



# Global Perspective of Digitization and Innovation in Shipping Industry

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**Abstract:** Digitization and innovation is transforming the shipping industry. This will have considerable improvements on revenue and cost. Already, several companies are on the top of that, other companies still have the opportunity to follow and adopt the digital transformation.

Digitization in shipping industry can take different forms to improve operation and business in general. Among the activities that have been already digitized package tracking, document management, network design, pricing, and empty container repositioning. Of course digitization has two sides, internal one within the shipping company itself and the other side that deals with customers. To succeed in adopting digitization, any company should have a clear vision about digitization, integrating new technologies, IT capabilities and mindsets into their traditional business.

In this paper, related literature was reviewed, the impact of logistic industry as a service sector on economic development was identified. Shipping industry as a major component in logistic was discussed. The role of digitization and innovation in developing logistic and in particular shipping industry was identified. As a case study, the case of KX Group, which is a leading global provider of innovative and fully integrated supply chain solutions was discussed. Results of using digital solutions are presented and analyzed. CAGE analysis was carried out to understand how the digitization in KX Group was utilized and perceived in different countries. Analysis showed a big gap between USA and Middle East & Africa numbers on the online bookings.

**Keywords:** Digitization, Logistic Industry, Shipping, Supply Chain Management, CAGE Analysis

## 1. INTRODUCTION

Logistic industry includes several services, these include transportation (shipping), insurance, customs clearance, handling, storage, packaging, inventory management, customer relations and services. According to the Council of Supply Chain Management Professionals [1], management of logistics includes positive, active and productive planning, implementation and control of commodities, labor and information from starting point to consumer. Transportation (shipping) is the key factor in logistic, development of shipping infrastructure has an important role in global economy. Investment by concerned firms in reducing shipping costs and increasing efficiency gained great importance, this is true at nations' level [2].

Advancements in information and communication technologies, and shipping modes resulted in globalization in international economy. This resulted in an increase of multinational corporation share in world economy, and growth of international trade and logistic industry. Logistic industry positively affected economy. Effectiveness of logistic industry enhanced competitiveness of corporations and national economies. Several studies carried out to investigate the correlation between logistic growth and economic growth [3-6].

There are key disrupting factors for logistic industry: changing customer expectations, technological breakthroughs, new entrants to the industry and new ways of competition and collaboration. Individual and industrial customers expect to get shipments faster, with more flexibility, and more transparent at a lower price. Technology is changing all aspects of operations in logistic companies.

Digitalization is a prerequisite for success, a digital strategy which is integrated into business strategy is essential. Most of new entrants to logistic industry are starts-up that are using new technology. Horizontal collaboration in last mile delivery is an example of redefining collaboration. Companies like FedEx and DHL have been working with national postal companies and local small companies for many years.

Labor is a major element of logistic operations. Digitalization allows firms to offer better service and save money at the same time. Industry's most labor intensive processes are on the way to being fully automated. Warehousing is already equipped with automated solutions, more sophistications are introduced.

In this paper, related literature will be reviewed, the impact of logistic industry as a service sector on economic development is identified. Shipping industry as a major component in logistic will be discussed. The role of digitization and innovation in developing logistic and in particular shipping industry was identified. As a case study, the case of KX Group, which is a leading global provider of innovative and fully integrated supply chain solutions will be analyzed and discussed.

## 2. SHIPPING INDUSTRY SECTOR

The first specialized cellular containerships were delivered in 1968. In the 1970s the containerization process expanded rapidly due to the adoption of standard container sizes and the awareness of industry players about the advantages and cost savings containerization brought [7-8]. Although container shipping occupies a relatively minor share of the whole maritime fleet (about 12 percent), it is the fastest growing sector and currently concentrates more than half of world trade value, regularly expanding to other commodities.

As a result of globalization, the amount of trade through intercontinental shipping using containers has increased dramatically [9]. In 2014, the number of containers shipped globally was 182 million TEU (twenty foot equivalent units). With China becoming as the world factory, trade increased accordingly. The container-shipping industry supported much of this trade: in 2015, China imported and exported 52 million 20-foot equivalent units, a fourfold increase on the 13 million twenty-foot equivalent units (TEUs) of 2000 [9].



**Figure1.** Container-trade growth has slowed since the financial crisis [9].

Figure 1 [9], shows Decades of growth in container trade, far exceeding global GDP growth, quickly followed. Even as recently as 2001–07, container trade volumes were growing by about 11 percent a year [9]. The underlying growth of trade faltered after the global financial crisis: since 2012, the volume of traded goods (including non-containerized goods) has increased approximately in line with GDP. The World Trade Organization (WTO) reports that the volume of merchandise trade rose by 1.3 percent in 2016, the first time since 2001 that trade growth has lagged behind global GDP growth.

### 3. DIGITIZATION AND INNOVATION IN SHIPPING INDUSTRY

Digitization is becoming very powerful economic tool and major disruptor [10-14]. Innovations in information technology paved the way for many technological innovations, after the rise of information technology in the 1990s it is named the age of information [16-16]. The modern understanding of digitalization has been transferred from using computers to using technologies to handle business in both business to business and business to customer forms.

Companies develop and follow a great variety of innovation based strategies, the objective of such strategies is to increase competitiveness and business performance [17,18]. Depending on the strategy, different types of innovations can be introduced and implemented to achieve specific objectives [19,20]. There are two types of innovations that can be recognized: product and technical process innovations [21,22]. Developing new products will enable companies to improve and maintain their position in an existing market or establish it in an emerging one. When companies improve processes, they increase productivity and efficiency. Also they lower production cost by increasing flexibility, adaptability, and agility [22].

Digital supply chain management systems extend coordination beyond the internal organization of production, which support the growing need for production according to customers' individual requirements. Digitalization facilitates data exchange and processing in vertical and horizontal networks. Better cooperation with suppliers, customers, and distributors will be achieved by applying digital technologies [23, 24]. Such a closer collaboration with partners may contribute significantly to effectiveness of their resource, supply chain and logistics management system.

Digitalization and innovation impact society at several levels. On the production side of the economy, digitization and innovation enable the automation of business operations, yielding operational efficiencies, such as reduction of transaction costs, with an impact on productivity. Also, digitization and innovation provide new business opportunities, impacting employment and entrepreneurship. Digitalization and innovation have a positive impact on the delivery of public services, digitalization enhances the provision of health and education. Digitalization has an impact on human relationships, facilitating social inclusion and communication.

However, digitalization could also result in potential negative effects, such as work force disruption, the disappearance of companies, cyber crime and social anomie.

### 4. ANALYSIS

KX is one of the top three freight forwarders companies worldwide. It is number one when it comes to sea freight and number one when it comes to air freight. KX offers plenty of services like air freight, sea freight, over land, and contract logistics. KX has more than 1,300 offices in over 100 countries, with around 100,000 employees. KX strategy called KX-NextGen (next generation) where they focus on three pillars: Technology, People, and Customers.

Technology is very important because it helps our customers to make their experience much better and it will help them to have better supply chain. People is the real assets KX has and they believe in empowering their employees. And of course customers are the main focus.

They want to be the best company to work with, and the best company to work for. KX business model is based on zero assets, and the only assets they have are the employees. Based on KX strategy (KX-NextGen) it's clear how digitalization is important to KX.

They have one team called digital & innovation team where they work on big data projects, and they create online platforms which help customers & KX staff to have better operations. KX has so many digital products like FreightNet, Sea explorer, Logindex, etc

FreightNet is an innovative tool which help customers to generate their own quotation in less than 60 seconds, place bookings, and track their shipments online. Sea Explorer is an innovative platform which offer overview of their sea freight services across the world. Based on reliability, sustainability and transit time Sea Explorer provides a digital insight into the biggest service network for sea freight, and you can see the CO<sub>2</sub> emission. Logindex is an innovative tool based on big data which help to predict the economy per country or region based on logistics industry.

Since digitalization helps to have efficient operations to KX and of course to customers, in nutshell to add values to customers. KX is working on the transformation and they take it very serious.

Moving forward, KX Middle East Africa has decided to set a challenging target which is to convert more than 40% of the manual booking process to digital process through FreightNet platform. KX network (supply chain) main members are customers, suppliers, and consignees.

The traditional process is that the customer sends email to KX asking for quotation, then KX will contact their counterpart to ask for price which might take as average two days, and if it was Thursday afternoon might take more than days because of the weekend.

After customer confirm the shipment, there will be back and forth emails to confirm the cargo details (weight, dimensions, quantity, etc) and documents related to the shipment which might take another day.

Then KX counterpart will contact the customer supplier to arrange the pickup, and at the same time they will keep the customer updated regarding the status of their shipment by emails, which will take a lot of time and efforts as well till last the mile delivery to their consignee.

KX found that this process takes so much time and efforts for supply chain partners. So, they decided to disrupt and change the manual way of booking and communication between the customers and KX using digital tool which is FreightNet.

KX created innovative tool which will allow customers to generate quotations in less than 60 seconds, place online booking and track all their shipment in one platform.

So the new process will be that customers will generate their own quotation, place booking, and track their shipments without sending any single email. All the information will be reflected into the operational system where operators can execute the shipments.

It's obvious how digitalization is helping customers and KX staff to have efficient operations. The data used in this analysis is taken drawn from Freight Net platform at KX. The number of the online bookings per region for the 2017 and 2018 are shown in the table 1:

**Table1.** *The number of the online bookings per region*

	Europe	Middle East and Africa	North America	Asia
2017	33,530	5,166	30,000	28,200
2018	44,000	7,502	43,596	31,344

The number of bookings in Middle East & Africa region per month for the 2017 and 2018 are depicted in Table 2.

**Table2.** *Number of bookings in Middle East & Africa region per month*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	240	247	375	422	439	457	439	487	517	527	540	476
2018	497	500	625	694	671	570	632	558	680	746	679	650

The number of online bookings in UAE, Turkey, Saudi Arabia, & Kenya for the 2017 and 2018 are shown in Table 3.

**Table3.** *Number of online bookings in UAE, Turkey, Saudi Arabia, & Kenya*

	UAE	Turkey	Saudi Arabia	Kenya
2017	885	1,001	71	60
2018	2,400	1,290	82	80

KX is leading the industry when it comes to digitalization, they started working on it since 2012. Now, the rest of the big freight forwarding companies are following KX steps.

Last year Panalpina co, and Agility Co. designed similar platforms to help their customers, and this year DB Schenker joined the crew. This shows how the industry is changing, and how digitalization is disrupting the whole industry. Big companies can see the value of innovation and digitalization when it comes to cost, efficiency and customer service.

**5. DISCUSSION**

If we look into the over view of the online bookings by region in 2018, we will find that the highest number of bookings came from Europe region (44,000), and the lowest number of bookings came from Middle East & Africa (7,502).

As an example of two regions like North America and Middle East and Africa, It’s very clear how there is a big difference between number of bookings between North America & Middle East & Africa. If we look into our data in 2018 we will find that the US received 44,000 online booking year to date. However, Middle East & Africa received 7,502 bookings only year to date.

That means North America region is more advanced and open to digitization than Middle East & Africa region. To have better idea about the reasons behind the big gap between the two regions, CAGE analysis has been used to check the countries background, understand the challenges, and to compare between them.

From Middle East and Africa side UAE, Turkey, Saudi Arabia, Kenya have been chosen. And from North America side, U.S was chosen. Interviews were conducted with customers in 5 countries (USA, UAE, Turkey, Saudi Arabia, Kenya), the purpose of the interviews is to help understand their perspective, and to have a proper CAGE analysis. Names of customers are not disclosed due to compliance and legal regulations.

**Table3.** CAGE Analysis

	Cultural Distance	Administrative Distance	Geographic Distance	Economic Distance
USA	1. American people are open for self service 2. American people trust the online service 3. American people doesn’t mind to pay online 4. Americans usually accept to change 5. USA population: 327,824,695 million [25]	1. U.S government is open for the online solutions and encouraging the citizen to use it 2. U.S government supports tech start-ups 3. U.S has clear regulations & law for the online services & payment	1. U.S IT infrastructure is really advanced compared to the rest of the world	1. Economy is strong and mature 2. A lot of investment on E commerce and technology like Amazon
UAE	1. UAE citizens and expats in UAE are open to self service 2. UAE citizens and expats trust the online services 3. UAE citizens and expats doesn’t mind to pay online 4. UAE population: 9,605,367 million including the expats	1. UAE government supports the online services, and most of the government services are online 2. UAE government supports tech start-ups 3. UAE has clear regulations & law for the online services and payment 4. UAE government strategy to go more digital and to implement digital tools like blockchain	1. UAE IT infrastructure is advanced compared to rest of the countries in Middle East & Africa	1. UAE economy considered one of the best economies in the Middle East & Africa 2. A lot of investments on technology and E commerce
Turkey	1. Turkish people are open to self service	1. Turkey government supports tech start-ups	1. Turkey IT infrastructure is	1. Turkey has a good economy.

	<ol style="list-style-type: none"> <li>2. Turkish people trust the online services</li> <li>3. Turkish People doesn't mind to pay online</li> <li>4. Turkey population: 82,391,356 million</li> </ol>	<ol style="list-style-type: none"> <li>2. Turkey has clear regulations &amp; laws for the online services and payment</li> </ol>	advanced	<ol style="list-style-type: none"> <li>1. However, they are currently facing challenges with their currency</li> <li>2. A lot of investment goes to start-ups and technology</li> </ol>
Saudi Arabia	<ol style="list-style-type: none"> <li>1. Saudi's not open to self service</li> <li>2. Saudi's doesn't trust the online services</li> <li>3. Saudi's doesn't trust the online payment and they always prefer cash on delivery</li> <li>4. Saudi's not easy to change their mindset</li> <li>5. Saudi population: 33,820,243 million</li> </ol>	<ol style="list-style-type: none"> <li>1. Saudi government just started to look into the online services and they will take time to have experience</li> <li>2. Lack of regulations &amp; laws when it comes into online services &amp; payment</li> <li>3. Saudi doesn't support tech start-ups enough</li> </ol>	1. Saudi has a good IT infrastructure	<ol style="list-style-type: none"> <li>1. Saudi economy depends on oil &amp; gas sector</li> <li>2. Not that much of investment goes to technology &amp; start-ups</li> <li>3. Saudi is considered as a rich country</li> </ol>
Kenya	<ol style="list-style-type: none"> <li>1. Kenyan's not open to self service</li> <li>2. Kenyan's doesn't trust the online services</li> <li>3. Kenyan's doesn't trust the online payment</li> <li>4. Kenya population: 51,522,949 million</li> </ol>	<ol style="list-style-type: none"> <li>1. Kenya government has recently decided to start offering online services and it will take time to have the experience</li> <li>2. Lack of regulations &amp; laws when it comes into online services &amp; payment</li> </ol>	1. Kenya has a weak IT infrastructure compared to the rest of the region	1. Kenya economy is weak compared to the rest of the region and there is no much improvement

After reviewing the CAGE analysis, it could be understood why there is a big gap between USA and Middle East & Africa numbers on the online bookings. Based on the analysis, the Americans have more experience in technology and digitization. Not forgetting that Americans mentality are open to self-service, and they trust online services and payments.

USA economy and population are the highest between the chosen countries, so the trading will be way better than other countries.

Comparing the countries in the same region which is Middle East & Africa. Looking into UAE they are leading the region in term number of the online bookings, and it make sense to me based on my analysis, since the government is transforming to digital government, and encourage all residents to use their online services. Turkey is similar to UAE in terms of government regulation, and economy that's why they ranked number two in the region.

Considering countries with low online bookings like Saudi, they have good IT infrastructure, good economy, and high population. But they still have low number of bookings. It's all about their culture, they don't like self-service, and they don't trust online services and payments. Saudis when do online shopping, they still prefer to pay cash on delivery, which explains why they have low number of bookings.

Kenya is the lowest in the region, their economy is not doing well, and they still have poor IT infrastructure compared to rest of the countries in the region.

**6. CONCLUSION**

Globally, there is a growing trend in logistic industry and in particular shipping industry. This has its positive impact on economy. Digitization and innovation have enhanced service sector in general, shipping industry is benefiting from utilizing digitization, and digitization will be propagating fast in this industry. In the case of KX, after adapting Freight Net as a digital tool for online booking, there was an increase the number of bookings in all regions, this increase trend continues with time. The growth value of bookings varies from one country to another. Countries development in utilizing

digitalization is depending on so many factors, like the government, if the government wants to develop the country in a digital way, it will help the rest of the sectors to change. UAE serves as a good example, where the UAE government is going more and more digital which helps the companies to follow, the percentage of booking growth in UAE is 271% in 2018 compared to 2017.

The perception of digitization is affected by mentality and culture, this could be a challenge for some countries, even with a good economy and IT infrastructure, the utilization of digitization may be limited, this is clear in the case of Saudi Arabia.

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