The Implications of E-Logistics on Business Performance in Supply Chain Management

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Abstract – Through a literature review of academic logistics publications and practitioner journals, this research examines the effect of Information Technology (IT) on logistics. The literature review and the examples from experience show that third-party logistic providers have a higher chance to exploit IT since they must share integrated IT systems with their clients. We analyze how e-logistics' relative effectiveness affects the bottom lines of various companies scattered along the distribution chain. Competition nowadays is between supply chains, and there is a growing need for firms to improve operations that affect their performance. The research studied the supply chains of major corporations, to draw substantial results. This resulted in analyzing a whole supply chain from the manufacturer all the way to the consumer. E-logistics tools used in the execution and planning of supply chains were identified, and their effectiveness was evaluated. A questionnaire was sent out to 475 people who were selected at random to be a good cross-section of the population. Descriptive statistics, correlation, and regression were utilized to analyze the data in this research. We make an effort to draw a picture of the tools' ability to improve the performance of specific businesses by tracing the connection between e-logistics setups and key performance characteristics. The results showed that e-logistics do affect the efficiency of businesses. In addition, the positive effects that IT has had on logistics are highlighted. It is explored where logistics is going in the future.

Keywords – E-Logistics, Supply Chain Management, Information Technology, Logistics Information System, Electronic Data Interchange.

I. INTRODUCTION

Ubiquity of Information Technology (IT) and internet technologies has boosted and tested logistics. To better control the flow of information, new technologies provide new tools. The use of IT as a productivity tool has the dual benefit of expanding potential and lowering expenses. It is generally agreed that companies can gain a competitive edge through the strategic use of Information Technology (IT) by cutting costs or setting themselves apart in some other way. Thanks to advancements in information technology, logistics are now used by many businesses as a strategic advantage. There are two main lines of inquiry that show the importance of information technology in the logistics process. For starters, there's the JIT logistics data stream.

With the advent of the Just-In-Time (JIT) approach to business, the value of Information Technology (IT) in logistics has increased. Companies' increasing reliance on JIT has increased logistics' significance as an established mechanism for on-time, damage-free deliveries with minimal lead times. When a company wants to gain an edge in the market, it often outsources tasks that aren't central to its core business. In a recent study, it was determined that 83% of Fortune 500 businesses had at least one agreement with a third-party logistics supplier. Third-party logistics providers have seen steady growth over the last several years. Only 38% of Fortune 500 respondents in a 1991 poll about the usage of third-party

logistics providers. Third-party logistics providers are increasingly looking to information technology to help them better serve their clientele.

In the military, logistics replaced transportation as the primary method of distributing weapons until a few decades ago. "The science of the movement of supplying and maintaining military forces in the field," "the management of materials flow through an organization, from raw materials flow through to finished goods," and "the detailed planning and organization of any large complex operation" are all definitions of logistics that have been in use for quite some time. The first term tells us about the historical military context, whereas the subsequent two discuss the contemporary commercial context. The second definition, which we will use to describe supply chain management, is directly applicable to the topic at hand.

In the '60s and '70s, the idea of logistics first appeared. This idea was used to better service the consumer at a lower cost. Distinctive method through which the firm connects with and helps its clients. Therefore, logistics has to be seen as more than just a method and placed within the larger context of the organization. The expensive price of logistical ideas caused them to fall out of favor. The logistics industry in the United States is responsible for an estimated 15% of GDP. Profitability was not a factor, capital wasn't being invested, processing and shipping took too long, and logistics wasn't making an effort to compete on a global scale. Thus, Supply Chain Management (SCM) is a replacement for logistics. Supply chain management is a popular topic in business. The name's etymological roots are up for grabs.

People were claiming that it was the realization of the promised activity unification. The ideas of logistics pioneers were championed by today's supply chain advocates. Businesses frequently undervalue their customers in pursuit of opportunities to boost their own performance. For an organization to be seen as having e-logistics capabilities, they must be able to provide for their customers' already-existing wants at the lowest feasible price. It's called "customer-driven" since the company is focused on its customers. E-logistics and e-collaboration represent a large issue area that may be evaluated to see how they contribute to the decline in supply chain and customer service operational competence and the consequent loss of business possibilities. To learn how a company may leverage these advantages to its advantage in the marketplace and so keep its supply chain running smoothly and provide value for its customers. Many scholars have proposed different methods for adapting and implementing E-logistics. Researchers who want to bridge the gap between adaptation and effective implementation should consider multiple theoretical perspectives.

Researchers employ a configuration method to identify weak spots that prevent E-Logistics from being fully implemented. As a consequence, the pace of adaptation increases and new algorithms and decision-support systems are developed to boost E-Logistics' efficiency. Improvements in client package, setup competence, data excellence, delivery of shared planning and execution, and improved receptiveness are only few of the well-recognized advantages presentation that may result from smart usage of ICT. Understanding how e-logistics affects supply chain performance is the focus of this study. Therefore, the analysis suggests:

H1**:** The employment of e-logistics has had a significant impact on the company’s productivity.

However, research on how e-logistics affects supply chain effectiveness in developing economies like Pakistan is scant. The connection between these factors is analyzed in the present research. The research presented here is novel because it broadens the scope of the ongoing effort to develop an e-logistics-appropriate supply chain model. Despite the fact that studies have been conducted, much more information is needed to fully understand the Pakistani situation. Considering all of these factors together may be a huge assistance to companies when deciding on a course of action. This research paper intends to investigate the effects that IT has had on the logistics industry. To that purpose, we combed through the scholarly and professional logistic journals of note. This paper has been organized as follows: Section II presents a critical survey of previous literatures majorly focusing on IT enablers of logistics. Section III presents a methodology for the research while Section IV focusses on presenting a theoretical framework employed in the research. Section V presents and discusses the results obtained in this research. Lastly, Section VI concludes and presents future research directions for this research.

II. LITERATURE REVIEW

Using a system of categorization to examine how information technology has modified logistics is a practical and fruitful approach to the study of this topic. Information systems used in logistics have been studied and classified in many ways in the past. Facility placement, transportation, inventory management, information and material flow are the five main components of a logistics system. Facility placement, stock management, order taking, transportation scheduling, warehouse design, freight rate recovery, and goods and order fulfillment are just some of the logistical issues that this program helps with. The facility's location, inventory management, logistics, production planning, and overall physical distribution were also highlighted as key factors in a separate study. Each category was handled as an independent entity rather than as part of a larger system.

In response to this deficiency, Aren and Nayman Hamamci [1] suggested a new categorization that includes transaction systems, short-term planning and inventory refilling structures, flow systems design, and network design and planning structures. Adding to Bowersox's original concept, Liu, Qian, and an [2] classified logistics into two broad groups. In the first group, customers' actual physical labor is included to meet their diverse service needs. Logistics, shipping, and customer support will all be a part of this. The second kind includes any information or monetary transaction flows that follow or set off the physical ones. **Fig 1** depicts a classification of logistics functions, which is useful for understanding the physical and

data movements within this field. Numerous logistics technologies are used to manage, coordinate, and facilitate the flow of information between logistical functions, as seen in the image.

IT Enablers in Logistics

Many authors in the field of logistics have argued that adopting cutting-edge IT may help businesses become more competitive. There have been little empirical research examining the correlation between logistics information skills and actual logistical proficiency. Our framework in the field of information systems categorizes logistics decisions as sequential, with levels ranging from the tactical to the strategic. It has been established that logistics information systems serve as strategic and operational enablers throughout the firm's supply chain. IT's role in the supply chain has evolved from facilitating implementation and material-handling activities to facilitating decision-making and work scheduling.

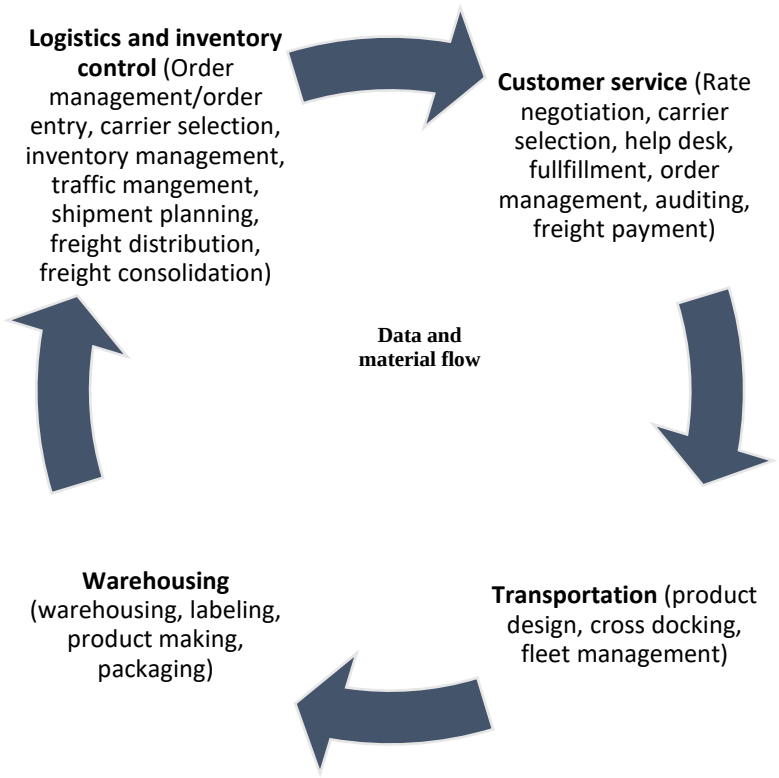

Fig 1. Classification Of Logistics Functionalities

Logistics Information System

A Logistics Information System (LIS) is the software side of logistics IT. A high level of client service may be achieved via the use of an effective LIS since it ensures that data is shared effectively between the inventory warehouse and the transportation department. The LIS of a company and its partners impacts their capacity to optimize logistics costs and service levels. Companies might get an edge over rivals in the market if they provide superior logistics services at a cheaper price. The literature recognizes two distinct types of LIS. Transactional applications including order input, order processing, storage, and shipping are within the purview of Logistics Operating Systems (LOS). Forecasting, inventory control, and transportation needs planning are all examples of applications that may be coordinated with the help of Logistics Planning Systems (LPS).

Electronic Data Interchange (EDI)

By simplifying and speeding up the transfer of data between businesses, Electronic Data Interchange (EDI) has become an indispensable tool in the logistics industry. For this technology to work, businesses need to adhere to universally accepted norms for data transfer and formatting. Companies have used these kinds of technology to manage their value chain operations, including logistics. A pioneering use of electronic data interchange (EDI) was the transmission of vehicle position information from railroads to its customers. Bills of lading, invoices, advance shipment notifications, and change orders are all other forms of logistics data that may be sent using EDI. Having up-to-date and correct information at your disposal is crucial when making choices about intricate logistical issues. Japan Airlines (JAL) used EDI to better manage the logistics of its extensive value chain, which includes the purchase and JIT delivery of jet fuel, aircraft components for repairs and maintenance, food catering, and other needs of its customers. Companies who use EDI are said to have an edge in the marketplace. Companies who adopted EDI had an easier time providing a wider range of services to their clientele.

Bar Coding

One of the most important applications of information technology to date, bar codes have had a huge effect on the industry. Some of the first uses of bar codes date back to the 1960s, when they were installed on train carriages. It's widespread now in any system that requires a tagging or identification system. There are several symbologies (types) of bar codes that may be used for various tasks. As a practical matter, most companies would rather adopt industry standards than proprietary requirements for the bar codes on their goods. Bar codes provide a solid basis for incorporating the company logistics and supply chain because they adhere to industry standards, reducing the complications intrinsic in the application of multiple standards.

Real-Time Communications Capability

For continuous information transfer, real-time communications, a feature of logistics IT, is crucial. One of logistics IT's key functions is to replace stock with data, as pointed out by Oláh, Karmazin, Pető, and Popp [3]. Goods can be tracked in real time with the help of logistic data systems of business contacts if they are equipped with real-time communication capabilities. Partners in business need a unified messaging platform for sharing and transforming data in a variety of organizational contexts and formats. In a dynamic scheduling and routing system, real-time communication channels also allow for schedule changes to be made while vehicles are already on the road. The ability of these systems to communicate in real time is what has made last-minute adjustments to routing and scheduling possible, as well as constant tracking.

Radio Frequency Identification (RFID)

Radio Frequency Identification (RFID) allows for the automated identification, tracking, and localization of objects. Predictions for the future usage of RFID systems are optimistic. RFID is a fast-expanding industry for automated data collection and identification, and it is often considered the natural progression of bar codes. Although RFID has been around since the 1940s, it is just now beginning to have a major influence on the supply chain. Large merchants like Wal-Mart and Target, as well as the United States Department of Defense, have issued rules for its suppliers to use RFID technology over the next several years. Walmart, Coke, P&G, and Gillette are just a few of the well-known brands testing out RFID for use in their supply chain management. RFID's supply-chain applications have been the primary reason for the technology's growth, but businesses are beginning to explore the technology's potential in other areas. Theft monitoring, asset management, mobile payments, real-time inventory monitoring, and baggage monitoring are some more uses.

RFID is being used by a wide range of manufacturers, including Dell, Seagate, Boeing, and Ford, to keep tabs on their work in progress. An RFID system consists of RFID transponders or tags, RFID antennas for interrogating and communicating with the tags, and RFID software for managing the system's data and interfacing with enterprise applications. RFID has a lot of untapped potential to boost supply chain efficiency and cut down on waste. A good use case for RFID tags would be the automatic updating of inventory systems as goods are unloaded from trucks and brought into stores. These are some of RFID's many benefits over barcodes: RFID tags can read from farther away, store more information, don't need a clear line of sight between the reader and the tag, and can collect data from a plethora of different sources all at once. Before RFID can be implemented everywhere, some technical and commercial hurdles must be cleared. Interference, security, and accuracy are all examples of technical issues, while cost and a lack of standards are examples of business issues. Managers also face the difficulty of making a business case for RFID adoption to upper management. There are a number of challenges facing early adopters of these technologies, including consumer backlash over perceived invasions of privacy, the inherent unpredictability of the RFID system, and concerns over the system's impact on health, safety, and IT infrastructure.

III. METHODOLOGY

Research Design

We repurposed a survey questionnaire to collect numerical data, and the questionnaire included questions about respondents' gender, age, occupation, and level of education. The second section addresses the central question of the investigation. A survey with Likert-scale questions was used to compile the data. The data collected via this questionnaire was processed using a number of methods, and the resulting information was analyzed.

Participants

The current research has a sample size of 475 participants. For the purpose of keeping up with the technological pack, this research focused on businesses who have implemented computerized systems for managing their supply chains. Thus, it served as a means of information gathering.

Data Collection Tool

Cristina Giménez Thomsen [4] presents the source for the e-logistics survey items. On the other hand, the survey looking at how company performance. Cronbach's alpha is used to determine the dependability (internal consistency) of a measuring tool. Composite dependability is used as an additional check of the internal consistency. Composite reliability on the latent constructs is used to calculate the average variance. Discriminant validity is also used to assess whether or not there is a significant difference between latent variables. Descriptive analysis helped us evaluate the quality of the data we had collected. The study's hypotheses were tested using structural equation modelling.

IV. THEORETICAL FRAMEWORK

System Approach Theory the System Approach to Information Theory describes how companies can coordinate their internal logistics by sharing data. The shipping company can now log in to their respective websites and track the precise location of the vessel at any given time. Freight tracking aboard ship has been automated, allowing carriers to better inform customers of when to expect shipments and prepare for their receipt and storage. The customers are also kept up-to-date with this information. If logistics delays can be avoided and lead times are kept, business efficiency for the customer will increase.

Ali et al. [5] state that analyzing the impact that IT has on logistics performance is one way to gauge the success of IT adoption in managing data flow, facilitating operations and maintenance systems and systems, and supporting decision making. According to Marchuk, Savchenko, and Harmash [6], the capability of the logistics system to integrate its supply chain is directly affected by its IT and information-sharing capabilities. Through instantaneous information sharing and electronic links, supply chain partners are better able to communicate with one another and work together. Managers are better able to make informed decisions thanks to the data made available to them as a result of IT integration, which in turn boosts the productivity and efficiency of day-to-day logistics operations. Ultimately, IT with computational intelligence aids the company in analyzing business data to better support and improve decision-making by management across a wide variety of business operations.

Adaptive Theory

The use of technology to organize, integrate, digitalize, and coordinate corporate systems, operations, and processes is central to the tenets of the Adaptive Theory in Distribution Network, which in turn increases the reliability of the system. Automating logistics processes allows for better shipment tracking. The delivery vans are equipped with tracking devices, so that their whereabouts can be monitored from the comfort of an office. Easy fleet management, including vehicle location and velocity, is the result. For example, Wang et al. [7] define Adaptive theory in his dissertation as follows: The network, method, and stakeholders are what give transportation and logistics systems their complexity. With the help of this theory, control mechanisms can be put in place, ensuring that the information system always delivers in terms of price, quality of service, and impact on the environment.

A fleet management solution, according to Zhang, Wang, Li, and Xu's [8] definition, is a system installed in vehicles that uses satellite positioning, data logging, and communication with a back-office program. Many decades ago, in the 1980s, on-board vehicle computers were linked to various satellite and geostationary wireless networks, marking the beginning of modern fleet tracking systems and solutions. These days, mobile networks can provide nearly anywhere in the world with affordable and speedy internet access. In terms of both quality and usability, the mobile computing technology we have today is unparalleled. All of these parts working together allow for the rollout of fleet management, transportation management, driver management, and mobile workforce management applications that connect vehicles to back-end enterprise information technology networks. Fleet management, as defined by Manchella, Haliem, Aggarwal, and Bhargava [9], involves the administration of fleets of light vehicles used for transporting people and light freight; this might include motorcycles and other equipment like generators and inventory handling systems.

Control Theory

All the files are managed and stored electronically, with control based on the principles of automation's theory of control. The shortage of human workers is mitigated by the availability of an extensive automated inventory system, which also helps to improve the quality of picking procedures. Warehouse stock can be quickly located thanks to the automation of inventory processes. The stock clerk can then use this information to determine when to reorder supplies and keep inventory at the right level. When a company experiences a stock out, it has exhausted its available supply of goods and is unable to fulfill any orders. Weak demand and supply forecasting, sloppy purchasing, and other factors could all be to blame. Store automation ensures orders are placed promptly by triggering systems upon shipment and automatically updating records.

Wire-connected mobile terminals can be used by inventory management software to keep track of stock levels and transaction histories in real time, providing more accurate and timely data while also improving inventory record security. The data is sent from a local area network over wires to a mobile network. Not too long ago, businesses saw logistics as nothing more than an expense, but recently, logistics has gained attention as a potential source of competitive edge. It has been acknowledged that logistics costs cannot be managed unless activities and processes are also managed.

V. RESULTS AND DISCUSSION

The first step is to assess the theoretical model's consistency (reliability). Every latent variable was checked for internal consistency using Cronbach's alpha and composite reliability. Cronbach's alpha is the primary standard for evaluating reliability within a study. Using the correlation between the variables, Cronbach's alpha can be used to determine the level of trustworthiness in a survey. All latent variables showed values for Cronbach's alpha between 0.599 and 0.811. Given that every latent variable's Cronbach's alpha is greater than 0.50. Convergent validity is the second criterion for assessing the internal consistency of all latent variables.

By analyzing the outer loading, Composite Reliability (CR) ensures that all variables are internally consistent. The precision of the constructs is specified in CR, while the proportion of the total variance attributable to the construct that can be attributed to measurement error is estimated in AVE. Composite reliability is calculated for each construct and compared

to the threshold value of 0.6. Composite reliability for the latent variable was found to be higher than the recommended value of 0.70, indicating high internal consistency. Each of the variables that make up a whole can be evaluated for their correlation with one another using convergent validity. The AVE is used to test for composite reliability of latent variables.

All latent variables were found to have convergent validity values between 0.551 and 0.911. Examining AVE as a measure of convergent validity with a threshold of.50. As AVE is greater than 0.50, it is clear that all latent variables are highly convergent. Each latent variable's convergent validity results are shown in **Table 1**. Discriminant validity is the criterion by which latent variables are differentiated from one another. Discriminant validity was calculated by comparing the AVE values to the square of the correlation between the variables. Ayieko [10] states that discriminant validity can be demonstrated if the AVE is larger than the correlation coefficient between the factors.

Table 1. Cronbach's Alpha's Results, Convergent Validity and Composite Reliability

Contructs	Convergent validity	Cronbach's Alpha	Constructs reliability
Company performance	0.511	0.599	0.776
E-logistics	0.911	0.811	0.904

The average retrieved variability of the square root was found to be larger than interactions between latent constructs. The tabulated results are shown below in **Table 2**.

Table 2. The Discriminant Validity Based on The Fornell Larcker Criteria

Contructs	Company's performance	E-logistics
Company performance	0.736	-0.442
E-logistics	0.808	-

Descriptive Statistics

E-logistics

Table 3 below displays data from 475 participants on the e-logistics variable used in this study. When considering a transition to e-logistics, this can prompt a range of responses from potential backers. To begin with the e-logistics variable, we see that 32 people are agnostic, 49 people strongly disagree with the first item, 172 people disagree, 145 people agree, and 77 people agree very strongly. The second e-logistics question received 475 responses, of which 9 were strongly opposed, 65 were opposed, 215 were in agreement, 77 were in strong agreement, and 109 were unsure. Three hundred and seventy-five people were polled about e-logistics' third question; 18 strongly disagreed, 95 disagreed, 203 agreed, 108 agreed strongly, and 51 were unsure. Out of 475 respondents, 22 strongly disagreed with the fourth e-logistics item, while 156 were opposed, 171 were in favor, 83 were enthusiastic, and 43 were ambivalent. The average values of the four anger items, which reflect the respondents' positive and negative reactions, are also displayed in the table above. The average ratings on five anger indicators range from 3.06 to 3.60 to 3.61 to 3.29. Average value for e-logistics is all on the upswing, a sign that investors are responding favorably to the sector.

Table 3. Descriptive Statistics and Distribution of E-Logistics

Elements	Element-wise descriptive and frequency statistics (N = 475)						
	S.D	D	N	A	S.A	Average	Standard Deviation
e-logistics 1	49.1	172.0	32.0	145.0	77.0	3.1	1.32
e-logistics 2	9.0	65.0	109.0	215.0	77.0	3.6	0.98
e-logistics 3	18.0	95.0	51.0	203.0	108.0	3.6	1.15
e-logistics 4	22.0	156.0	43.0	171.9	83.0	3.3	1.22
Note: **Standard deviation disapprove, D is disapproved, N is neutral, A is approve, and SA is strongly approve**							

Firm Performance

Table 4 displays 475 responses from the respondents regarding 5 components of the current study's variable, firm performance. In regards to the first component of the variable firm performance, 55 people strongly disagree, 155 people disagree, 133 people agree, 46 people agree strongly, and 86 people are unsure. Out of 475 respondents, 71 had a strong disapproval of the second measure of company performance, while 96 had a disapproval, 206 had an approval, 58 had a strong approval, and 44 were unsure. Out of 475 replies on the third question about company performance, 72 people severely disagree, 104 people disagree, 171 people agree, 54 people agree strongly, and 74 people were unsure. Out of 475 responses, 48 were strong disagreements on the fourth item regarding firm performance, while 81 were disagreements, 150 were agreements, 67 were strong agreements, and 129 were neutral. Out of a total of 475 responses, 43 were very dissatisfied, 76 were not satisfied, 176 were satisfied, 54 were extremely satisfied, and 126 were not sure. The average scores of the five items measuring respondents' opinions on the company's performance are also included in the table above. In terms of the

firm's overall performance, the average scores are as follows: 2.9, 3.2, 3.1, 3.2, and 3.3. When looking at firm performance, all of the mean values are on the plus side, showing that investors have a favorable opinion of the company.

Table 4. Descriptive Statistics and Distribution Based on The Performance of the Firm

Elements	**Element-wise descriptive and frequency statistics (N = 475)**						
	S.D	D	N	A	S.A	Average	Standard Deviation
Firm_performance 1	55.0	155.0	86.0	133.0	46.0	2.9	1.21
Firm_performance 2	71.0	96.0	44.0	206.0	58.0	3.2	1.30
Firm_performance 3	72.0	104.0	74.0	171.0	54.0	3.1	1.28
Firm_performance 4	48.0	81.0	129.0	150	67.0	3.2	1.19
Firm_performance 5	43.0	76.0	126.0	176.0	54.0	3.3	1.13
Note: **Standard deviation disapprove, D is disapproved, N is neutral, A is approve, and SA is strongly approve**							

Correlation Analysis

The correlation matrix is shown in **Table 5** below. The correlation matrix reveals a modest relationship between e-logistics and business success.

Table 5. Correlation Analysis

Contructs	**Investment decisions**	**PVCSR**
Company performance	1	0.395
E-logistics	-	1

In this study, "E-log" refers to the exogenous as well as latent variable of interest, which is the field of electronic logistics. There are 4 indicators for e-logistics. These four factors were used to evaluate the state of e-logistics. Electronic logistics, abbreviated e-log, is based on the average of four separate measures. Firm performance served as the dependent parameter (endogenous variable) in this analysis. The term "Firm-Performance" is used throughout this study to refer to the firm's effectiveness as the dependent variable. Five factors were used to assess the company's success. Two items were left out because their outer loadings were below 0.5. As a result, three metrics were used to assess the company's effectiveness. These three metrics were used in the analysis of the firm's performance. The term "Firm-Performance" is used to describe the overall average of a company's performance on three different metrics.

Path Coefficient of Structural Model

E-logistics, or "H1," significantly affects business outcomes. To that end, the hypothesis postulates that e-logistics has a major bearing on business success. Because the 0.002 P Value is below the critical value of p 0.05, the hypothesis is confirmed. The results in **Table 6** revealed that e-logistics has a substantial effect on company performance (= -0.157).

Table 6. Tests of the Structural Framework

Contructs	**Performance**	**T scores**	**Estimates**
Company performance_ E-logistics	0.002	2.87	-0.16*
Note: *Signifies importance at 1% while *** signifies importance at 5%**			

As this research has shown, there is a link between e-logistics and business success. Based on the data presented above, we infer that the IV increases with the DV. Based on what has been said so far, it seems reasonable to accept H1 and conclude that e-logistics has a positive impact on productivity. With the use of e- logistics, businesses were able to maximize supply chain efficiency. A company's competitiveness and the quality of its services both benefit from well-functioning logistics systems. E-transportation has been shown to improve supply chain management effectiveness in previous studies. When trying to gain an edge in a cutthroat market, companies are increasingly focusing their efforts on fostering strong bonds with their current clientele and expanding their base of satisfied consumers via the delivery of high-quality goods and services. This demonstrates that customer satisfaction has a direct effect on supply chain management effectiveness since pleased customers are more likely to provide good feedback. Indeed, the findings of prior studies lend credence to our working theory. The capacity to adapt to changing market circumstances via the development of new, successful strategies is crucial to any company's long-term survival.

Implication of Ecommerce on Logistics

The logistics industry is facing both advantages and disadvantages due to the expansion of online shopping. Companies are beginning to accept orders from customers in other countries as the popularity of online shopping rises worldwide. In many cases, customers are located in areas that are not served by the firms' current distribution networks. When this happens, businesses have little choice but to outsource their physical supply chain operations to a third-party logistics provider.

Because of the importance of information exchange, businesses must have e-commerce application skills. E-logistics refers to the collection of tools and methods used to manage logistics data. In the logistics industry, additional markup language is a crucial web technology that enables the sharing of data across multiple systems and business partners (XML). To better manage its information flows for logistics operations like RFQ, shipping, and tracking, UPS, for one, is using the capabilities of web services.

Changing Trends in Logistics

Third-Party Logistics (3PL) provider selection is an area where consultants are starting to play a more prominent role in assisting shippers. Freight providers use consultants to assist with supply chain strategy alignment. The term "4PL" was created to describe the increasingly important role consultants play in the management of supply chain resources, technology, and procedures. Whether or whether shippers will hand over complete control of logistics to the consultants is an open question. It's possible that shippers may form partnerships with third-party logistics operators rather than outsourcing logistics management to consultancies. Information technology and the ability to manage the supply chain efficiently are the two most important factors in enabling cooperation between shipper companies and third-party logistics providers. This means that in order to reap the full advantages of using third party logistics, businesses must also implement the necessary logistic technology.

Supply Chain Drivers (Enablers)

Based on a review of the literature, Oyedijo et al. [11] propose a set of drivers—facilities, mobility, inventories, procurement, price, and information—that must be altered by businesses in order to maintain an efficient supply chain see **Fig 2**.

Facilities

According to Lerman et al. [12], modern business settings need a supply chain configuration that includes facilities. Facilities may refer to either a manufacturing plant or a storage facility where goods are made or stored. According to the research of Prananingtyas and Zulaekhah [13], the term "facilities" is used to describe the storage areas and locations of raw materials, WIP, and completed items in a supply chain. This supply chain facilitator is important regardless of the scale of the warehouses or manufacturing facilities and should be taken into account in all cases. The demand market is where a company's facilities should be placed if the company wants to be as responsive as possible to consumer needs, whereas the supply market is where a company's facilities should be located if the company uses heavy raw resources as inputs. The expenses associated with transporting raw materials across large distances to a processing facility are thereby avoided.

It has long been recognized the significance of "network facilities," which include factories, distribution centers, ports, and so on, as well as the transportation services that connect them. Keep in mind that there is a spectrum between reactivity and cost efficiency in supply chain and logistics management, and be ready to handle questions like whether to have a central distribution facility or to decentralize warehouse facilities. When shipping products internationally, it's necessary to have a place to put them, therefore businesses have to decide whether to build or acquire storage facilities. Partners in the supply chain will need to decide whether to buy or lease infrastructure in various locations across the world. Developing more responsive and efficient infrastructure in the supply chain increases responsiveness and the speed at which items may be accessed.

Inventory

The term "inventory" is used to refer to a company's stock of products and supplies. Supply chains, like any other business, live and die by their inventory. Given that inventory exists due to a disconnect between demand and supply it follows that some strategy must be developed in order to realize the goals of the business. Policies can consist of things like stockpile sizes, push versus pull demand tactics, and other forms of stock management. While having more stock on hand improves a company's ability to meet customer demand, it also increases the money it must spend keeping that stock. However, a reduction in stock levels reduces the company's ability to respond quickly to customers' needs. The effectiveness of the supply chain as a whole can be severely damaged by a sudden shift in inventory policy. Many companies' inventory holding policies have been disrupted by the current supernatural event of Covid-19.

It has been proposed by Zelewski and Peters [14] that a supply chain's distribution networks are more easily defined when choices regarding what inventory to store, where to maintain the inventory, and how much to retain are made with this information in mind. A strong network of supply-chain inventory management partners boosts operational effectiveness and efficiency. Once again, Sivakumar, Ganesh, Punnniyamoorthy, and Koh [15] stress that companies use specialists to generate appropriate inventory levels and guarantee efficient and successful relationships across the supply chain to decrease stockpiles. Depending on the circumstances, businesses may use inventory management systems like Vendor Managed Inventory (VMI), Just-In-Time production (JIT), or lean production. Consigning and delaying inventory are two options that Sudirga, Nurprihatin, Rembulan, and Yuniarto [16] recommend for agile manufacturing.

Transportation

A crucial part of any functional supply chain is the means by which goods and materials are transported from one point to another. However, Popkowski and Bugayko [17] stress that transportation is the primary challenge in SCM. We agree with

this line of thinking because most transportation services are contracted with external parties over which supply chain partners have no say, other than through penalties for things like transit losses. Transportation is the physical link between the various participants in the supply chain, their respective facilities, and the end user. Effectiveness in both areas depends on the partners in the supply chain being able to make educated choices about the transportation services they use. Transport services in the supply chain help get finished goods to retailers and consumers. Its primary function is to enhance location utility, timing utility, and quantity utility. Before loading can begin, all parties along the supply chain must reach consensus on the mode to be used, the route to be taken, and the loading instructions. Rogers [18] proposes a paradigm consisting of "smart infrastructure," "smart vehicles," and "smart freight," or the cargo itself, all of which indicate that there must be architecture to go along with a chosen method of transport, in addition to correct packaging of the logistics itself. Firms and their supply-chain partners or direct customers may need to work together on route planning in certain circumstances. An effective transportation network is crucial for the timely delivery of cargo.

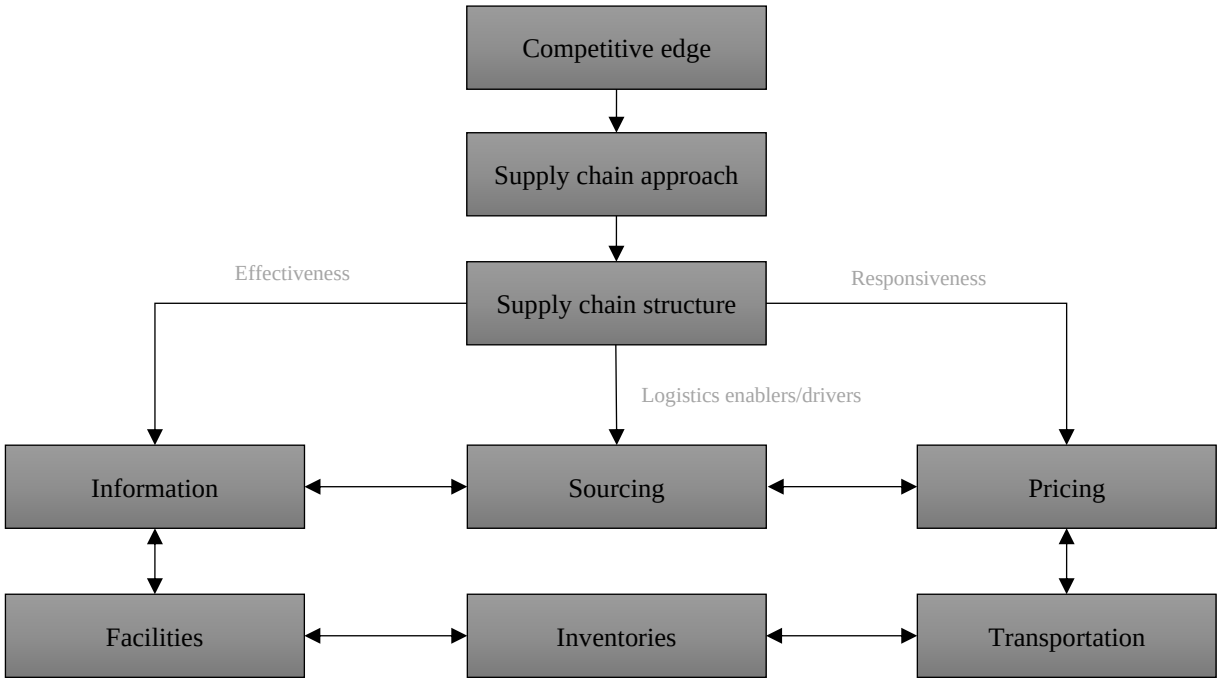

Fig 2. A Framework Depicting The Supply Chain Enablers

Information

Information is often regarded as the single most important factor shaping the supply chain. It facilitates communication between all parties in the supply chain, reducing friction and making cooperation less intimidating. According to Agarwal [19], data has been dubbed "the lifeblood of business" because of how crucial it is to making good decisions and acting in the right way. The same authors also stress the need of having easily accessible information inside the supply chain in order to facilitate the planning, implementation, and assessment of critical procedures. It is critical to understand not just price and procurement, but also the other facilitators of the supply chain, such as storage, transportation, and inventories.

Suppliers, manufacturers, intermediates, logistics service providers, and end-users may all benefit from the fast, low-cost exchange of information made possible by today's supply chain information systems. Since the lack of control over the dissemination of information inside these supply chains may have disastrous consequences, it is crucial that this aspect of the networks be managed carefully. For instance, a supply chain with unethical participants might lead to the disclosure of confidential information to other parties. Information management's contribution to supply chain efficiency was the subject of Yin and Tian [20] research. Whether a company's focus is on production or service, bringing attention to such data is crucial. The execution of formal confidentiality contracts between and among supply chain participants may be a component of information management techniques. Putting the data provided throughout the supply chain into relevant categories is a great assist in getting the data to the right people at the right time. For example, Chi [21] proposes many types of data, including processing transactions, logistics planning and cooperation, order fulfillment, and delivery coordinating. Next, we'll concentrate on properly routing data for the supply chain's future success. When everyone in the supply chain has access to the same information, risks are mitigated but not eliminated. Equitable sharing of information among supply chain parties improves supply chain performance. For instance, Joireman, Liu, and Kareklas [22] proposes that continual communication with the firm's consumers is vital to maximizing green initiative objectives inside the supply chain. According to the theory put forward by Connor [23], a company's ability to survive depends on its ability to capture demand and supply trends using internally designed business information systems.

Sourcing/Procurement

According to Di Noi et al. [24], determining which sourcing method will provide the greatest results requires first learning as much as possible about the raw materials or final goods themselves, as well as the company and nation from which they will be procured. Supply chains need decisions to be made about how to carry out certain functions. The supply or procurement division is responsible for this complex operation, since it should only be carried out by duly authorized employees. Adopting green sourcing choices with critical suppliers is one way to ensure long-term viability of a company's operations.

Pricing

It has been hypothesized by AlinezhadSarokolaee, Taghizadeh, and Ebrati [25] that fluctuations in pricing and customer expectations are related to one another throughout the supply chain. For instance, the current economic circumstances brought on by CoViD-19 have caused price fluctuations in goods, transportation services, facilities, and data management devices like laptops, which have increased in demand due to the popularity of online education. According to Damoah [26], the success of the supply chain might depend on how well the pricing strategy accommodates both suppliers and customers. According to the research presented by Peter and Zeisel [27], organizations may reap supply chain advantages by using pricing methods such regional pricing, mark-up, and bundling techniques. If customers believe the prices charged by a business are unreasonable, they may go elsewhere for similar products or services, or even switch to other businesses. The supplier, on the other hand, might go out of business if the low costs agreed upon by the purchasing company aren't reviewed on a regular basis. Nonetheless, this will undoubtedly have far-reaching consequences for the supply chain as a whole. In light of these drivers and enablers, it is critical to pinpoint supply chain management procedures that must be taken into account to guarantee efficient supply chain operations. Collaboration, supply- and demand- planning, inventory, manufacturing and distribution, and logistics are all on the list of supply-chain management techniques listed by Choe [28].

VI. CONCLUSION AND FUTURE RESEARCH DIRECTIONS

This paper set out to investigate how various IT initiatives have altered traditional logistics processes. The journals used by both academics and professionals in the field were analyzed. Information technology applications in logistics support were discussed. It's clear that professors and grad students know about Radio Frequency Identification (RFID) and other cutting-edge technologies. Companies can gain a competitive edge from technological advancements. Incorporating cutting-edge technologies presents both threats and rewards for established businesses. In order to evaluate the potential advantages of new technologies, a thorough business case and return on investment calculation must be performed. The findings suggest that businesses that implement e-organization and e-logistics tools will gain the most from their trading experiences and increase their bottom line as a result. Other facets of e-coordination, like inventory control and e-transportation, can be studied in the future. With the way that business is shifting toward e-commerce, companies of all sizes have access to previously untapped markets. If used wisely, an organization's information resources can become a source of competitive edge and ultimately lead to remarkable achievements. Companies should adopt the most effective methods for utilizing logistical information technologies in order to achieve their long-term objectives. Companies may need to re-evaluate their logistics plans in light of impending changes in the field of logistics. The use of third-party logistics providers is becoming increasingly popular as businesses look to devote more resources to their core activities. To make full use of the services provided by third-party operators, however, businesses must first implement logistics information systems that are compatible with those of the service providers. Logistics researchers may choose from a wide variety of possible topics and approaches. Companies should carefully weigh the benefits and drawbacks of using new logistic information and communication technologies like RFID before actually doing so. To what extent might you anticipate advantages? How much money have you made back? Various econometric models may be developed by academics to foretell the results of implementing logistics technology. Advantageous possibilities for implementing new technology may be evaluated using modeling methods. In order to simplify logistics for online transactions, businesses need to adopt better coordination strategies. E-logistics is a growing industry, and collaborative technology that enable it will improve future logistics significantly. An exciting area of study with relevance to online logistics technology is multi-agent systems (MAS). Comparison of offers from various third-party logistics providers may be made with the use of intelligent software agents. In order to facilitate international online trade, businesses must have access to a variety of global logistics services. Technology is the most effective means of bridging the world's disparate regions. In terms of logistics monitoring and coordination, which channels of communication and technology would be most useful to the company? There has to be more hard data to prove that logistics IT improves business performance. Researches might use many theoretical frameworks to investigate the intricate connections between logistics technology and efficiency. When assessing the efficiency gains from implementing a logistics information system, it is possible to apply the lens of organizational learning.

Data Availability

No data was used to support this study.

Conflicts of Interests

The author(s) declare(s) that they have no conflicts of interest.

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