

INDUSTRY 4.0 IMPACT ON LOGISTICS IN VIETNAM

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Abstract

Recently, the industrial revolution 4.0 has been mentioned frequently and it has been impacting much on many fields from systems of production, management, business administration to the whole economy of the country, labour market, ... It is like a new wind bringing a lot of opportunities and also many challenges for every country in the world.

The opportunity is that all nations has the same starting point in the 4.0 revolution. The challenge is that by the impact of technology, cheap labour is no longer an advantage or the gap between the rich and the poor more and more is getting high. So many countries will have to find ways to adapt to this trend.

Unavoidable from the impact, the logistics industry is also many advantages and disadvantages caused by industry 4.0. These influences have become the premise for the logistics industry is moving to adapt to the industrial 4.0

Keywords: industry 4.0; logistics, trend of logistics in Vietnam.

1. Impact of the industrial 4.0 to the world

1.1. The industrial 4.0 – concept and identification [1]

Back to the human kind's development history, many revolutions has taken place, helping the human kind to take large progresses. It may be seen that the human kind has experienced 03 industrial revolutions and now is at the beginning of the 4th one. Details are as follows:

- The 1st industrial revolution started at the end of XVIII century, marked by the birth of steam engine, internal combustion engine, opening a new era of machinery production and trading development.

- The 2nd industrial revolution started at the beginning of XX century, with the invention of electricity generator and electricity engine, opening the era of mass production using electricity.

- The 3rd industrial revolution started in the 1960s – 1990s, creating semi-conductor, electronic appliances, inventing computer and internet, providing the ability of communication, supervision and adjustment of manufacture procedure.

The strong and comprehensive development of digital technology, especially the Internet, has soundly changed the global life of socio-economy. The 3rd industrial revolution itself became the foundation for the 4th industrial revolution.

The 4th industrial revolution (industry 4.0) is digitalizing the value chain from factory to customer, which combining the activities of logistics, production, informatics technology, technique... to digitalize business activities. The 4th industrial revolution is very different from and more comprehensive than the previous revolutions. It is the trend of combining virtual system and entities. Internet connects everything (Internet of Things – IoT) and Internet connects every system (Internet of Systems – IoS).

The specific characters of this industry 4.0 include the Cyber Physical Systems – CPS), “smart products” with sensor alerting machines to how they should be treated; procedures will have self-ruling right within a various level modules. Smart embedded equipment will work together through a wireless network or through the “cloud”. industry 4.0 can be understood as creating smart factories with machines designed to connect with Internet and with each other’s through a system which can self-image the whole manufacture procedure to make the final decision.

Industry 4.0 is a place to cultivate and develop new technologies such as Nano, 3D printing, molecule biological technology, genetic technology, artificial intelligence, ... This technology will connect all people in the world, enhance activities’ productivity of enterprises and organization...

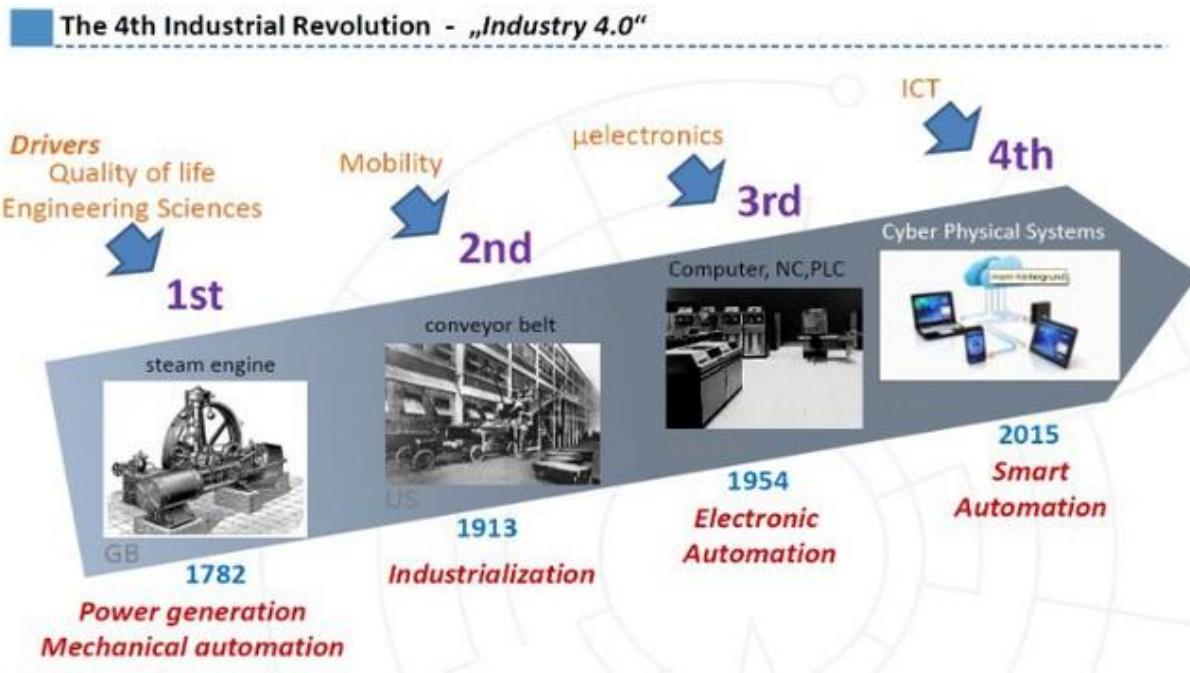


Fig. 1. Industrial revolutions in human kind’s history

1.2. Impact of industry 4.0 to the world

Industry 4.0 has deleted all boundaries among physics, biology, digital technique through a combination between virtual system and things. It impacts on all areas from the system of production, management, business corporate governance to the whole economy of the country, labour market ... Main impacts are listed below [1]:

- At first, every step of manufacture process is automatically connected. It is presented through: (1) Combining the sensing technology, big data analysis, cloud computing and internet connecting things to promote automatic machines and smart production system. (2) 3D printing technology supports the manufacture of completed product, it prints the products without any middle steps, which help reducing manufacture cost.

- At second, new technology will impact on every economy and challenge the role of human. New technology will cause hazards of internet security, directly affecting the whole global. Countries will have to focus on managing technology comprehensively. Industry 4.0 will make chance for people with high adaptability.

- At third, Industry 4.0 makes disadvantages for low level labour and then extends the gap of richness and poorness. However, socio-economy will achieve a balance if social leaders, social and business organizations get escape from the trail of old thinking and methods. This is also same as that from political decision, strategy, business model to decision of investment in training human resource or research and development are considered and solved obsoletely. In industry 4.0, talent and knowledge will be the most factors of the manufacture process. This will increase split the market labour into levels.

- At fourth, industry 4.0 will increase the right of people to involve in managing nation through presenting their political opinion. So, that, the Government, although supported by new technology in controlling the public, still have to cope with the pressure of changing to plan and implement policy. The society is more and more open, transparent and democratic.

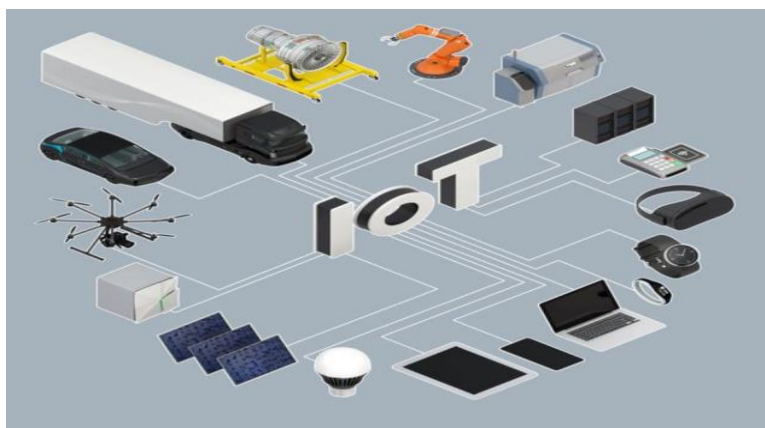


Fig. 2. Internet of Things - IoT

*** Overview of Industry 4.0's impact on Vietnam [2, 3, 4, 5, 7]**

It can be said that industry 4.0 is bringing both golden opportunities and huge challenges to developing countries in general and Vietnam in particular.

- Golden opportunities

In today's trend, industry 4.0 is at its beginning stage, countries have almost "equal" opportunity of approaching this revolution. Hence, Vietnam can take the advantage of this opportunity to shorten the gap with developed countries. To do this, Vietnam shall have to go straight to researching and applying or attracting new technology investment because these new technologies don't depend on the old technologies, from which to shorten the gap of development. At the same time, with current average income of Vietnam people, they already came in for scientific achievement – modern technology, using smart phone and popular internet connection.

- Huge challenges

Industry 4.0 has placed Vietnam in front of a huge challenge: profuse and cheap labour source is not a factor creating competitive advantage and attract foreign investment to Vietnam any more.

With modern technology, industry 4.0 will use machine to replace human in the whole process of manufacture. Therefore, instead of holding an advantage of cheap labour force, Vietnam will turn into suffering from an "obsession" of joblessness and increasing social insecurity. Hence, Vietnam's objective of becoming a processing and manufacturing center of the world in 2015 with the ambition of obtaining much employment will become abstract under the affect of industry 4.0

2. Industry 4.0 impacts on logistics

There are many concepts of logistics, each organization has an opinion about logistics. However, the most popular one comes from International Committee of Logistics Administration, as follows:

"Logistics is a process of planning, implementing and managing effectively the flow of capital in order to control the process of circulating and reserving cargo from the phase of raw material preservation to the phase of finished product completion to meet customer's requirements" [10]

So, logistics can be imagined as a chain of continual activities which are interrelated and interacted, in a close relationship from manufacture to consumption. This is shown in below map

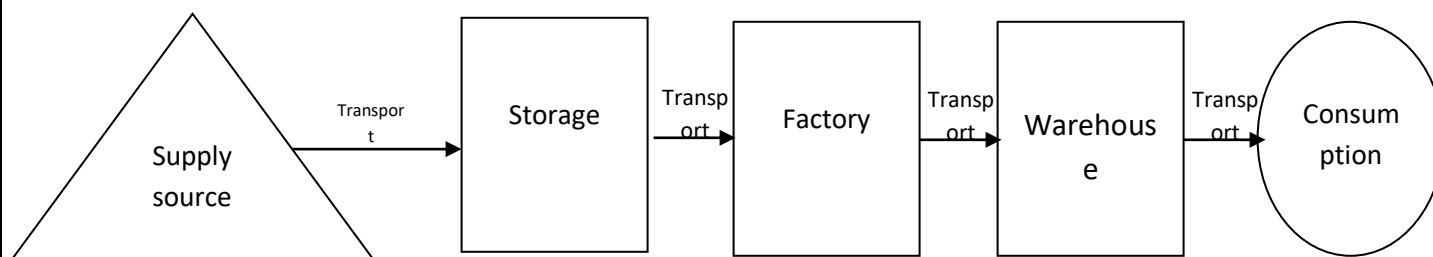


Fig. 3. Chain of Logistics activities

As we know, with today technology, smart warehouse management system, application of technology in using container, unmanned transport system, association of steps in logistics will be more complete. However, these factors develop separately, not uninterruptedly. Therefore, when industry 4.0 develops, it connects all phases of logistics and automates the whole supply chain. Hence, industry 4.0 definitely affects on the chain of continual activities from manufacture to consumption of logistics.

Industry 4.0 is considered a new wave, impacting on logistics and it will create many highlights in the future [6, 8, 9, 11]:

** Smart logistics*

Automatic computer system controls the whole working process. The computer system also operates independently, it can manage all processes independently. With modern web technology, because it allows direct interaction among relevant people, cargo storage, distribution and transport will be different in comparison with how they are at the moment. Service management using IT and service provision through Internet will create new business models, new distribution channels and break the current logistics design.

** Smart factory*

New technology creates smart factories with outstanding features like independent module's components and their inter-communication ability under the support of information system. Then people play the role of supporting and executing production process. Operation of the smart factory is shown in 3 phases of suppliers, manufacture process and customers. While the *Suppliers* require transparency of the smart supply network, the factory shall manufacture to meet the needs of *Customers*. As for the manufacture process, it requires many factors, at least an automatic manufacture system implementing smart decision with data storage and processing in cloud and ensuring good network security.

Therefore, this will affect the current arrangement of factory, change product designing method, marketing strategy and the whole distribution system of the enterprise.

** Data connection and transport logistics*

Under the impact of industry 4.0, especially the impact of IoT, smart transport means are optimized in the conditions of available infrastructure. In addition, data of transport capacity, whether, traffic and means associated in the cloud is shared, creating transportation flow from the phase of materials to the phase of transporting products to consumers more effectively. Not only production line or factory, but also the big data system and forecast analysis is used flexibly in both processes of manufacture and business – this will put much pressure on organizations to be able to use these data extremely and effectively

** Smart transport system in warehouse*

Warehouse system is managed by automatic forklifts. These forklifts feel surrounding environment independently by laser scanners, infrared sensor, sensors and direction control of corresponding targets. This system does not have the central controller, equipment processes transport orders, establishes the rules of controlling the route and shares data of each forklift's position in ware house. If there is any problem of interruption, the forklift will automatically react and recover the problem.

** High quality human resource*

Increase of smart factories in future makes competence (not capital) become the core factor of the production. This makes the need of using high quality labour increase, requiring supply chain managers to improve skills and competence.

** Some proposals in managing logistics to adapt to industry 4.0*

- In order to make acquaintance, exist and develop in the context that the global economy is entering industry 4.0, logistics managers have to focus on the 03 basic points:

+ One is good management and treatment of information: industry 4.0 creates a huge data quantity, this data will be priceless resources if well exploited, otherwise, the information system will be disorder and operated ineffectively. This will make IoT a key but also a challenge which needs overcoming of logistics industry.

+ Second, one is development of an optimal service supporting system: managers have to make a business network absolutely helping customers to directly contact with producers through network system. Customers can order with various options and adjustment through internet. At the same time, the warehouse system is also automated to optimize cargo and inventory management.

+ Third, one is ensuring high quality labour: To ensure a high quality and profuse human resource, enterprises have to make labour force order with training institutes. And, cooperating in training to have a human resource meeting the need.

- On the other hand, for logistics to well adapt to industry 4.0, the Government of each country shall have supporting measures, details as follows

- + Improving infrastructure and technique with investment and strategic decision, e.g. the road and airport network
- + Reducing business expenses by reducing enterprise's tax
- + Enhancing supports for developing and creative enterprises

* In Vietnam, although logistics is only a young field, but it has developed largely in the economy. With much attention from enterprises, logistics is having a quite important position in transportation enterprises. However, it also needs to confirm that Vietnam young logistics industry is not correctly logistics but only focusing on transportation.

As in the world, logistics in Vietnam also bears impacts in many aspects, however, thanks for industry 4.0, the gap between logistics in Vietnam and in the world, will be shorten. Taking advantage of this opportunity, it is hoped that in future Vietnam will have a developed logistics system through smart factory or the connection of data in a big system... But, industry 4.0 will impact on the management of logistics in Vietnam with many serious challenges, especially the impact on the advantage of cheap labour force. To overcome these challenges, managers of logistics in Vietnam should have measures like designing a good, transparent, clear supply network; planning needs meeting business requirements...

Conclusion

The trend industry 4.0 is an indispensable trend of the whole world today, it affects all aspects of the socio-economic life. Therefore, included in this trend, logistics is also impacted soundly on many aspects, from creating smart factory, managing warehouse through an automatic system to connecting the huge data system of logistics industry and ensuring high quality labour force. The article also addresses that managers in the world in general and in Vietnam in particular should have effective responses in order to ensure an effective logistics system under the impact of industry 4.0.

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