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Proceedings of the International Scientific and Practical Conference "Socio-Economic Challenges" are devoted to finding a systemic solution to multidisciplinary problems in the field of modern development, management, administration of various systems, corporate social responsibility, innovation management in various fields of environmental management.

For scientists, scientists, students, graduate students, representatives of business and public organizations and higher education institutions and a wide range of readers.

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FUTURE LOGISTIC'S TECHNOLOGOIES IN CONTEXT OF INDUSTRY 4.0

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Introduction. Technology and digitalization are penetrating and changing all areas of business, and logistics is no exception. Logistics both today and in the future will be one of the main factors in the competition. Success in competition between enterprises and economic regions is determined by the level of competence and technology in logistics.

Robotics in warehousing

The first works in the supply chain were in production. George Devol registered the first robotics patent in 1954, and his company Unimation made the first industrial robot in 1956. This first robot was able to move material at a distance of about three to six meters. General Motors installed the first robot at the plant in New Jersey in 1962. For a long time, the works were only suitable for work in industrial production because they were dangerous to people while they were being used.[1]

Autonomous mobile works (AMR)

Autonomous mobile robots do not need a specified track or a predetermined route between locations. AMR understands its position with the help of computers, on-board sensors, and maps. These small and clever works can identify the information on each package and sort it. AMRs can move around the warehouse, so create your own routes depending on the required operation. If necessary, they also change the route and avoid obstacles in their environment.[2] These works provide efficiency, accuracy, and safety in the sorting process. They also help reduce redundant sorting so that employees can perform other roles. People are sometimes more prone to mistakes when work is very boring and monotonous. Omit, modern work provides stable accuracy regardless of the tedious nature of the process. As a result, warehouses have a higher level of inventory accuracy.

AMRs not only assist in the picking and sorting process but can also be used for daily inventory checks. Accounting robots, such as TagSurveyor, can scan inventory at a distance of up to seven and a half meters thanks to RFID sensors and scanners. Not only will your inventory data be more accurate, but it will also prevent inventory theft.[2]

Chinese warehouses are one of the fastest-growing segments of the country's economy. In fact, 40% of the world's parcels were delivered from China. Their desire for speed and accuracy has led to the creation of autonomous mobile robots. AMR can sort up to 18,000 parcels per hour, and manual labor costs are reduced by 70%.[3]

Automated storage and retrieval systems (AS / RS)

Automated storage and retrieval systems are technology that inputs and outputs inventory. It usually works in conjunction with warehousing software that manages operations.

AS / RS comes in different forms depending on the type of task, the required system, or the products it will work with. They work either as a shuttle operating on a fixed path or as a crane lifting goods between passages. Although now there are works that go up the aisles, such as Skypod, which also receive customer orders. Order picking can account for 50% or more of your warehouse's labor costs, especially for large warehouses. By reducing labor costs and time spent searching, workers can focus on more complex processes, such as packing and shipping goods.[3]

Alibaba, the world's largest retailer, has proven how useful AS / RS can be in their warehouse in China. Using 60 robots, they reduced labor costs in the warehouse by 70%. The robots work via Wi-Fi to deliver working equipment for packing and placement. As a result, their operations increased, and tripled production.[3]

Internet of Things in Logistics

The Internet of Things increases the transparency of the supply chain. You can track the location of your cargo up to a single unit. Location tracking is not limited to the timely delivery. In fact, location data obtained through the Internet of Things in logistics technologies helps transport companies to ensure the quality of goods from production to the time it arrives at its destination.[1]

This information is useful in the case of perishable goods, such as fruit. , when transporting long distances, location information can play a vital role in choosing the best alternative route in the event of a possible failure. Thus, real-time location data provides a better understanding of each link in the supply chain. The Internet of Things can improve supply chain intelligence. Being able to lock a load while it is on the road can help companies reduce risks and take immediate action, especially for temperature-sensitive loads if something goes wrong.

Besides, the ability to control the temperature throughout transportation helps companies in the supply chain to maintain the quality of perishable goods and pharmaceuticals. This data is used by the system, which notifies the relevant personnel in case of temperature drop. Internet of Things technologies can collect data related to environmental factors such as pressure, humidity, light. These systems provide important route information to help companies analyze the safety aspect. This feature can reduce supply chain losses even for the most sensitive loads.[2]

The company focuses on SenseAware is a subsidiary of FedEx, which offers to track logistics using sensors. It detects changes in light, humidity, pressure, and temperature. It also offers alerts based on time and location and is currently available in 20 countries.[3]

With an IoT-based system, supply chain companies can track the location of their

vehicles, as well as personnel assigned to a vehicle, at any time. This gives a clearer idea of how resources are used and provide insight to further improve resource allocation.[2]

The Internet of Things can help companies automate car maintenance and repair. Compliance and safety are important aspects of supply chain management, and automating this process can help companies avoid problems. , there are supply chain companies that plan to use the same technology to track the health of their drivers.

With more accurate information about vehicles, drivers, and traffic, better strategies can improve fleet and fuel management.

Conclusions

Technologies in logistics are developing rapidly, each logistics company invests time and money in research and implementation of new technologies to optimize costs and increase added value. But it is worth noting that each of these companies takes risks. First of all, this is an innovation risk, because no one knows how relevant the new technology will be and whether a more optimal technology will be invented before it pays off. There is also a great legal risk, because some new technologies are not regulated in the legal field, so companies have to wait for the approval of regulatory laws, and no one knows the terms of these same laws. Another negative factor is that due to the high cost of research, new technologies are usually introduced by large companies, which poses a threat to small and medium-sized enterprises, and can lead to market monopolization by individual corporations. On the other hand, due to excessive investment in technology, companies can go bankrupt if the technology does not pay off, or if competitors come up with better technology. And new logistics operators will enter the market. But the digitalization of logistics gives rise to new activities for IT companies, such as big data analysis, predictive analytics.

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