THE POST-PANDEMIC CHALLENGES OF DIGITIZATION ASCENDANCY WITHIN REVERSE LOGISTICS

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ABSTRACT

The recent Covid19 pandemic has accelerated logistics processes, making the transition to business digitalization much faster for some companies in the industry than was anticipated.
Customer satisfaction during the process between the order placed on an online site and marketplaces and the effective delivery of the product is an important element for logistics companies and, in particular, their profitability and market position depend on it.
The transition from physical to online environment has brought new challenges not only for managers, choosing solutions and budgeting for this transformation, but also for employees adapting to new working conditions.
Even if new technologies are available for all types of organizations, the process of choosing them can be complex, requiring certain conditions to be met: ease of use, low running costs and to improve working remote or implementing remote working

KEYWORDS: *digitization, lockdown effects, post-pandemic challenges, reverse logistics.*

DOI: 10.24818/IMC/2022/03.11

1. INTRODUCTION

The worldwide context of the last two years has radically changed the manner in which companies communicate with their customers and how their clients purchase products and how they are delivered to them. In the first part of the lockdown, many businesses that owned their own warehouses or held their stocks through Third-party Logistics, Forth Party Logistics or Fifth Party Logistics operators, made massive dismissals due to declining sales, the lack of profit and consequently the closure of physical stores, or reduced working hours in the warehouse and consequently salaries, or put 40% of the staff dedicated to logistics operations on technical layoff, forcing warehouse staff specialized in logistics operational processes to refocus to other employing enterprises.
But in the following immediate period all companies have witnessed a retrenchment, increasing the volume of orders submitted online with home delivery, easy boxes or pickup via drive-ins or drive thru. Firms were thus confronted with a straightforward reality, and now found that they were in the position of having to hire on a massive scale in order to support the enormous number of orders.

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2. THE REVERSE LOGISTIC PROCESS DURING AND AFTER THE COVID-19 LOCKDOWN

Before the lockdown there only a part of categories of goods which were suitable for online purchases, nowadays (Wang et al., 2021) 95% of SKU (Stock Keeping Unit) categories became massively used for online purchases in all industries.

Two years since the first lockdown we are experiencing yet another massive structural change in the manner in which goods are delivered, generated by the high transportation costs resulting from the rising prices of fuel, shipping insurance and transit costs of goods.

The customers are no longer prepared from paying high delivery costs and are shifting to easy box deliveries, which is generating more and more changes in operational processes across the supply chain.

Further these changes are to be supported mainly by software systems by adding new operational modules with new operating tabs, which should have very high technical and functional capabilities to store data and run them in real time.

The adaptation is carried out in real time in order to maintain the very competitive commercial environment, taking into account that specialized studies (Hsu et al., 2021) in the last period have indicated the most considered tools by the customer as: delivery services, speed of delivery, the attitude of the deliveryman, information about the order, the condition of the goods and the location where the ordered products are collected (Restuputri et al., 2022).

Today they are witnessing the emergence of a new type of customer behavior on the online shopping environment: the placement of several orders to different companies for the purchase of the same type of product with the same quantity ordered, the customer's criteria for purchase and payment being defined in particular by the time of receiving the product.

The other products ordered from companies that have not ensured to deliver the product urgently to the selected address or the easy boxes, will be refused or returned.

Thus, it can be said that a major phenomenon called reverse logistics with negative financial implications for businesses comes to the spotlight. This adaptation to customer behavior is required with a predominant emphasis on the role of human staff (Urquhart et al., 2022) as a key factor in the technological transition (Alhaimer, 2021).

Emphasizing that a substantial attention has been given to human robot collaboration even in Industry 5.0 (Jafari et al., 2022) it is empowered once again that the success comes from aligning human knowledge and skills to the performance of software systems, in the same way software systems must be designed as user friendly as possible (Fang & Zhang, 2021), precisely in order to shorten the induction period of newly hired staff and the rapid transition from trainee to full charge employee.

With the junction of Information and Communication Technology and the Internet on mobile devices speeding up the evolution and offering to consumers the opportunity to have access to the desired products and services (Nichifor et al., 2021) back across all lines of the operational logistics structure, real-time changes have been required to adapt the processing rate to the customers' ordering speed.

The access through mobile platforms or mobile applications has also increased the impact made by reverse logistics. As fast as the products are ordered by the customers at the same speed they can be returned, inside the warehouses there appears to be a need for permanent modification and updating of the operational layout and the way of storage according to the ABCD classes, but also according to the destinations, which can be of the following forms: home delivery, easy box delivery, store delivery, showroom delivery, delivery in a certain period of time.

In the field of sales, it should be taken into account that a returned product is no longer considered a new product. It may have damaged packaging, may be unsealed, damaged, damaged in its entirety,

deformed or may be returned with items missing from the package. Additional logistics costs are added to the resale price.

Example of logistics calculation: the product was imported intermodal (sea, rail, and road container) with a logistics cost of 5% of the purchase price per piece/pack and is delivered to a customer with a courier cost of 100%, the delivery cost depending on the delivery distance and volume occupied. Subsequently, it is returned to the warehouse with a return cost of 75% of the delivery cost, plus the costs of receipt return in the warehouse, verification, and storage. To all this is added a discount for resealed products. We also consider that the purchase and return rate for resealed products is 15% lower than the purchase and return rate for new products.

According to the logistics calculation exemplified, we experience a significant loss of profit in the absence of adapting human capital, logistics capacity and software systems capability to support delivery needs with an OTIF (On Time In Full) indicator of at least 99%, for a company that wants to perform in a highly competitive market.

Although global business data indicates that about 70% of SMEs (small and medium sized enterprises) have increased their use of digital technology as a result of the COVID19 (Apoga et al., 2022), it is worth mentioning that this development also generates class modifications in the workforce structure, the investment being rather in terms of bringing the latest technology to a user-friendly level for logistics operations employees

Considering that the level of operational logistic costs must be kept under control in such a way as not to change the profit rate towards negative values, in the absence of specialized professionals, software companies are required to adapt their applications (Piroșcă et al., 2021) to all these restrictions but at the same time they must provide an overview of the company's performance in relation to the market, keeping a history of all important performance indicators in relation to previous years.

Of course a number of conceptual models successfully combine entrepreneurial orientation, digital technology capability and SME performance (Wardaya et al., 2019) but all need to align at a similar rate of evolution (Santana et al., 2022).

Considering that a simple identification of products by scanning EAN (European Article Number) barcodes for transmission to marketplaces may encounter difficulties if, from the moment of receiving the consolidated pallet label and split per box, the unit box and SKU, the human factor has not ensured the operability in the assignment logic.

Thus, aligning human knowledge and skills to the performance of software systems is found to be a precondition for OTIF upgrowth of the SMEs companies (Iordache et al., 2022).

In terms of cost, simply positioning a pallet at the rack with the identification label on the side or on the back can generate several problems, such as: inventory differences, multiple movements to the rack with the forklift, multiple picker checks, closing an order in out of stock and implicitly losing the sale (Dura et al., 2022).

In terms of marketplace indices, where the customer can track their order status in real time, we are facing performance decreases, in picking time, processing time, and delivery time. The dissatisfied customer will leave negative feedback, which will influence the behavior of potential customers prospecting the market for a future purchase.

New nonlinear digital development models for SMEs take into account the interactions between the digital technologies and the organizational processes (Depaoli et al.,2020), because the small and medium sized enterprises (SMEs) risk not being competitive if they fail to adopt the digitalization (Azevedo & Almeida, 2021), despite that a common denominator is the need for integrating, building and reshaping the internal and the external resources to adapt to the fast changing environments (Aramburu et al., 2021).

Although a real-time adaptation is desirable due to the limited resources (Sakas et al., 2021) and capabilities (Fan et al., 2022), the process of transition to full digitization for small and medium sized enterprises (SMEs) is relatively slow (Sun et al., 2022), and it is essential to establish the key

factors and pathways (Shan et al., 2021) to success for SMEs in order to optimize the allocation of resources (Zhang et al., 2022). Stakeholders have to enable the development of omnichannel strategies and integrated communications, knowing and understanding that the effects of cognitive, emotional and contextual behavioral tendencies are crucial (Hermes & Riedl, 2021). In the business environment, the main value of online communication and order placement networks consists in their versatility and potential to facilitate the communication (López & Ania, 2021).
As the literature also confirms that the current reconfigured reality (Matuszelański & Kopczewska, 2022), the time between purchase and delivery (Xiahou & Harada, 2022) must be shortened, performance of shipping being one of the key factors (Rijanto, 2021) that affects the customer satisfaction in ecommerce, the last mile shipping has become the most critical transportation activity (Li & Li, 2021) which, running back on the integral flows of (Shih et al., 2021) supply chain, has an impact on all the internal departments and the communication and logistics operation processes. Every minute counts and every mistake costs, so processes are no longer audited only annually in general, but also at the encounter of an operational logistics gap.
The process on the blueprint of which the software system is configured analyses all activities from upstream to downstream (Mu et al., 2022) in terms of document workflow, personnel workflow and goods workflow. Any interaction with a nonactive customer experience currently has an impact, due to online exposure, on both the SKU that was identified as having a problem, similar or complementary SKUs or other products of the company itself, which are present in various locations such as: on the company's own website, on the marketplace as well as on other online platforms or in shopping applications.
This is a phenomenon of exposure in the online environment that can have a rapid effect and consequences, and the speed of reaction can make the difference between a purchased product, a returned product or a paid and kept product.
In the same direction, the modeling of processes and the alignment of the software system to the requirements of internal and external customers is a constant and imperative operation in focusing on the OTIF up growth of the SMEs companies.
One has to consider that if rigid return policy is introduced in the market companies may risk to lose customers due to unpleasant return customer experiences (Klumpp & Loske, 2021). On the other hand, a flexible return policy is also vulnerable towards the return abuse (Wei et al 2021).
Thus adaptation to customer needs must be done while achieving a predetermined profit margin, consumer behavior requires constant monitoring and classification according to customer level groups and classes.

3. PROPOSALS FOR DIGITIZED CHALLENGES OUTRUNNING POST-PANDEMIC EFFECTS USING NEW TECHNOLOGIES

3.1 The world of new technologies:

This section will present the most used technologies for digitizing organizations and their importance. (Internet of Things (IoT), Artificial Intelligence (AI), Cloud Computing Mobile Apps and Websites)

3.1.1 Internet of Things IoT

The Internet of Things is about connecting things that are currently not connected to the Internet, impacting many economic sectors such as manufacturing, logistics, healthcare, consumer goods and more. IoT devices have low processing power in order to consume as less energy as possible. (Schiller et al., 2022)
Where physical work could not be transposed online, IoT has come to the aid of companies. Deploying sensors on the number of people entering the building, what their body temperature is and which areas of the building are crowded.

All this information being transmitted via Wi-Fi for analysis. To reduce costs, companies have implemented light and temperature sensors based on the presence of employees in the building.
From a logistics point of view, this technology has brought benefits. Installation of trackers on vehicles to determine location and speed using GPS receivers transmitting detailed information via GSM antennas to servers. These can be accessed via website or mobile applications by employees for reporting purposes.

3.1.2 IoT & AI

The presence of artificial intelligence in the implementation of IoT technology is necessary due to devices having low processing power. (Schiller et al., 2022)
The development of smart sensors with AI technology will collect much more detailed information that can be stored in the cloud to help employees.

3.1.3 Cloud Computing

Increasingly companies are turning to cloud storage solutions for various use cases like data backup, disaster recovery, big data analytics, data transfer and more.
The use of the term "cloud" also refers to data centers that are shared across the globe and can be accessed via the internet.
Cloud services are used to aggregate data and information from various elements such as sensors, appliances and other devices. (Goudarzi et al., 2022)
For example, logistics companies use the cloud to use real-time data to optimize delivery routes or implement a warehouse management system.

3.2 Mobile Apps and Websites for teleconferencing

During the Covid19 pandemic, the use of video conferencing and digital communication has increased (Omer et al., 2022), forcing companies to use applications designed for this purpose. Not many companies have decided to create a platform for internal communication.
These video conferencing applications are still popular today, with more and more companies implementing them in their operations.

3.2.1 Security:

The way of working has become smarter with the use of the technologies outlined above, which improves consistency, efficiency and adaptability in achieving objectives. On the other hand, cybersecurity threats are increasingly common. This section will present the security challenges present in these new technologies and the solutions to reduce these security risks.
According to the study by Goudarzi et al. (2022), five causes make technologies vulnerable to cyberattacks:

a) Presence of a high number of smart devices connected to an internet network: the possibility of a cyberattack would be much higher because even if a single device is compromised the whole system would be affected.
b) The use of the third-party component: their use makes networks vulnerable to piracy. They can be infected with viruses like Trojans that could spread throughout the network.
c) Lack of security training for employees: following the implementation of a technology, employee training in its use is mandatory. If they are not trained properly, data (e.g. authentication data) can be lost and the system compromised.
d) Use of insecure internet protocols: using protocols that do not encrypt data can be easy targets for attacks that can extract data during transfer.
e) Technology maintenance: During this process, some of the shortening layers can be disabled. Attackers can at that time compromise the system.

In the process of compromising devices, attackers use 4 methods (Goudarzi et al., 2022):

a) Scanning – The first stage involves collecting information about the systems;
b) Surveillance – The second stage involves analyzing the data collected about the systems and finding weaknesses;
c) Maintenance – The third stage involves taking control of the system;
d) Manipulation – The last step involves installing an undetectable application to collect data or modify data.

In these complex IT infrastructures, constantly threatened by increasingly aggressive cyberattacks, companies need a secure, reliable system. Blockchain aims to eliminate these vulnerabilities.

3.2.2 Blockchain

Blockchain is similar to a simple, decentralized database stored in network nodes using peer to peer networking, asymmetric cryptography and cryptographic hashing. Many industries have shown interest in blockchain technologies, including logistics. (Tegeltija et al., 2022).
Blockchain is intended to manage and control IoT devices as well as increase the level of security, (e.g. it provides strong encryption for authentication and data integrity).
The main principles of blockchain are named as follows: distributed database, peer to peer transmission, transparency, irreversibility and computational logic. (Barenji & Montreuil, 2022)
According to the study by Barenji and Montreuil (2022) logistics can have an architecture based on blockchain, IoT, Cloud and AI technologies as shown in Figure 1.
The architecture is structured on four layers that are connected to the physical resources. The first layer (cloud) is responsible for data storage and computing power. The second layer (blockchain) handles the blockchain infrastructure and the security, the third layer manages real time device communication and the fourth layer (IoT) implements sensors and devices.
Implementing this type of architecture will improve collaboration between parts involve in logistics, transparency at every stage, data security and encryption as well as data decentralization.

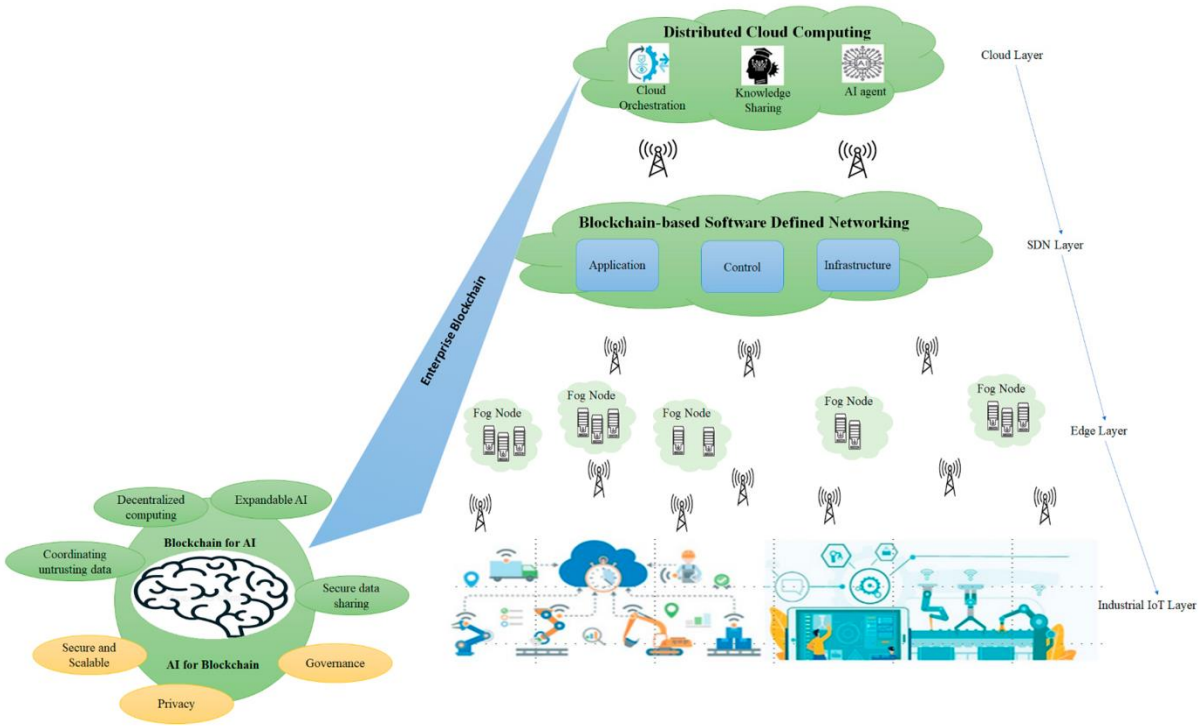

Figure 1. Digital transformation of logistics
Source: Barenji and Montreuil (2022)

It is expected that logistics managers evaluate the efficiency of their commissioners by integrating several dimensions, taking into account simultaneously the behavioral aspects of the people working in the operational systems of ecommerce logistics (Liu et al.,2022a), the structural changes (Liu et al.,2022b) of the market as well as forecasting the impact of the fluctuating (Nguyen, 2022) economic context on the company's activity. All this information is further reported (34) and has as an immediate consequence to influence the decisions of the sales teams.

When online sales channels are established, the demand stimulation activities will be implemented to encourage the consumer's shopping activities. Thus, promotional and discount offers will be developed to facilitate consumers' purchase and use of services at a time when their incomes are severely affected due to the COVID19 pandemic (Darko, 2022).

In most cases the product listings in the online environment are done through the retrieval of data such as SKU code, SKU name, SKU logistic size and in some cases the stock availability at the supplier.

It should be mentioned once again how important it is to have an accurate and constantly updated logistics database by filling in logistical details, stock outs and out of motion product cancellations as well as crosschecking the current database with the current stock in the software systems with the database listed online and the physical availability of the product.

Furthermore, in an increasingly volatile and uncertain global environment, it is becoming more important for companies to collaborate with partners along the supply chain to leverage and complement their core competencies (Oliveira et al., 2022).

Accordingly, the real-time mapping of processes in line with changes in the structure of the specialized market is very useful for businesses, as it allows managers to make evidence-based decisions, in addition to facilitating understanding and communication between the different departments involved in a given process (Azab et al., 2021), and its implementation in software systems with the possibility of accessing them in mobile applications must be developed to suit users and meet their technological needs.

4. CONCLUSIONS

The COVID-19 pandemic has caused a lot of changes in the way organizations do business, with managers having to choose the best strategies in order to achieve company goals. (Juchnowicz & Kinowska, 2021). In an interconnected world with access to high internet speeds, moving business to digital has been adopted by more and more companies.

The introduction of new technologies and Industry 4.0 is becoming a priority. (Mehedintu & Soava, 2022) . Their implementation helps companies to be resilient and competitive.

The process of digitization and adoption of new technologies in supply chain and logistics has changed the business model in the Supply Chain 4.0.

Working from home became a priority during Covid-19, which has been maintained today by many organizations, bringing many benefits with it. Even if the evidence is not always very clear, working from home seems to improve employee well-being. (Crawford, 2022).

The adjustment of logistics capacity, the human capital in the operational logistics segment and the capabilities of software systems to support the need to deliver products to the customer with a successful OTIF (On Time-In Full) for a company that expects to be profitable in today's very competitive market, is a sine qua non condition.

The current environment in which enterprises are operating is very competitive and the structure of expectations for logistics services has been strongly impacted by the COVID19 pandemic and the international socioeconomic conditions.

Thus, by introducing the use of digitalization, a company's activity will be made more efficient and indicators will be improved at the end of the study period.

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