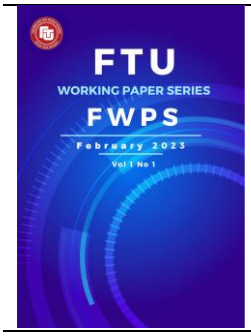

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CHUYỂN ĐỔI SỐ TRONG LOGISTICS TẠI VIỆT NAM

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Tóm tắt

Là ngành dịch vụ thiết yếu, có giá trị gia tăng cao, Logistics là nền tảng cho thương mại hàng hóa, góp phần nâng cao năng lực cạnh tranh của nền kinh tế. Với sự bùng nổ của công nghệ số và Cách mạng công nghiệp 4.0, ngành logistics có nhiều cơ hội bứt phá để đóng góp nhiều hơn cho nền kinh tế nếu sớm đẩy mạnh chuyển đổi số. Nghiên cứu của chúng tôi trình bày về chuyển đổi số tại các doanh nghiệp logistics Việt Nam hiện nay và xác định những khó khăn, thách thức trong chuyển đổi số. Qua đó, đề xuất một số giải pháp nhằm tạo điều kiện chuyển đổi số trong các doanh nghiệp logistics.

Từ khoá: Logistics, chuyển đổi số, ngành logistics, Việt Nam

DIGITAL TRANSFORMATION IN LOGISTICS IN VIETNAM

Abstract

As an essential service industry with high added value, Logistics is the foundation for goods trade, contributing to improving the economy's competitiveness. With the explosion of Digital technology and the Industrial Revolution 4.0, the logistics industry has many breakthrough opportunities to contribute more to the economy if it accelerates digital transformation soon. Our study presents the current digital transformation at Vietnamese logistics enterprises and identifies difficulties and challenges in digital transformation. Some solutions are also proposed to facilitate digital transformation in logistics enterprises.

Keywords: Logistics, Digital transformation, Logistics industry, Vietnam

Introduction

In Vietnam, with about 3,000 transport and logistics enterprises including road, railway, sea, inland waterway, airway, etc., the logistics industry has achieved positive results, contributing to creating favorable conditions for Vietnam. It is considered to have a lot of potential but the development is not really worthy, reflected in many different issues throughout the supply chain.

But in recent years, Vietnam's logistics industry has made great strides, especially in the context of the Industrial Revolution 4.0, the logistics ecosystem in Vietnam has become more and more modern with new applications of Digital transformation. Digital transformation has affirmed its essential role since the outbreak of the Covid-19 pandemic at the end of 2019. In the context of Covid-19, many traditional tools can no longer be applied, which makes the necessary Digital transformation stronger than ever.

Given the importance of such Digital transformation, many questions are raised, which are: (1) How has Vietnam in general and some specific enterprises in particular been applying Digital transformation in logistics? (2) What are the challenges in applying Digital transformation for Vietnamese Logistics Service Providers (LSPs)? (3) What measures do LSPs in Vietnam need to take to implement effective Digital transformation? The answers to the above questions will be clarified in our research paper.

1. Literature review

1.1. Research situation in the world

Logistics is a relatively new field that has received a lot of attention from researchers and businesses in recent years. The World Economic Forum (2016) provides data on the value of digital transformation for the logistics industry, and at the same time identifies 5 key topics of Digital transformation in logistics, from which to draw core questions to help leaders and policymakers make the right decisions. Sorkun (2019) studies the practical application of technologies in the digital transformation process in logistics activities, helping companies have a more comprehensive view of the digital transformation process and can choose to prioritize technologies that fit their resources. Junge et al (2019) and Cichosz et al (2020) both assessed the value of Digital transformation in terms of barriers as well as success factors of Digital transformation for the future development of logistics. In particular, Cichosz et al (2019) focused on LSP enterprises instead of the logistics industry panorama like Junge's research. Higgins et al (2021) identify trends and changes in logistics in the context of the Covid-19 pandemic and discover new challenges in the logistics industry.

In addition, several studies have also been conducted to focus on the indicators for measuring the success and outcomes of Digital transformation within enterprises. Matt et al (2015) gave evaluation criteria based on four elements of Digital transformation: use of technology, change in value creation, structural change, and financial aspects. Gurumurthy et al (2020) build criteria based on a digital maturity model expressed through five factors: cost effectiveness, revenue growth, product and service quality, customer satisfaction, and employee engagement. In the field of logistics, Junge et al (2019) focused on four factors to evaluate the effectiveness of digital transformation: technology, data-driven services, leadership, corporate structure, innovation, and creativity.

1.2. Research situation in Vietnam

In Vietnam, Nguyen et al (2016) analyzed the current situation of technology applications in Vietnamese LSP enterprises, thereby making recommendations for them to develop applications of technology in logistics. Dinh (2018) through analyzing the main trends of logistics 4.0 in the future has discovered opportunities and challenges in Vietnam's logistics industry. Since then, the author has made some suggestions to help Vietnamese logistics catch up with those trends. VCCI (2020) not only assesses the impact of the pandemic on businesses but also analyzes Digital

transformation application trends to help businesses overcome difficulties in the context of Covid-19. Cao (2020) focuses on assessing the current situation of Digital transformation and analyzing the opportunities and challenges posed by Digital transformation for the logistics service industry in Vietnam. Thereby, the study also proposes recommendations to accelerate the Digital transformation process in the Vietnamese logistics industry.

1.3. Research gaps

Most of the studies in the world are highly generalized, studying many aspects of Digital transformation in the entire logistics industry. Meanwhile, studies in Vietnam do not go into the development of theoretical frameworks but focus on the current situation of digital technology applications and the Digital transformation of Vietnam's logistics industry. However, the new studies only assess the general situation but do not have a specific analysis of the application of digital technology in the logistics service business activities of LSP enterprises in the context of the Covid-19 pandemic.

2. Methodology

The study was conducted using the qualitative research method. The research team gathered data from sources such as domestic and foreign articles, studies, research projects, doctoral theses, and official data portals from universities, governments, and organizations around the world. With qualitative research methods such as comparison, explanation, statistics, interpretation, analysis, induction, and synthesis... the topic gives an overview of the research problem and provides in-depth analysis of each aspect of the problem to arrive at the most accurate assessment. This contributes new insights into the field of research related to the topic.

3. Overview of Digital transformation in Logistics

3.1. The concept of Digital transformation

The process of integrating digital technology into all spheres of society is known as digital transformation. This form is regarded as the culmination of the "paperless" conversion procedure. The majority of societal processes and fields are impacted, affecting the market environment (Tran, 2022).

Unlike digitization, which is a term used to refer to the conversion of real values to digital values or the conversion of information from physical, analog to digital form (via binary numbers 0 and 1), Digital transformation is known as the process of applying digitization and process digitization to business. Businesses will apply digital technology to their operations, in order to effectively manage the organization and create new values. For example, converting from cash payment to online payment such as mobile money, e-wallet, QR code scanning...

3.2. The concept of Digital transformation in Logistics

For businesses providing logistics services, digital transformation is the process of applying technology to optimize the efficiency of production, supply and transportation of goods and services. Businesses in the logistics industry must digitize data, analyze it using AI and Big Data technologies, and create value by enhancing customer experience, lowering transportation costs, lowering risks, and raising income (FPT Digital, 2022).

Businesses utilize order management software, warehouse management software, and delivery management software (FMS), for instance (OMS and WMS). Due to the cost-

optimization of the logistics service operating process, order data management is more effective. Or other physical retailers have enhanced their logistics by utilizing digital technology to hasten delivery times. All of these indicate how crucial and essential it is to integrate contemporary technology into corporate processes and services.

Four primary components make up the features of digital transformation in logistics are technology, operation, organization, and expertise (Stuermer et al., 2011). Digital transformation is based on technology, but in order to apply it to logistics efficiently, we need approriate strategy for operations and organization, assisted by experts.

3.3. Benefits of Digital transformation for Logistics enterprises

3.3.1 Save cost and time

Automation simplifies the flow of goods generally, making sure that goods are trackable and arrive on schedule, and reducing other financial risks. When there is an issue that delays the transportation process, technology applications are employed to maximize resources and develop backup alternatives. For instance, tracking the path of items being carried is made possible for businesses through online mapping software. This tool examines outside variables to determine the shortest route for shipping items, allowing firms to reduce material prices and delivery delays. The palletizing robot will make sure that all the goods are prepared for shipping and packed. As a result, firms can reduce labor expenses by speeding up the loading and unloading of cargo.

3.3.2 Easily track shipment status

Technology applications help businesses track the actual transit time of goods. Parameters and data are displayed in detail from start to finish, businesses can fully anticipate the risks of order progress, if any. There are many ways for the Internet of things to improve delivery management. Connected Radio Frequency Identification (RFID) tags and Global Positioning System (GPS) sensors help business managers track shipments to the final stage. Additionally, thanks to connected sensors, logistics managers can receive real-time location data to ensure weather or other environmental changes won't jeopardize deliveries.

3.3.3 Increase transparency in shipping activities

One of the main objectives that business managers hope to accomplish through the integration of IoT solutions for logistics is the digital transformation of logistics that increases the transparency of the delivery process. Managers are more assured that all phases of the supply chain are successfully completed when they can trace things from the warehouse to the customer's door. Additionally, it increases consumer faith in the brand and helps support staff members save a ton of time. This is due to the fact that the customer is no longer asking customer support for delivery status updates.

3.3.4 Optimize internal operations

Enterprises are better able to lower logistics management faults the more open and transparent the departmental communication is. As a result, the supply chain's efficiency is increased by:

- Decide which technology will be most useful for the digital transformation of logistics: Businesses are required to conduct both impartial and targeted supplier research to avoid selection bias.

- Ensure that the newer solutions can be integrated with your current technologies: Enable real-time departmental collaboration and automated data exchange.

- Critical thinking: with much greater efficiency gained from automated procedures. When unexpected occurrences happen, employees can concentrate on strategy, clients, and developing solutions.

3.4. Application of technologies in digital transformation in Logistics enterprises

3.4.1 Electronic air waybill (e-AWB)

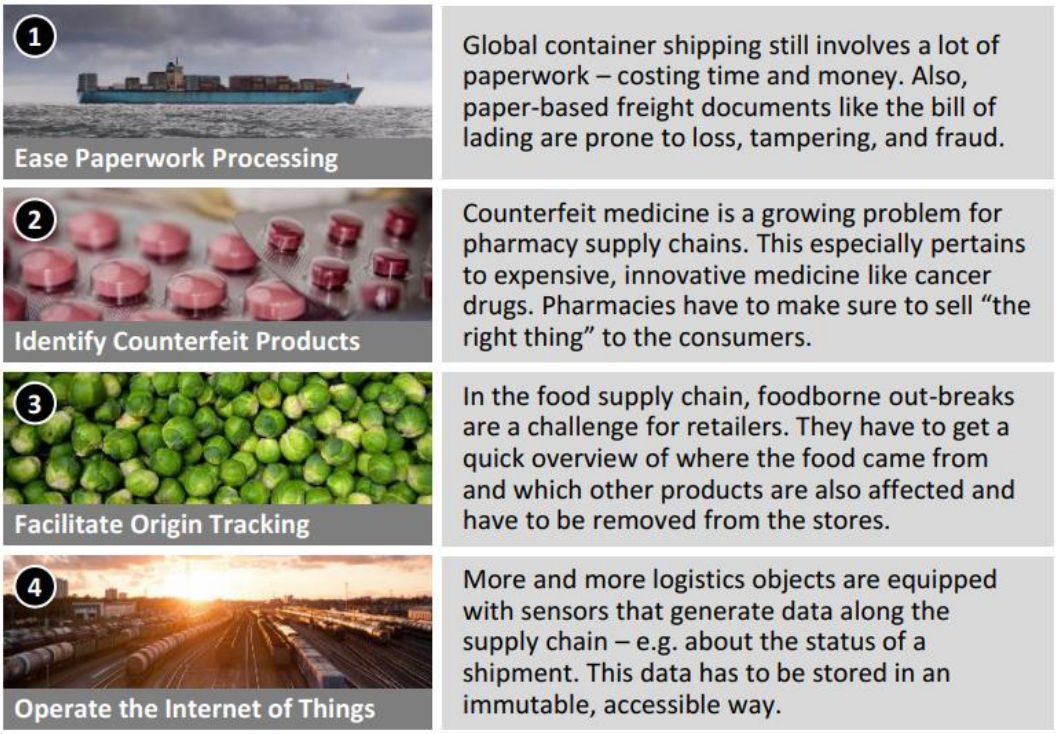
E-AWB (Electronic air waybill) is a freight forwarder, logistics provider, or other shipping customer and United can come to a binding cargo shipping agreement by the exchange of an electronic message. The use of electronic air waybills reduced the need to handle, store, and print paper air waybills. Instead of the shipment-specific information seen on the front of the paper air waybill, United receives electronic messages from the customer. Origin agents only need to double-check the piece count and weight when sending any Master Air Waybill (MAWB) or any House Air Waybill (HAWB) data via standard e-AWB messages to accept the shipment (United Cargo, 2022)

E-AWB will increase output, boost dependability, speed up procedures, improve customer service, and cut expenses. By the end of 2022, IATA established an industry goal of reaching 100% e-AWB, which will mean that all goods will exclusively be transported by e-AWB (FPT Digital, 2022).

3.4.2 Blockchain technology

To exchange safe authentication data, large logistics organizations continue to rely on Application Programming Interfaces (APIs) or Electronic Data Interchange (EDI), which improves the security of business operations. But when the supply chain is overly dependent on these technologies, it causes a lot of uncertainty and has major repercussions. Blockchain technology may offer a way to reduce risks and improve the issues caused by data entry errors, inaccurate information, and system connectivity.

Blockchain is an emergent technology concept that enables the decentralized and immutable storage of verified data. Blockchain is considered to offer large potential for improving processes and enhancing business models in logistics and Supply Chain Management (SCM). However, according to a study on trends in logistics and SCM, Blockchain is only known to some logistics experts and even pursuing implementation plans (Kersten et al. 2017). These examples combine four key concepts to create a comprehensive and diverse picture that will subsequently be utilized to examine the potential applications of blockchain technology in logistics.



Firgure 1. Overview of Use Case Exemplars

Source: Hackius, Niels; Petersen, Moritz (2017)

The advantages of blockchain in logistics include unmistakable increases in transparency, strengthened relationships between companies, total payment security, improved management procedures, and lower expenses. Blockchain is an ideal tool for facilitating the monitoring of cargo, international contracts, and payment processing because it can act as an instructor. It is inevitable that logistics organizations will undergo digital transformation. The most prominent example of this is blockchain technology. A necessity for future warehouses and a competitive advantage today (Hackius, Niels; Petersen, Moritz, 2017)

Blockchain technology is predicted to increase from $411.5 million in 2017 to $7.68 billion by 2022, with major benefits in the near future, according to some projections. The introduction of applications for banking, financial services, and insurance, including virtual currencies and identities, as well as the ongoing advancement of this technology and the expansion of key suppliers, are the main causes of this rapid growth. Blockchain is still in its infancy, but given its enormous potential, now seems like a good moment to learn more about it. Businesses must comprehend how blockchain technology may support ground-breaking innovations, what challenges must be solved, and the potential value and observable benefits it can provide, particularly in logistics.

3.4.3 Artificial Intelligence and Machine Learning

The logistics industry will greatly benefit from Artificial Intelligence (AI) and Machine Learning (ML) since these technologies make it easier for logistics firms to use and analyze data, find patterns, and subsequently enhance operations. While AI gathers data, machine learning analyzes massive volumes of data, completes repetitive jobs flawlessly, multitasks swiftly, works continuously, and never stops improving. Models can be used for supply chain management, demand forecasting, production planning, and more. In other words, applying AI

& ML may give companies the knowledge they need to lower risk, boost performance, and even save freight costs. According to the poll and research, AI is expected to boost productivity by more than 40-45% by 2035 (FPT Digital, 2022)

Examples:

- Predictive Capabilities of AI have made demand forecasting easier. When inventory is behind the demand schedule, businesses lose money. Network planning and demand planning are becoming more efficient thanks to AI, which enables merchandisers to be more proactive.

- Use Case "Shell Inventory Optimiser," a product that uses advanced analytics on historical data to optimize operational spare part inventory levels, was created in a collaboration between Shell and Equinor. Equinor expects this tool to reduce inventory inflow by as much as 13%, saving millions.

- Smart Warehouse Systems are able to recognize patterns, regularities and dependencies from unstructured data. They can then adapt, independently and dynamically, to new circumstances throughout the entire logistics system.

- Use Case Cainiao, the logistics division of Chinese e-commerce behemoth Alibaba, has declared the opening of business at its brand-new smart warehouse in Huiyang, Guangdong province. The warehouse has more than 100 self-charging, Wi-Fi-equipped AGVs (automated guided vehicles) to oversee transporting products. Alibaba claims that since the warehouse started, employee productivity has tripled.

- Use Case UPS developed Dynamic On-Road Integrated Optimization and Navigation technology (ORION) that uses advanced algorithms, artificial intelligence and machine learning and offers precise delivery time estimates, dependability and responsiveness. UPS has saved around 100 million miles and 10 million gallons of gasoline annually since ORION's first deployment in 2012.

3.4.4 Cloud computing technology

Cloud computing refers to the ability to connect to the Internet, store and access data over the Internet at any time or place. The application of cloud technology in logistics allows enterprises to better manage the entire operation from receiving inventory from suppliers, storing warehouses, shipping, and handling logistics. Currently, the integration of cloud computing in digital transformation in logistics is demonstrated by the ability to expand the scope of management, real-time journey tracking and information analysis.

Cloud computing can extend and customize the scope of management, so enterprises will operate more efficiently and flexibly. In terms of real-time, freight and storage costs can be drastically impacted by unforeseen events that require immediate price corrections, even while the goods are being transported or in storage. With the use of cloud computing tools, enterprises can simply make these modifications in real-time and instantaneously implement them throughout all business operations, including quotations and receipts. Enterprises using cloud computing can monitor inventory in real time, have more flexibility in making inventory forecasts, and prepare order plans from suppliers in advance, which improves efficiency in transportation and supply (Giang, 2020).

Moreover, information such as the fastest route, convenient traffic time, and vehicles needing maintenance... are specifically analyzed by the cloud to create a perfect and efficient

operation process. Cloud computing technology has opened up significant opportunities for enterprises to increase efficiency, optimize operational processes and offer value-added services to customers (Giang, 2020).

3.4.5 Automated forklift – Automated Guided Vehicle (AGV)

Today, automated forklifts have become extremely popular in warehouses, ports, air terminals, and other logistics lines. Packages that are unloaded by unmanned forklifts and put into warehouses by automatic conveyor belts with robotic arms have become a hallmark feature of digital logistics. Forklifts automatically collect data using their sensors. Numerous cameras at the front, rear, and sides scan the entire vehicle's surroundings, instantly detecting potential obstacles, calculating distances and determining how to move. Moreover, the smart automatic forklift is also equipped with a wireless or wired control system that easily connects to the common control port of the warehouse. This application allows the manager to monitor the frequency of vehicle use through which there are plans to improve work productivity (Misa, 2022).

4. Current situation of Digital transformation in Logistics in Vietnam

4.1 Current situation of Digital transformation in Logistics in Vietnam

The logistics service industry plays an essential role, and is a spearhead service industry with high added value, as a foundation for the development of trade in goods, contributing to improving the competitiveness of the economy (Linh, 2020). Over the years, identifying logistics as one of the backbone industries of the digital economy, Vietnam has paid attention to the development of logistics services.

On February 14, 2017, the Prime Minister issued Decision No. 200/QD-TTg approving the action plan for improvement of competitiveness and devepoment of Vietnam's logistics services by 2025. Accordingly, logistics service industry strives to achieve a proportion of 8%-10% of GDP, service growth rate reaches 15%-20%, logistics service outsourcing rate reaches 50%-60%, ranked by the country's Logistics Performance Index (LPI) in the world reached 50th and above; Focusing on attracting investment in logistics infrastructure development, building regional and international logistics centers, improving the efficiency of connection between Vietnam and other countries.

According to the Vietnam Logistics Business Association (VLA, 2021), the growth rate of the logistics industry in Vietnam in recent years has reached about 14 - 16%, with a scale of about 40 - 42 billion USD/year. Vietnam's logistics market has the participation of about 3000 domestic enterprises and 30 enterprises providing transnational logistics services. Of these, 89% are Vietnamese Small and Medium Enterprises (SMEs) with a capital of less than 10 billion VND, about 5% have capital of 10 - 20 billion VND; 10% are joint venture enterprises and 1% are 100% foreign-owned enterprises (about 30 enterprises) providing cross-border logistics services, with big names such as DHL, FedEx, Maersk Logistics, APL Logistics, CJ logistics, KMTC Logistics,... Currently, Vietnamese logistics enterprises are providing from 2 to 17 different logistics services, of which mainly forwarding, transportation, warehouse, express delivery, and customs declaration. 50 - 60% of enterprises are applying different types of technology, depending on the size and nature of services of each enterprise (Tuong, 2021).

The Covid-19 pandemic also creates an impetus for logistics enterprises to further promote the digital transformation process. In order to assess the current situation of information technology applications and digital transformation of logistics enterprises, in 2021, the Vietnam

Logistics Research and Development Institute (VLI) conducted a survey and in-depth interviews with logistics enterprises providing different logistics services: transportation, warehousing, distribution centers, last-mile delivery, express delivery, smart delivery platform.

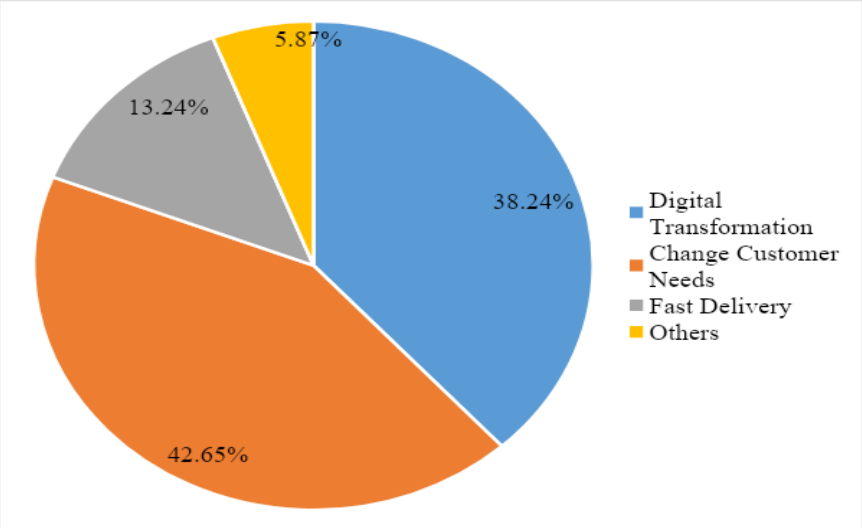


Figure 2. The Covid-19 pandemic has formed new trends in the logistics service market

Source: Vietnam Logistics Research and Development Institute – VLI (2021)

The survey results show that 38.24% of enterprises believe that Covid-19 has formed the need for the digital transformation of logistics enterprises, while 42.65% of enterprises believe that the impact of Covid-19 is to change customer needs (such as using more e-transactions, e-commerce delivery services), in addition, there are other trends that are formed such as changes in the concept of operating logistics enterprises, especially foreign forwarding companies or ability to work remotely.

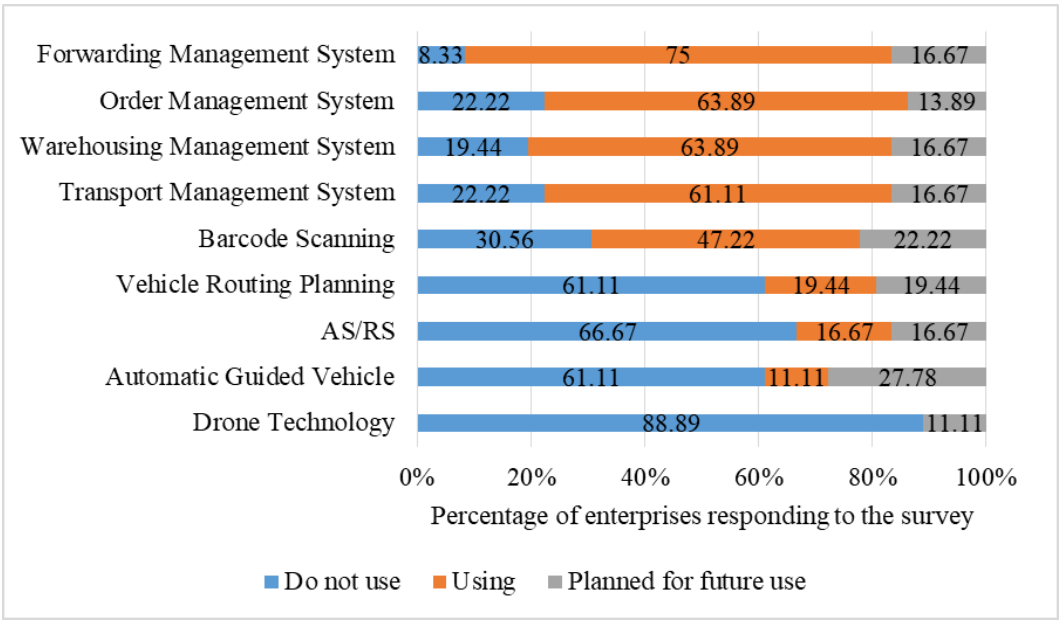


Figure 3. Technology applications and development trends that enterprises are providing or plan to provide to customers using logistics services

Source: Vietnam Logistics Research and Development Institute – VLI (2021)

However, the survey results show that enterprises have made great efforts to invest and apply necessary information technology in the implementation of major logistics services. Specifically, 75% of businesses are using Forwarding Management Software (FMS); 63.89% of enterprises are using Order Management Software (OMS), and Warehouse Management Software (WMS); 61.11% of businesses are using Transport Management Software (TMS). However, applications optimizing operations such as Vehicle Routing Planning (VRP), Automated Storage and Retrieval System (AS/RS) or Automatic Guided Vehicle (AGV) are applied by only a few enterprises with the respective rates of 19.4%, 16.67%, and 11.11%.

In particular, the application of drone technology (drone) has not been used at all, but 11.11% of businesses plan to use it in the future. Drone is an automatic flying device that is being applied to deliver goods in large cities with high population density for urban logistics. In addition, the need to improve the efficiency of goods handling at distribution centers and warehouses in order to reduce leadtime and optimize time and human resources is also the driving force behind 27.78% of enterprises that will invest in the application of AGV as a solution to reduce dependence on human resources and increase automation.

The trend to promote digital transformation is also the goal of the VLA Congress VIII term (2021-2024): Towards the goal of digital transformation - creativity - innovation. With this policy, VLA has implemented specific projects related to digital transformation, including some key projects (Tuong, 2021).

- Test the prototype, replicate the application model, and deliver the Electronic Delivery Order (eDO) and Electronic Bill of Lading (eBL) solutions to Less-than-container load (LCL), shipping by sea and by air using blockchain technology.

- VLA had an initial agreement with FPT Corporation and the Vietnam Digital Agriculture Association (VIDA) to jointly establish a community technology company aiming to develop one platform to connect available technology applications in order to serve both the LSP community and the goods owner community (Import-Export), firstly, the members of VIDA. Building a digital platform for the logistics service chain will connect stakeholders in the chain (ports, carriers, agents, forwarding companies, warehouses,...) to share data, increase existence for the chain, improve usage efficiency, vehicle exploitation, operational efficiency and the first product on that digital platform is eDO with the aforementioned blockchain technology.

- Research, apply and develop technology - Robotics and AGV - Robotics/AI technology in warehouses with many types of Robots, Automated Storage and Retrieval Systems (ASRS), Robotic forklift trucks, or Butler (Part-to-Picker).

The above results clearly show the efforts and determination of the logistics industry in the digitalization process. In addition, the Government's national digital transformation policy will be a solid foundation, creating a driving force for the development of the logistics sector.

4.2 Example of Logistics enterprises pioneering in digital transformation in Logistics in Vietnam

4.2.1 Saigon Newport Corporation

Saigon Newport Corporation is a pioneer in digital transformation in logistics. In 2021, Newport Cai Mep International Port set a record in mother ship handling from 14,235 TEU to 15,615 TEU, with a handling capacity of 238.08 containers/hour. One Columba ship of the FPE

service continues to exceed the volume of cargo through 2 million TEUs, contributing to the growth of the whole system by more than 4.7% and taking over 55% of the market share of import and export containers through seaports across the country (An, 2022).

To achieve this achievement and strong growth, Saigon Newport Corporation has embraced digital transformation in logistics very early. Saigon Newport Corporation (2020) built ePort software with the functions of a port for online declaration and payment, e-invoicing, loyalty program integration, and automatic liquidation/booking of ships, which helps customers not need to go to the port for direct procedures. The automatic customs supervision system at Cat Lai port, Hai Phong port, Hiep Phuoc port, and Cai Mep port cluster helps to reduce the time for procedures and customs clearance at the port significantly. Parking time at the gate is reduced from 13 minutes to 6 minutes; e-customs clearance time is reduced by 2 minutes/cont. This is one of the important factors that help to minimize traffic congestion at port gates, in port procedures areas as well as on ports in and out, contributing to increase labor productivity and significantly reduce personnel costs in many departments.

The application of eDO to replace conventional delivery orders by electronic data transmission is part of the total number of other electronic communications related to the container. Saigon Newport Corporation, after successfully applying ePort and eDO, advanced production management and administration programs, reduced the time spent by ships at the port by 55%, delivery time by 25%; the number of work and traffic safety incidents by 60% (Nhan, 2022).

4.2.2 Gemadept Corporation

In 2021, Gemadept's total port operation is estimated at 2.7 million TEUs, an impressive growth of 53% over the same period. Gemadept's logistics system also recorded a very positive growth momentum, maintaining the position of the Top 4 leading domestic shipping carriers in the country and the top 2 market share of river transport on the arterial routes of Vietnam - Cambodia and in the Mekong Delta. During the year, Gemadept continued to expand its distribution center system, and develop logistics services in both width and depth, successfully fulfilling its mission of maintaining and promoting the flow of goods in the midst of the epidemic (Gemadept, 2022).

That success is due to the corporation's digitalization of port operations and logistics, successful deployment of advanced software to continuously improve and simplify procedures, exploitation and management. Gemadept Joint Stock Company officially deployed SmartPort application on May 12, 2021. Gemadept Corporation is always oriented to be the leader in improving and updating new technologies to improve service quality and support many utilities for customers. Smart Port is the first software for the application of modern technology in synchronizing tasks between departments in the port and connecting between ports, inland container depots (ICDs), depots, connecting shipping lines and ports. This will make the execution of customer tasks synchronized across departments, faster and more accurately. Customers can fully control their cargo, and interact with any port, depot, ICD and anywhere. Connecting the port cluster to a common ecosystem will also help the corporation control its branches more easily, quickly and efficiently.

4.2.3 Viettel Post

In 2021, the number of technology projects of Viettel Post has reached about 100. Viettel Post has built and continuously improved the digital transformation ecosystem including multi-channel sales management system - Viettel Sale, warehouse management system - Fulfillment, and multimodal transportation system - MyGo to promote all resources (Anh, 2021).

Particularly in 2021, Viettel Post's modern warehouse system is invested in 63 provinces and cities, applying many smart technologies in the warehouse such as automatic monitoring and warning, which has been effective in the context of the epidemic (Anh, 2021). In 2021, Viettel Post recorded consolidated revenue of VND 21,452 billion. This revenue increased by 24% over the same period and profit after tax reached 295.89 billion dongs (Viettel Post, 2022). Also from the beginning of 2022, an automatic sorting conveyor system was opened in the southern market with an output of more than 1 million parcels per day. The automatic conveyor system shortens the journey of parcels to 4 to 6 hours, saving the company 48% in labor costs and reducing manpower by 86%, optimizing resources and improving labor productivity (Anh, 2021).

5. Challenges in digital transformation in Logistics in Vietnam

Over the past year or so, the transportation and logistics industry has been dealt a heavy blow, like all other industries. With product migrations stalled, fewer bills to be shipped, and growing pressure to go online, the industry suddenly finds itself surrounded by changes, challenges, and expectations. According to FPT's statistics, about 70% of Vietnamese enterprises have failed to digitally transform. The Enterprise Development Department, Ministry of Planning and Investment conducted a survey and summarized 9 challenges that businesses face in the digital transformation process with the percentages as follows:

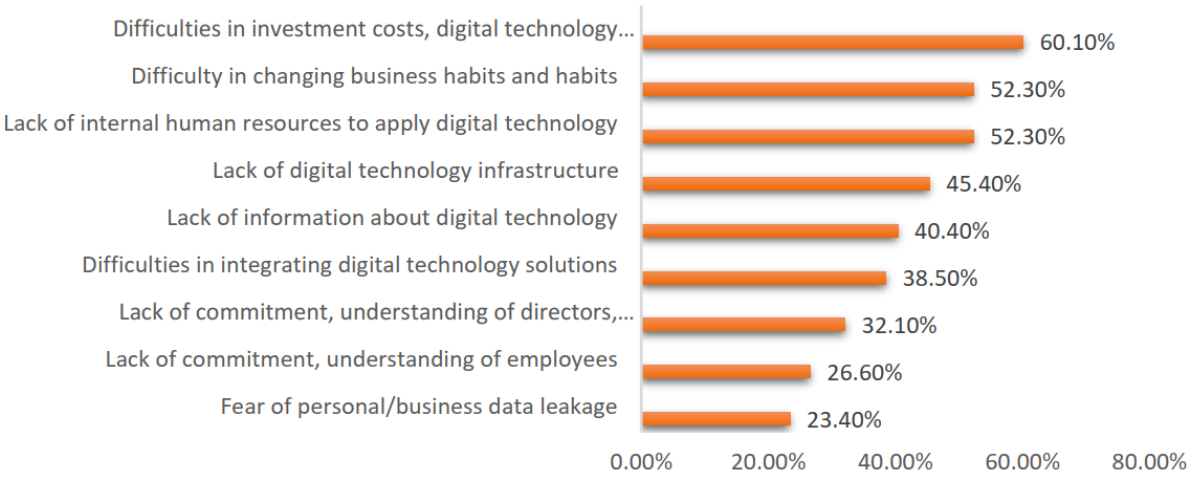


Figure 4. Barriers to digital transformation of businesses

Source: Department of Enterprise Development, Ministry of Planning and Investment (2021)

Among the 9 barriers above, our research will deeply analyze some main challenges that Vietnam's logistic enterprises have to face currently.

Lack of integration of Logistics and Transportation

With a digitally driven buying and selling ecosystem, there is an increasing reliance on the supply chain, transportation and logistics industries to fulfill order needs, move products rapidly across boundaries, and do the same at a reasonable cost. This poses a challenge for professionals

who, without digital solutions for logistics, have struggled to consolidate and centralize the logistics and transportation industry. Now, with global trade taking shape, already stagnant and manual-driven activities are now a competitive threat to companies that don't make an effort to disrupt them, choosing to digitize transportation and logistics and add flexibility to their models.

Massive data volume

The Logistics and Transportation industry generates and maintains large amounts of data and information, especially with today's commercial expansion. However, accessing this information becomes difficult, especially when it is segmented and stored in different locations. This, together with manual data entry and processing, results in erroneous outputs that impede the goal of improving customer experience. Logistics digital solutions not only efficiently track and manage this data but also connect all the disparate sources on a single integrated digital logistics system. Furthermore, digitalization in logistics and supply chain management helps business leaders comply with new data management standards and meet customer expectations.

Lack of resiliency and process automation

Labor-intensive logistics and internal transportation operations led by people are not only time-consuming but also error-prone and inefficient. The Covid 19 pandemic is the last ray of light for the Logistics and Transportation industry. To gain a 360-degree view of business processes and facilitate omnichannel customer interactions, process automation through transport and logistics digitization becomes imperative. As a result, the adoption of digital solutions for logistics and automation capabilities will lead to a more agile and flexible business model.

Challenges in technology adoption

Logistics, as one of the most important industries in international trade, requires careful investment, particularly in the area of "digitization," in order to respond to and adapt to market conditions. According to the VLA's 2018 survey, the level of science and technology applications in Vietnam remains low, with the majority of them being single solutions. Basic applications, such as international forwarding management, warehouse management, transportation management, and data exchange, account for approximately 40% of information technology applications currently used in logistics enterprises. Customs declaration is the most commonly used 75-100% of the time.

According to the general consensus, most businesses currently stop at the level of digitization, that is, converting operational data into electronic storage but lacking the connection and ability to look up and process data. orders through the online platform The level of science and technology application in enterprises providing logistics services is still low. In Vietnam, international standard software is not widely used.

Furthermore, the Vietnam logistics industry is over reliant on old systems. Aging systems not only slow down operations but also hinder productivity and increase technical liabilities. To scale without risk, ensure business continuity, and future-proof your model. The Logistics and Transportation industry needs to adopt a modern approach to doing business. It's time to replace paper with a transformative digital logistics platform that integrates well with legacy systems.

Cost of digital transformation

The majority of logistics service providers are small-scale businesses with limited financial resources. The digital transformation process, according to VLA, costs between 200 million

and tens of billions of dong. In Vietnam, this cost is quite high for small and medium-sized businesses. Many businesses claim that investing in automation, such as foreign models and software, requires a significant initial investment; however, doing it yourself according to the internal model will require a significant amount of time, difficulty, information, technology, human resource costs, and so on. One of the most difficult problems to solve today is the availability of financial resources for digital transformation investment. Without the support of the government and financial and credit institutions, logistics providers will find it extremely difficult to implement digital transformation.

For the Logistics and Transportation industry in general and freight transport in particular, technology plays an important role in digital transformation. E-commerce market with millions of orders per day and a wide variety of goods and delivery addresses dispersed in many localities. To meet the requirements of fast delivery with high accuracy, software such as order management, warehouse management, transportation management, resource planning, etc. is absolutely necessary for businesses. Investment costs to develop information technology infrastructure synchronously can reach hundreds of billions of dong, a huge investment, especially for SMEs. Not to mention that ¾ of seaports, ICDs and depots have not yet integrated digital technology software, so it will limit the ability of enterprises to connect to information infrastructure, causing congestion and delays in operation.

According to a report by the General Statistics Office, more than 98% of Vietnamese enterprises are small and medium-sized. With the number of businesses with capital under 10 billion VND being 90%, the resources to pay for technology solutions are limited, while digital transformation projects can cost businesses billions of dong. Therefore, Vietnamese logistics enterprises currently only use standard software such as electronic customs declaration, vehicle positioning via GPS, order management software, etc.

Challenges in human resources for digital transformation:

Vietnam's logistics human resources are not only scarce but also of poor quality. Those in key positions, in particular, despite having been trained or re-trained, still lack knowledge and experience in the logistics industry. According to the findings of a recent survey conducted by Ho Chi Minh City's Institute for Development Research. In Ho Chi Minh City, up to 53.3% of businesses lack staff with professional qualifications and logistics knowledge; 30% of businesses must retrain their employees, and only 6.7% of businesses are satisfied with their employees' expertise...

Challenges to competitive potential:

Currently, despite the fact that the majority of logistics enterprises are domestic, their competitiveness in comparison to large international enterprises is plagued by numerous issues, the majority of which stem from the aforementioned limitations, such as potential weak finance, outdated technology, and a lack of high-quality resources. Other factors include a lack of management skills, cumbersome equipment, and so on. Many Vietnamese businesses are confronted with challenges and fierce competition from the market of foreign enterprises, which have experienced units, the ability to provide services, and greater financial potential...

6. Solutions for digital transformation in Logistics in Vietnam

6.1 Solutions for state management agencies

Cisco research shows that government programs have a forward impact on the digitization process of Vietnamese businesses, the majority of businesses (64%) are aware of government support initiatives and gain benefit from those policies and the remaining 30% know but do not participate. Therefore, the government should continue to implement the following solutions:

Firstly, due to the industry's biggest difficulty being the limitation of IT infrastructure in digital transformation, the government has to take action by applying modern science and technology, catching up with the international level, and shaping the e-Logistics industry in the context of Industry 4.0. Government needs to focus on investing in digital infrastructure to meet the explosive demand for data connection and processing, and encourage IT corporations to build and transfer logistics software to Vietnamese logistics enterprises at preferential price to create opportunities to use and participate in digital transformation activities equally.

Secondly, research and apply new technologies, technical advances in management, operation, training in supply chain and logistics services. Encourage and guide enterprises in a number of industries to apply advanced supply chain management models in production and business.

Third, continue to improve the legal framework for logistics and community services, especially security, vandal prevention and digital management. Integrate network supervising, ensure cybersecurity right from the time of design and construction. Research, amend and promulgate new policies and laws governing logistics services, multimodal transport, and cross-border transport in e-commerce.

Fourth, promulgate preferential policies on tax, land lease and loan interest to support logistics enterprises with conditions to invest in warehouse network, goods classification system, automation equipment with high productivity. Have policies to encourage shareholders, support loans and preferential interest rates for startups in digital technology solutions, in order to help logistics businesses buy or rent solutions from software providers, when they do not have enough financial capacity.

Fifth, strengthen digital transformation connections between state agencies and organizations and businesses between IT industry associations and logistics associations to create synchronous efficiency in digital transformation efforts.

6.2 Solutions for enterprises

Enterprises using logistics services: Enterprises need to raise awareness of the need for digital transformation, digital transformation is indispensable if they do not want to be eliminated from the market. Human resources are the core factor to operate the digital logistics system and require higher skills than traditional logistics, so training and retraining is required. Focusing on coordination between logistics enterprises, associations and universities to provide a knowledge base for this industry is extremely important.

Logistics service providers:

+ Digital transformation needs to proceed according to a suitable roadmap to the specific capabilities of each enterprise. There is a need for a progressive transformation from data digitization to process digitization and business model change to a digital-platform model that is suitable for automation processes (Nhan, 2022).

Figure 5. Development stages in the digital transformation of enterprises.

Source: Associate professor PhD An Thi Thanh Nhan (2022)

+ When implementing digital transformation, logistics service enterprises must have a synchronous transformation. Focusing on building a digital platform for the logistics chain, helping to connect stakeholders in the chain (ports, carriers, agents, forwarding companies, warehouses,...) to share data, increase the availability for the chain, and improve the efficiency of use. However, prioritizing investment in modules is necessary, allowing digital technologies to be gradually integrated to synchronize the whole business system in a sustainable way.

Figure 6. The importance of digital transformation and level of innovation activity in six parts in logistics enterprises.

Source: MMH Staff (2020)

Conclusion

This research paper provides information about digital transformation in the logistics industry, the current situation of digital transformation in logistics in Vietnam and challenges that Vietnamese logistics enterprises have to deal with when enforcing digital transformation and proposes solutions to those challenges.

Digital transformation is both an opportunity and a challenge for Vietnamese enterprises currently. In the face of competition and the explosion of the digital economy, along with increasingly fast e-commerce, especially under the pressure of recovering from the COVID-19 pandemic, logistics enterprises have partly understand the issue of accelerating digital transformation and applying technological achievements to business activities to enhance economic efficiency, as well as optimize in production and product supply chains. Digital transformation becomes urgent for businesses in the industry to overcome difficulties and accelerate development.

Besides, expanding and promoting the application of technology is crucial to maintaining the growth rate and further development of the logistics industry. The Fourth Industrial Revolution causes the traditional logistics centers to be transformed into new types of centers

using high technology… Therefore, a thorough action plan is needed to improve the competitiveness and development of the logistics industry in Vietnam.

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