

Last-Mile Logistics in Vietnam in Industrial Revolution 4.0: Opportunities and Challenges

D. T. Phuong

Ba Ria – Vung Tau University, Vungtau City, Socialist Republic of Vietnam

ABSTRACT: Industrial Revolution 4.0 is taking place quickly and vigorously. It has a widespread impact on all sectors, such as industry structure, supply, and demand of the labor market. In the logistics and supply chain industry, Industrial Revolution 4.0 changes the way of management related to activities such as warehousing, transportation, and especially last-mile delivery. The scope of the article provides some background knowledge about last-mile delivery. Besides, the paper points out an overview of the opportunities and challenges that the last-mile logistics in Vietnam faces in the era of digital supply chains, then suggests some solutions to help Vietnam's last-mile logistics catch up with the world's trend.

Keywords: E-commerce, E-logistics, Industrial Revolution 4.0, Last-mile logistics

1 INTRODUCTION

Industrial Revolution 4.0 has facilitated e-commerce to grow rapidly. However, this development has had a significant impact on distribution in logistics activities. Nowadays, consumers prefer online shopping and order delivery at their homes instead of going directly to retail stores. They do not care about the shipping process but care about the flexibility of the delivery process, the safety of goods, and the price of home delivery services. If the delivery is terrible, it will bring bad experiences to customers, thereby affecting the competitiveness of businesses.

In Vietnam, the Industrial Revolution 4.0 encourages the appearance of new distribution businesses alongside traditional service providers such as FedEx and Viettel. Therefore, the distributors more and more focus on improving the quality of last-mile delivery.

This article attempts to answer the question: *What are the opportunities and challenges that last-mile logistics in Vietnam is facing in the Industry Revolution 4.0?*

To answer the above question, the structure of this article will be as follows: First, some background knowledge about last-mile logistics. Next, the article points out the opportunities and challeng-

es that last-mile logistics in Vietnam is facing. To conclude, the author will reiterate the customer requirements for last-mile delivery in order to choose a solution suitable to the existing capacity of logistics enterprises in Vietnam.

2 LAST-MILE LOGISTICS IN INDUSTRIAL REVOLUTION 4.0

2.1 Definition of last-mile logistics

The term "last mile" was initially used in the telecommunications networks, but latter is applied in logistics management as well as related fields such as e-commerce or distribution in the supply chain. According to Lindner (2011), last-mile logistics (hereafter LML) "*is the last part of a delivery process. It involves a series of activities and processes that are necessary for the delivery process from the last transit point to the final drop point of the delivery chain*".

Most supply chains, as shown in Figure 1, have the following standard process: raw materials are supplied to the manufacturing industry. Then the finished products are shipped to the warehouse or the distribution center. From this point onwards, there are two main ways of distributing goods: traditional distribution to supermarkets and retail stores; or a di-

rect delivery system for customers. LML refers to the final leg in the system involving the direct consumer channel.



Figure 1. Last-mile logistics in basic supply chain
(Source: Author's work based on Gevaers, et al., 2009)

In short, *LML is the last stretch of a business-to-consumer (B2C) parcel. It takes place from the order penetration point (i.e., fulfillment center) to the final consignee's preferred destination point (e.g., home or cluster/collection point), for the reception of goods.* (Lim, et al., 2015).

2.2 Main stakeholders in last-mile logistics

There are several stakeholders whose different behaviors and objectives will affect LML organization and modeling. The four key stakeholders are: shippers, freight carriers, consumers, and administrator (Maša, 2015). Their main objectives can be listed as follows:

- Shippers tend to minimize their delivery costs while optimizing the shipping mix and increasing customer insights.
- Freight carriers aim to reduce transport costs while increasing shipment accuracy and consolidation deliveries.
- Consumers whose satisfactions can be used to measure the quality and performance of LML. Their demands include flexible destination, speed delivery, and simple tracking, as well as lower shipping prices.

Administrators try to preserve and improve the social life and environment within their area of responsibility. Concerning LML, the central role of the administration is to control and reduce the negative impacts of freight transportation (Wohlrab, et al., 2012) such as: reducing congestion, reducing accidents, increasing low-emission vehicles, and so on.

2.3 Last-mile logistics trend in Industrial Revolution 4.0

Industrial Revolution 4.0 (hereafter IR 4.0) has impacted the whole supply chain. In the next part, the author will analyze the LML trend in IR 4.0 in

two aspects: consumers' demands and technologies used in LML.

a. Consumers' demands

Consumer' demands may re-shape the LML operations. LML companies (including shippers and freight carriers) have to find a more efficient way of transportation and distribution to meet the requirement of faster fulfillment. Delivery within the same day of order tends to be the priority option of consumers.

The development of e-commerce in IR 4.0 has changed the shopping habits of consumers. Customers prefer to shop online rather than directly come to stores. The result of this change is the "growing volume of shipments and the proliferation of possible delivery locations for companies engaged in delivering goods" (Choe, et al., 2017).

The other demand of consumers is about the destination of goods. They require more options for delivery with various locations so that they can pick up the shipment smoothly. This demand leads to the trend of city warehouses. Amazon is a forerunner in this area by building at least 58 city warehouses in 2016.

Lastly, the "want to know" demand (Choe, et al., 2017). Consumers would like to check the status or track the location of their shipment at any time. This requirement influences the LML trend and the use of smart technology for tracking purposes. Every shipment will be notified to customers through SMS or email.

With all the demands mentioned above, LML operators have to deal with the difficulty of satisfying consumers' needs while they are not willing to pay the extra costs.

b. Technologies used in last-mile logistics

Applying top technology trends of IR 4.0 is becoming the best solution for LML companies. Three top technology trends for LML are Big data, Internet of Things (IoT), and Artificial Intelligence. Below are examples of leading trends in LML:

- In the digital age, the amount of data increases with the multiplier. Data sets can be so large and complex and become difficult to process using traditional data processing applications and existing data management tools. Big Data helps transportation companies and e-commerce businesses to plan more effectively and make data-driven decisions based on actionable insights. Applications of Big Data could be a Warehouse Management System (WMS), Route Mapping Software, and so on.
- Delivery by driverless cars, drones, and robots will change LML organizations sooner. The benefits of these technologies are: 1) Reducing emis-

- sion, 2) Reducing road accidents, 3) Increasing delivery speed, and 4) Reducing transport cost for small package or parcels.
- Augmented reality applications provide a much broader range and nuances in the size and features of delivery points. For example, Google Maps has added augmented reality to assist people who have difficulty reading maps. Applications of augmented reality will make the LML process more convenient if delivered at unfamiliar locations.

3 LAST-MILE LOGISTICS IN THE INDUSTRIAL REVOLUTION 4.0 IN VIETNAM

The most significant impact of IR 4.0 in Vietnam is the steady development of e-commerce. Vietnam currently has one of the fastest-growing B2C e-commerce markets in Southeast Asia. In 2018, Vietnam's e-commerce continued to grow comprehensively, with a growth rate of over 30% (VECOM, 2019). According to the E-commerce industry in Vietnam report by the EU-Vietnam Business network (2018), with rapid and continuous growth since 2015, the e-commerce industry in Vietnam is forecasted to continue rising rapidly from 2017 to 2020, accounting for 5.2% of total retail sales. According to a report by Ken Research, Vietnam E-commerce logistics market value is reported to be EUR 90 million in 2018 and projected to grow at an annual rate of 42% per year till 2022 (Yen, 2019). This is a great opportunity as well as a challenge for e-commerce logistics, especially LML.

3.1 Opportunities

The current booming of Vietnam e-commerce, therefore, has created very high demand and pressure for logistics services as well as triggered a promising e-logistics sector, particularly LML, which is essential for e-commerce business because it interacts directly with end customers. Investing strategically in LML has been the pivotal factor for any e-commerce player to surpass the competition. In order to satisfy consumers' demands, some e-commerce platforms develop their own logistics department to carry out warehousing, packing, and shipping, such as Lazada, Tiki, Thegioididong, FPT shop, and so on. Nevertheless, not all online retailers can carry out logistics activities by themselves due to limited resources such as warehouses, human resources, and transportation. Therefore, relying on 3PLs partners is the best option for cost-efficiency, and fast delivery service is really a "delicious cake"

that every e-logistics service provider wants. The overview of the courier market in Vietnam is as follows:

- First, traditional postal service providers such as VN Post, EMS, and Viettel Post have joined the fast delivery service business. Their advantage is the existing nationwide post office network so that they can deliver goods to rural areas.
- Second, the customers' demand for faster delivery has brought a massive opportunity for logistics startups that can bring in technology solutions to improve quality service and optimize the operating system. Some startups such as Giao hang nhanh (GHN) and Giao hang tiet kiem (GHTK) become the delivery partners of the key e-commerce platforms in Vietnam. (Example: GHN is a delivery partner of Lazada, Shopee, Tiki, and Sendo).
- Finally, multinational companies, such as DHL e-commerce, and Grab Express, have also jumped into the field, heating competition. International logistics service provider DHL e-commerce has announced the introduction of the DHL Parcel Metro Same Day service in Vietnam's in Ho Chi Minh City and Hanoi. The service allows Vietnamese online retailers to offer same-day delivery to customers in both cities with real-time tracking and rescheduling of deliveries through DHL's digital platform.

In another story, on-demand service (crowdsourcing) is one of the hot trends recently. This service appears to meet the need for time-sensitive delivery, especially in the food delivery segment. IR 4.0 has promoted the development of some apps on smartphone. For example, when customers make an order of foods, the apps automatically detect their locations to recommend some restaurants nearby. A shipper will then be chosen to deliver the foods to the consumer. Consumers can then track the real-time location of the driver in the app. This trend has opened the playground for several players such as Now, Lala, Vietnamm, Lixi, Loship, GO-VIET's GO-FOOD, Grab's GrabFood, and many other small startups.

3.2 Challenges

The first challenge for LML in Vietnam comes from the competition of courier companies. As mentioned above, the fast delivery market is promising land for investors. On the other hand, this is really a fierce battle. Big players in the field of e-logistics are continually investing in fast delivery services: Grab signed a strategic partnership agreement with Vietjet Air, tech-based courier Swift247 to launch an

integrated express digital platform that provides delivery solutions by ground and air in Southeast Asia; GHN opened a fully automated warehouse in Hanoi to support its quick delivery services and will open the second warehouse in Ho Chi Minh City before November 2019. At the same time, delivery companies are trying to increase their competitive advantage by reducing shipping time: Tiki became the first e-commerce retailer in the country to implement a two-hour delivery promise; Shopee offers delivery in four hours; Sendo in three hours', and Korea's Lotte.vn even promises to deliver certain products within one hour. According to Do Hoa, CEO of business consultancy IME Vietnam, "In this competitive stage, large apps with many services will have an edge because they can cross-subsidize express delivery with profits from other segments, allowing them to hang on for longer", and the advantage belongs to large enterprises who can mobilize significant capital investments that will do small businesses with less financial resources will be eliminated sooner or later.

The second challenge is the underdevelopment logistics infrastructure. Narrow roads and traffic jams in big cities like Hanoi or Ho Chi Minh may become the "nightmare" of LML providers. Endless stories of high congestion in Ho Chi Minh city can threaten the courier companies' commitment to delivery lead times. Besides, the means of transportation in e-logistics is currently not diversified, lacking, and high cost. In Vietnam, the vehicles used in last-mile delivery are mostly motorcycles. However, motorcycles are not designed for delivery, and LML companies are improving them by adding boxes with low carrying capacity.

The third big challenge is the consumers' behavior in payment. Vietnamese prefer offline payment for online shopping, partly because of fear of online fraud. Customers prefer Cash-On-delivery (COD) and Open Box services that allow them to check the goods upon delivery, and they have the right to refuse to pay if the products do not meet their expectations, which triggers a higher cancellation risk. There is a severe problem of COD which is so-called "boom" in Vietnam: customers order but refuse to receive the shipment with much unacceptable reason such as "do not have enough money", "do not like" or simply cutting off all contacts with online retailers and delivery companies. This causes losses for both online shippers and delivery companies because of incurring return costs, and loss of value of goods for those items that cannot be resold like food. On the other hand, carrying a large amount of cash may lead to the risk of loss or robbery for drivers.

The final major challenge is the shortage of technology. There are two respects about applying technology in e-commerce: 1) for e-logistics providers: the application in e-logistics to serve e-commerce is still limited. With the explosive output of e-commerce, the failure to apply automation systems is a significant barrier. The use of robots or drones in the LML in Vietnam is also impossible due to high investment costs, inadequate infrastructure, as well as the safety of shipments, is not guaranteed. 2) for customers: not all customers are technologically proficient, especially those over 50 years old. For example, changes in Shopee's shipping discount policy may embarrass them. Instead, they would prefer to use the services of traditional postal businesses like VNPost.

Other challenges that LML in Vietnam are facing can be listed below:

- Legal corridors and administrative procedures: in Vietnam, there are no laws for e-commerce as well as the logistics industry for e-commerce. Typically, for traditional logistics, a red invoice is a mandatory document to be allowed to transport. However, with LML, before customers receive and pay orders, it is not considered a successful transaction that is entitled to issue red invoices.
- Human Resources: including the lack of qualified middle and high-level human resources, the shortage of delivery staff, and the ability to retain talented staff of LML enterprises.
- Poor quality addresses, rural areas, and failed delivery attempts.
- Inaccuracy in the time and place of delivery of customers causes extra costs of redelivery.

4 CONCLUSION

The growth of multi-channel e-commerce and retail, coupled with the increase in consumer expectations for express and free shipping, has put pressure on LML administrators. In addition to price and delivery time, customers also set out many criteria to choose from, which LML service providers should pay attention to: Professional level of employees: employees are trained regularly and can produce certificates when required. This professionalism is also demonstrated in the workmanship and ability to install products sold to customers. Ability to continuously access and monitor the delivery status of orders. Flexibility and ability to provide accompanying services. Customer service after delivery, which helps improve reverse logistics performance.

Today, with the emergence of new business models, new technologies, collaborative software, and

applications help reducing shipping costs, providing more flexible delivery options, and increasing customers' satisfaction. However, technology application is not the only solution for LML, and not all logistics enterprises can invest in technology to improve their LML services. In that case, LML businesses can take advantage of all the resources they have, such as customer service centers and social networking sites, to meet customers' requirements. First, standardizing the distribution process will lead to more accurately and timely LML services. Careful handling during packaging and transportation to ensure the safety of goods should also be emphasized. In addition, the flexibility in payment methods also helps customers more comfortable when ordering. Logistics providers can apply a solution for delivery several times a day before returning goods to the warehouse to reduce the number of missed shipments and reduce customer complaints. Alternatively, just pick up the phone to redefine the most convenient delivery location for customers at present to reduce shipping costs for LML.

Regarding state management, Vietnam needs to improve its infrastructure system. In addition, there is a need for a legal mechanism for logistics in e-commerce to protect the rights of online retailers, delivery companies, and customers.

Vietnam E-Commerce Association (VECOM). 2019. Vietnam E-business Index 2019. Page on the VECOM's website. Retrieved from <http://en.vecom.vn/document/17185>

Yen Hai.2019.Demand for e-logistics in Vietnam projected to boom. Page on Hanoi times. Retrieved from <http://www.hanoitimes.vn/economy/trade-service/2019/01/81e0d1c0/demand-for-e-logistics-in-vietnam-projected-to-boom/>

REFERENCES

- EVBN.2018. E-commerce industry in Vietnam report. Page on the EU-Vietnam Business network's website. Retrieved from <http://www.ukabc.org.uk/wp-content/uploads/2018/09/EVBN-Report-E-commerce-Final-Update-180622.pdf>
- J. Wohlrab, T.S. Harrington, J.S. Srai. 2012. Last Mile Logistics Evaluation - Customer, Industrial and Institutional Perspectives. *POMS 23rd Annual Conference*. Chicago, Illinois, USA
- Maša Slabinac. 2015. Innovation solutions for a "last-mile" delivery – a European experience. *15th international scientific conference Business Logistics in Modern Management*. Osijek, Croatia
- Roel Gevaers, Eddy Van de Voorde and Thierry Vanelslander. 2009. Characteristics of innovations in last mile logistics - Using best practices, case studies and making the link with green and sustainable logistics -, *Association for European Transport and contributors*
- Stanley Frederick W.T. Lim, Xin Jin and Jagit Singh Srai. 2015. Last-mile logistics models: A literature review and design guideline. *20th International Symposium on Logistics Conference*. Bologna, Italy
- Ted Choe, Scott A. Rosenberger, Mauricio Garza, Jon Woolfolk. 2017. The future of freight. How new technology and new thinking can transform how goods are shipped. Page on Deloitte's website. Retrieved from <https://www2.deloitte.com/us/en/>