The benefit of digitalisation

IMO MTCC GMN Digital Week
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According to IMO statistics in 2017, shipping has an essential contribution to the world economy since more than 90% of the world’s trade, in volume, is carried by sea.

It is estimated that a 10% to 30% improvement in efficiency in the EU logistics sector has:
- the potential equal to €100 – 300 billion cut in costs for the European industries
- with consequent reduction of 15% to 30% in CO2 emissions

The ports and logistics sector has already used new technologies to a certain extent but five innovations have recently gained uprising significant attention in this sector:
- automation,
- autonomous transport,
- IoT and big data,
- Simulation and virtual reality,
- Blockchain.
Five ICT innovations with the highest impact on ports and logistics

- Automation
- Blockchain
- Autonomous transport
- Simulation and virtual reality
- BigDtaa
Automation

- Logistics automation and robotic operation is the application of computer software and automated machinery and equipment to enhance the efficiency of logistics operations.

- There are six major benefits of applying Logistics Automation in transport management system:
  - *The decrease in Costly Errors*
  - *Availability of Transportation Mode Choice and Real Time Freight Rates*
  - *Increased Customer Service*
  - *Access to Real Time Freight Data and Analysis*
  - *Organizational Control*
  - *Scalability and Speed*

- Automated equipment are currently available for many terminal functions like *ship-to-shore berthing, straddle-carrier ground transportation, the management of container stacks and also trucks loading.*

- A number of this automated equipment can run quite autonomously, while the other ones use remote operators in a safer and more comfortable place.

- Software and sensors are utilized widely for monitoring the practices, which results in an optimised smooth flow of goods through the port, with related savings in time, fuel/cost, and personnel.
Autonomous transport (vehicles)

- **Autonomous vehicles across the Air**: DHL is using drones to deliver medicine to Juist, a small island in Germany.
- **Prime Air** — a delivery system from **Amazon** designed to safely get packages to customers in 30 minutes or less using unmanned aerial vehicles.
- **Autonomous vehicles across the Land**: Dimlers' 18-wheeler Freightliner, called "Inspiration Truck".
- **Google** self-driving car, now is "Waymo".
- **Autonomous vehicles across the Sea**: Rolls-Royce launched a virtual-reality prototype of an autonomous ship.
- **Kongsberg** is developing autonomous / unmanned / self-driving ship control systems.
The purpose of handling a high volume of data at high speed is to capitalize an additional value from the bulk of data.

In logistics, the major part of this data is produced by the growing number of robots and automated equipment and processes. The recent advanced and cheap sensors allow the firms to track the goods and measure the activities.

These sensors make the equipment of the ports and the cargo enable to be “connected and linked”, as part of a wider network of the Internet of Things (IoT).

In logistics, the examples could be the sensors that monitor a reefer containers’ temperature or E-seals.

Network infrastructure at the ports needs to be adequate for the high bandwidth and use cybersecurity for the purpose of IoT applications.
Critical success factors

- Data analytics/ algorithms
- Skills and capabilities
- Business processes
- Data Privacy and Protection
- Quality/ Integrity of data
- Acquisition/ access of data
- Data Governance

Keys aspects

- Digitalization data;
- Structured and unstructured data. Customs, PGAs, other stakeholders, public domains;
- Predictive analytics, artificial intelligence, machine learning;
- New Tools algorithms
Simulation and virtual reality – Digital twin

- The availability of a **wide range of big data applications** will lead to opportunities for port operators, logistics firms, and service providers to take advantages of simulation software.
- In this respect, different **port operations could be modelled** to analyze operational flows, identify the possible barriers, and evaluate various scenarios of design and throughput.
- The simulation will play a more important role when the automated equipment and robotic machinery are used in port and logistics sector.
- For an efficient synchronization of port and logistics activities through simulation, a technology that will support a lot is **virtual reality (VR)**. It assists via expansion of physical reality by adding layers of computer-generated information to the real environment, to support such operation simulations.
- In a port atmosphere, it can be achieved by visualizing enhanced feeds from infrastructure, port equipment, automated vehicles and various types of drones.
Marc Andreessen defined the Blockchain in simple words as “The practical consequence [...] for the first time, a way for one Internet user to transfer a unique piece of digital property to another Internet user, such that the transfer is guaranteed to be safe and secure, everyone knows that the transfer has taken place, and nobody can challenge the legitimacy of the transfer. The consequences of this breakthrough are hard to overstate.”

The blockchain comprises an enormous database running across a global network of independent computers that are collaboratively maintained by distributed participants.

The main difference with data exchange methods is that in Blockchain there is no unit in the supply chain creating “islands of data”.

Opposite to the “islands of data”, the Blockchain is structured on a decentralized and distributed nature, that continuously validate each transaction between all parties and sequentially record those in public “blocks”.

It is about to establishing trust, secured data provision, visibility, networking, and integration of supply chain elements and actors.

However, there are challenges for the implementation of Blockchain such as logistics stakeholders awareness on the benefits of blockchain technology.
The impact of Blockchain in the maritime trade relate financial and insurance services

Ongoing projects are presented in the port of:
• **Antwerp**;
• **Tallinn**;
• **Israeli Ports** with the digitalization of the bill of lading

**Blockchain in Maritime Trade: Challenges**

- New technology;
- Lack of expertise developers;
- Long transaction confirmation time;
- Legal recognition UNCITRAL published “model law on Electronic Transferable Records” they gave consideration to the possibility to use distributed ledgers technologies;
- Interoperability of Blockchain networks;
- Using Blockchain when needed.
Figure 1. Hype Cycle for Supply Chain Execution Technologies, 2018

Technologies of interest:

- Blockchain in Supply Chain
- Real-Time Visibility Platforms
- Mobile Technology for Supply Chain
- Information Hubs for SCM
- RFID for Logistics and Transportation
- Global Logistics Visibility
- Track-and-Trace and Serialization
**REAL TIME VISIBILITY**

**Definition**

Real-time visibility is a core part of logistics technology and plays a complementary function that supports transportation management, warehouse management, yard management and fleet management.

Driven by the "Amazon effect," both commercial customers and consumers continue to have increasing demands around real-time visibility to their orders.
**Definition**

Global logistics visibility is the capacity to track and trace parts, components or products in transit from the manufacturer to their final destination. This includes logistics activities and transport as well as the state of events and milestones that take place before and during transit.

Global logistics leaders are using a variety of mechanisms, such as

- **Electronic Data Interchange** integration with ocean carriers
- **Web portals** for other service providers

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*Example of supply chain*