Automation and virtualization of logistics processes

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Agenda

- Logistics virtualization
- Challenges of the logistics industry in the context of e-logistics and virtual logistics
- Practical Applications
- Marriage of Logistics and IT

dr Jacek Karcz

Doctor of Economic Sciences. A highly motivated, success-oriented, well-educated professional. With over 15 years of practical experience in operational, sales and marketing structures in TSL companies (Gruber Logistics, DHL, TNT, CAT LC, Arcese). Presents a modern and energetic style of work. A person strongly oriented towards both internal and external customers. For 5 years associated with training and research.

Virtual

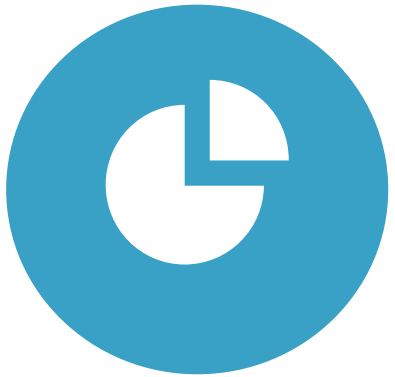
In the achievements of ancient philosophy, virtual means manifested through an effect and not through a form. Currently, the term "virtual" is the opposite of the term "real"

Virtual organization

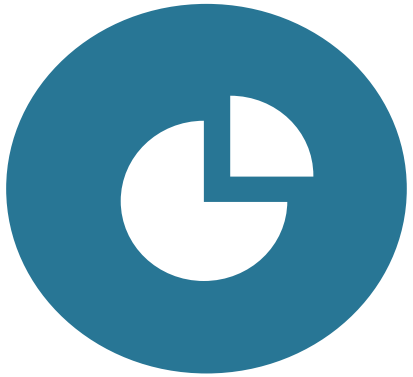
- Process and structural approach
- Application of IT solutions
- Flexibility
- Network character
- New management methods
- New organizational forms

Logistics virtualization

Logistics
and its basic tasks



Implementation of physical flows
Focus on the effective implementation of all physical flows using the most modern tools



Implementation of information flows
Effective collection, processing, storage and exchange of data between entities.

E-economy

e-Commerce

For many companies, new opportunities for gaining new markets, business development or emergence as an enterprise

e-Learning

The use of modern technologies for the development of competences. It allows you to use resources more efficiently during the development process

e-Marketing

Thanks to technologies, development both as a support for currently implemented processes, but also the creation of new ways and new marketing methods

e-Banking

One of the key areas contributing to the development of the e-Economy. Handling electronic transactions and electronic banking itself.

e-Production

It allows access to the production support functions via the website. By using this tool, you can drastically increase the flexibility of production management.

e-Logistics

Implementation of tasks supporting, e.g. e-commerce, but also the intensification of activities resulting from the development of virtual logistics

Industry problems

1. Lack of employees for simple physical jobs:
- Monotony
- Repetitive tasks
- Difficult working conditions

2. Growing minimum wages

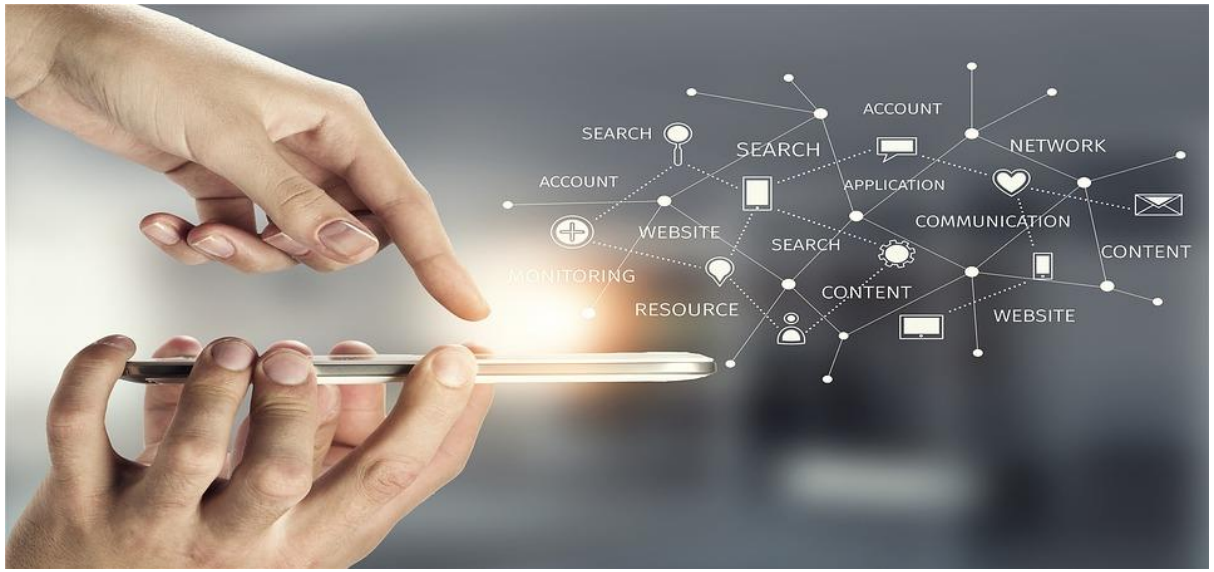
3. High costs of maintaining the availability of staff

4. Low employee efficiency

Big Data – a challenge not for everyone

Big Data as 5V:

Volume - talking about the data volume,
Velocity - processing speed,
Variety - variety of processed data,
Veracity - uncertainty regarding the quality of collected data
Value - somehow defining the market value of the data.



Big Data technologies analyze not only numerical data - known to us from the popular spreadsheet program.

<u>Big Data also processes data from voice sources or video materials.</u>

What drives us?

1. **Development of electronic commerce (e-commerce)**

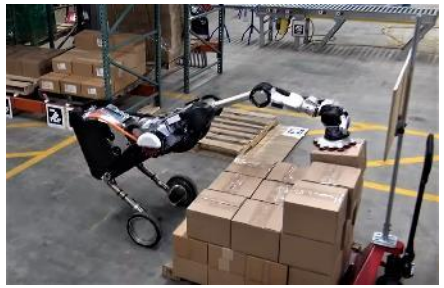
Product distribution has completely changed over the past decade. The products are now individually packaged and shipped directly to customers, rather than in bulk to suppliers, as has been the case in the past. There is a huge variety of packaging requirements, the weight of shipments increases as we purchase heavier and heavier items online.

2. **Lack of available manpower**

Skill gaps affect many industries, not just logistics. There are not enough skilled workers to fill the required positions.

What helps us?

1. Robotization



2. Automation

RPA - Robotic Process Automation

Robotic Process Automation is a technology for automating repetitive business processes using computer programs (robots simulating human work). It is an application that mimics human work and automates repetitive, rule-based manual tasks, as well as a set of algorithms that perform specific tasks. They include working with people.

Bridging the existing staffing gap without increasing employment

Ability to serve more customers

Shorter time of task completion, higher quality and efficiency of work.

Lower costs of handling processes

Robotization in Logistics

DISTRIBUTION CENTERS

Robot applications in distribution centers include packaging, automated supervision, automated inventory management and picking. Other robots that have application are exoskeletons, for example, that can be used to help people lift heavy loads.

SORTING CENTERS

Robotic applications in sorting centers include autonomous maneuvering, container loading / unloading, autonomous replenishment and self-propelled trucks.
We often see companies using bots to achieve nearly 24-hour work.

DELIVERY – LAST MILE

Last mile delivery is perhaps the best known robotic part of logistics among the general public.
Robot applications include automated airline delivery (drones) and e.g. mobile parcel stations.

Robotization in Logistics - examples

Regardless of the choice of the logistics model, all processes can be automated.
The main reason for automation is to increase efficiency (faster order fulfillment) without increasing resources (hiring new people, expanding space) and eliminating mistakes.

SKYPOD

KIVA

CELLUVEYOR

OCADO

AGV WEASEL

Robotization in Logistics - examples

SKYPOD

The French company Exotec Solutions has created Skypod, a small robot that literally moves between the shelves. Skypod is a small robot designed to carry containers containing articles. Its special feature is the ability to move around the warehouse without the need for guiding infrastructure. In short, he is able to climb shelves alone to collect products. Designed to optimize time and handling, this small robot can pack 400 packages per hour.

Robotization in Logistics - examples

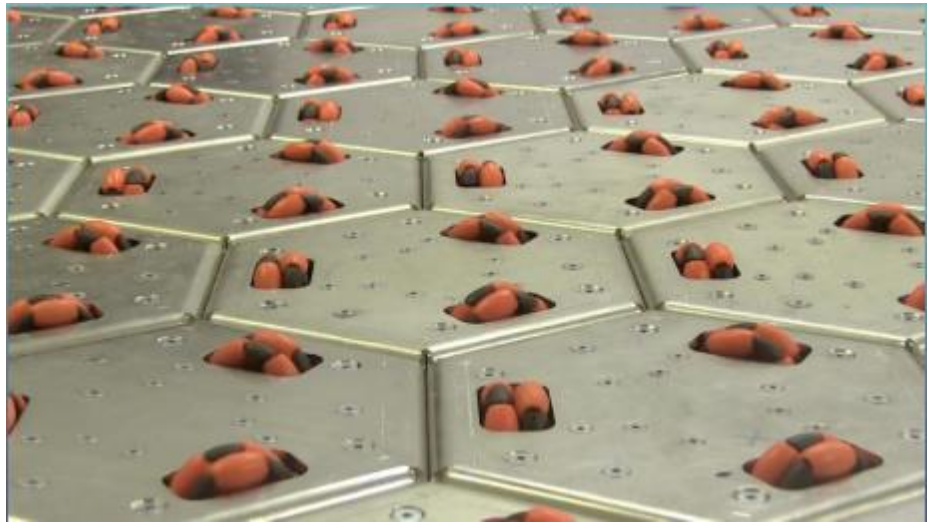
KIVA

Are you wondering how Amazon realizes such fast parcel deliveries? The solution is in two words: Amazon Robotics. This special department manages Amazon logistics thanks to the innovative Kiva robot. It is distinguished by shelves on which the products to be delivered are stored. The principle is very simple: after purchasing the product, the robot starts up, takes the shelf and transfers the product directly to the service responsible for preparing the order. In the USA, tens of thousands of robots equip Amazon warehouses. The Kiva Systems company behind this innovation was bought by Amazon in 2012 for $ 777 million

Robotization in Logistics - examples

CELLUVEYOR

Celluveyor is an absolutely brilliant robot that will revolutionize daily manual work. This robot, invented in Germany, is very popular in logistics. A kind of special "carpet" simply moves the products in a certain direction, Celluveyor is equipped with several wheels that allow you to choose the direction in which the package is to move in real time. Thanks to the program, you can change the orientation of the conveyor with one click on the touch screen.



Robotization in Logistics - examples

OCADO

In the UK, the Ocado supermarket chain has unveiled a new type of futuristic warehouse. And only on a visual level, an idea inevitably attracts a lot of attention. Ocado is managed by automated robots, thousands of them evolving on a grid that looks like lines of pixels. Each storage area contains a series of products that the robot will be able to pick up easily as it glides over the grids. All the robots execute 65,000 orders per week.

Robotization in Logistics - examples

AGV WEASEL

AGV WEASEL, designed by SSI Schäfer, is a small robot designed specifically to facilitate the transport of products from one conveyor to another in the warehouse. It can also be used to carry one box to another. It is used for virtually any type of transfer. AGV WEASEL is the perfect little taxi that provides fast transport of goods in the warehouse. Best of all, it can be used manually or fully automatically. A faithful companion that saves a lot of time in the warehouse.

Drones in logistics

First drone delivery - Domino's Pizza

Drone pizza became a reality in November 2016 when Domino's along with its partner Flirtey, a drone supplier, delivered the order to the customer's door at 11:19 am in Whangaparaoa, New Zealand, 25km north of Auckland.
A team of drone experts and a pilot autonomously steered DRU Flirtey's drone via GPS to drop pizzas.

Drones in logistics

Point-to-point delivery

- External - The client is the endpoint
- Internal - displacement within the warehouse
- Key indicator - the size of the load
- There is still no clear regulation

Drones in logistics

Tracking - Asset / Inventory Inventory

- High mobility of drones in terms of movement
- Inventory of open squares
- Scanning and tracking inventory in vertical warehouses (Eyesee, Dronescan) - 10x faster than a human
- Any hours of operation
- Operation without interruption

Drones in logistics

Amazon and another flying magazine

Amazon's great blimp is called the Airborne Fulfillment Center and has been patented by the company. Such a ship would solve many problems related to the supply of drones, mainly with a small range and short working time of drones. The sky warehouse would store the most popular products, and the drones would take care of the delivery on the last episode, i.e. a distance of about one mile.

Robotization – Pros and Cons

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- The answer to staffing problems
- Speed up deliveries
- Less environmental pollution
- Greater convenience
- Fewer human accidents
- Less risk in terms of disease

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- Restrictions on making quick decisions
- Failure
- Short service life
- Long waiting times for the implementation of the installation
- Implementation cost
- Infrastructure around
- Law

Internet of Things

The Internet of Things includes the hardware and software infrastructure that allows the communication and interaction of physical devices that are active participants in processes.

* Report of the European Commission Internet of Things

Devices in the Internet of Things:

- They have unique identifiers
- They collect data from the environment
- They work with other devices

Internet of Things

IoT in practice

- Alternative ordering methods
- Fleet management (e.g. filling)
- Inventory
- RFID (Decathlon)

Virtual team

A virtual team is a small group of people who, thanks to complementary competences and based on mutual relations, cooperate to achieve a specific goal, fully engaged and responsible for the tasks entrusted to them, in accordance with their roles in the team and adopted rules

The virtual team is characterized by:

- spatial dispersion of team members,
- replacing the direct transmission of information with electronic communication, possibly:
- independence from organizational structures,
- unequal working time,
- multiculturalism.

The future of virtual logistics

Nobody can predict the future. We experience it most strongly in many years now. Despite the turmoil, we are left to forecast, plan and act so as to have an impact on what will happen in the future.

Thank you for your attention