

Information Technology Impacts on the Logistic Industry

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Abstract

According to studies, nowadays logistics differs from that of several years in the past due to the expanded use of information era (IT). These technologies have refurbished the methodology of transferring, storing, and handing over items throughout the worldwide frontier, making those processes extra green, transparent, and sustainable. This paper explores the outcomes of the way IT complements the logistics region via supply chain management, automation, records analysis, real-time monitoring, consumer family members, environmental worries, obstacles, and possibilities.

Keywords: Supply Chain, Inventory, Data Analysis, Information, Sustainability

Introduction

Supply Chain Management: Key Improvements

Among these, supply chain management can be regarded as one of the most successful IT field targets. Classic supply chains use a lot of paper and formal communication between the supply chain stakeholders. However, the best way that has been implemented to support these activities is through the implementation of Information Technology solutions like ERP systems and SCMs. The former makes it possible to control procurement, inventory, orders, and distribution processes as more than one tool. This trend is a key component of today's supply chains through RFID and IoT. These efficient technologies give businesses up-to-date information on the stock position, goods flow, and storage environment. For instance, via value addition, IoT could allow for real-time monitoring of temperature and humidity that affect perishable good's environment without compromises. That kind of capability leads to less wastage, an increase in customer satisfaction, and increased operational capacity.

Automation and Robotics

IT-led automation now ranks as a powerful agent of change in logistics environments. Current automation technologies from the warehouses to the delivery networks suggest that there is a reduction in the reliance of companies on manual labor. For instance, Warehouse Management Systems (WMS) enable functions such as order, location and stock, pick, and pack. These systems make it easier for warehouses to function with higher accuracy and speed and less likelihood of human error. Apart from software automation, robotics has found one of the best applications in the logistics field[1]. AMRs and AGVs are well-known technologies used to achieve the smooth movement of products in a warehouse.

Applications of these robots with sensors and algorithms will enable them to travel independently in complex terrain. They interact with regular employees to perform monotonous

tasks that would otherwise bog down the employees, thus sparing them time for more productive tasks [2]. RPA is involved with the back-end operative logistics activities, which include order processing and invoicing. RPA automates time-consuming administrative work, inhibits errors, and lessens processing time, thereby increasing customer satisfaction.

Data Analysis and Forecasting Information

The logistics industry, especially in transport, is currently among the industries that produce large volumes of data daily, ranging from the transport schedule to customer orders, among others. The capacity to sort through this data has become invaluable. IT enables the issue of big data logistics that helps logistics companies to make profound analyses of their work. Of the data analytics techniques, the authors have found that predictive analytics has been the most beneficial. In this way, through analyses of historical data, companies in the logistics industry can predict potential demand, disturbance factors, and appropriate delivery paths. For instance, in the RS of predictive maintenance systems, information from different sensors of vehicles and machinery is used to predict failures. This makes the operation reliable and minimizes downtime periods.

Real Time Tracking and Transparency

Another interesting value derived from the use of IT in logistics is the ability to offer tracking and communication. GPS tool, in association with sophisticated tracking tools, enables companies and customers to track their consignment at any time during its transit. Such a level of transparency has indeed dramatically enhanced the expectations of customers when it comes to their rights. Consumers no longer want arbitrary information on the movements of their products but accurate information in real time. Logistics companies react by providing tracking interfaces on the web and with mobile applications, allowing clients to follow their shipments from the point of origin to delivery. This creates confidence and generally makes the customer feel more comfortable using the services. Dynamic route optimization, which is supported by IT systems, enhances functional flexibility [3]. Using traffic flow, meteorological conditions, and delivery's real-time data, transport enterprises can alter directions in advance. This not only increases client satisfaction because of timely deliveries but also saves on fuel and operational costs.

Improved Customer Satisfaction

Successful incorporation of logistics with IT has taken the customer experience to the next level. The changes in recent times have made velocity and dependability the two most important values among the online business models out there. Currently, firms such as Amazon use complex IT solutions to provide same-day or next-day delivery, thus putting pressure on other firms to follow suit. Here, real-time communication with customers is another unique enhancement in this aspect.

Technologies allow firms in logistics to electronically notify their clients of order progress updates like shipment, order status, expected delivery time, and other relevant delays. It is at this level of communication that animosity is rare and trust and openness are promoted. There is also increased customer experience through personalization made possible by data analytics. With the help of analytical data on clients buying power and spending patterns, logistics corporations can provide an individual transportation solution. For instance, customers may be offered options to achieve a sustainable environment in shipping options or choose express delivery.

Sustainability/ Environmental Impact

Logistics has emerged as one of the most important business priorities, and IT is central to developing sustainable logistics strategies. When it comes to managing supply chain routes through GPS and real-time data, it also saves on fuel and, hence, emissions. Furthermore, through IT systems, the load may be consolidated to allow the vehicles to be utilized to the maximum to eliminate the need for multiple trips. Another change that may be seen links to the considerations of electric as well as self-driving automobiles. These vehicles, sometimes incorporated into IT systems, offer explored environmentally friendly means of transport. For instance as per study, electric trucks produced by Tesla are fitted with sophisticated navigation and IoT integration, which are very effective and eco-friendly [4]. The technology is also implementing sustainable solutions in the supply chain by promoting the pro-peninsula view. Blockchain also supports the use of sustainability and guarantees firms green certification since the ledger presents actual records about the origin of the products and the processes of transporting them across the supply chain.

E-Commerce and Final Mile

The advancement of e-commerce solutions has shifted a lot of pressure on logistics firms to enhance last-mile delivery solutions. Solutions provided by information technology have been crucial in addressing these challenges. The route optimization algorithm, tracking, and auto-sorting means that parcels get to customers fast and correctly. With the support of information technologies, Delivery Drones are becoming more popular in last-mile transport. Today, there is a tendency among such corporations as Amazon and UPS to employ drones to deliver goods to residents of certain districts that seem difficult to access or to crowded areas. The management of these drones depends on information technology systems for signalization, communication, and command. Also, new IT-enabling models, such as crowd-sourced delivery platforms, are emerging. Services like Uber Freight market and arrange transport warehouses for independent drivers with their logistics firms affording reasonable prices for their deliveries.

Challenges and Risks

However, despite the many advantages that IT has brought to the logistics industry, challenges and risks are also on the horizon. Cyber threats are among the most challenging, considering the large volume of sensitive data handled by logistics companies. A breach can halt operations, damage customer information, and erode reputations. The initial costs of implementing IT solutions are very high, especially for SMEs. The implementation of advanced technologies such as robotics, blockchain, and AI requires a lot of investment in infrastructure, training, and maintenance. The integration of legacy systems with modern IT solutions is another challenge. Most logistics companies still use outdated systems that are incompatible with new technologies [5]. Transitioning to modern systems requires careful planning and execution to avoid disruptions.

Future Prospects

In the future, IT in the logistics industry will be teeming with opportunities. AI and ML have been expected to transform into something new. AI-powered chatbots will better customer service by dealing with queries and resolving any issues that may arise quite efficiently. The ML algorithm will refine predictive analytics models to make forecasting and other decisions even more accurate and

reliable. The rollout of 5G technology promises to revolutionize communication and data transfer in logistics. This will involve faster and more reliable connectivity, allowing seamless communication between IoT devices, vehicles, and IT systems. The applications will go as advanced as real-time drone coordination and autonomous fleet management. Blockchain technology is poised to be more widespread, and the same will ensure transparency and security in supply chains. By offering a tamper-proof record of transactions, blockchain can prevent fraud, streamline customs processes, and enhance traceability. Quantum computing, in its infancy, has the promise to solve complex logistics problems. It can, for example, optimize global shipping routes through the analysis of massive data in a matter of seconds, which would take far longer for traditional computers.

Conclusion

Information era has now turn out to be the backbone of present day logistics, bringing efficiency, transparency, and innovation into the enterprise. From more advantageous deliver chain control to actual-time tracking and sustainability, data generation has converted each logistics operation. Despite the drawbacks of such demanding situations as cybersecurity risks and a high implementation cost, the benefits of IT outweigh the cons. Companies embracing IT innovation could be nicely positioned in terms of evolving customer expectancies, competitiveness in a constantly changing marketplace, and developing a sustainable future. With emerging technology together with AI, 5G, blockchain, and quantum computing, future trends are bound to conform the logistics enterprise even extra. By maintaining in advance with these tendencies, logistics agencies can unlock new opportunities and preserve to trade the sport in transporting and handing over their goods round the arena.

References

- [1] M. Gu, L. Yang, and B. Huo, "The impact of information technology usage on supply chain resilience and performance: An ambidexterous view," *International Journal of Production Economics*, vol. 232, no. 1, p. 107956, Oct. 2020, doi: <https://doi.org/10.1016/j.ijpe.2020.107956>.
- [2] S. F. Wamba and M. M. Queiroz, "Blockchain in the operations and supply chain management: Benefits, challenges and future research opportunities," *International Journal of Information Management*, vol. 52, no. 2, p. 102064, Jan. 2020, doi: <https://doi.org/10.1016/j.ijinfomgt.2019.102064>.
- [3] D. Antoni, F. Jie, and A. Abareshi, "Critical factors in information technology capability for enhancing firm's environmental performance: case of Indonesian ICT sector," *International Journal of Agile Systems and Management*, vol. 13, no. 2, p. 159, 2020, doi: <https://doi.org/10.1504/ijasm.2020.107907>.
- [4] S. Saengchai and K. Jermstittiparsert, "Supply Chain in Digital Era: Role of IT Infrastructure and Trade Digitalization in Enhancing Supply Chain Performance," *International Journal of Supply Chain Management*, vol. 8, no. 5, pp. 697–707, Oct. 2019, Available: <https://ojs.excelingtech.co.uk/index.php/IJSCM/article/view/3666>
- [5] C.-K. Hou, "The effects of IT infrastructure integration and flexibility on supply chain capabilities and organizational performance: An empirical study of the electronics industry in Taiwan," *Information Development*, vol. 36, no. 4, pp. 576–602, Nov. 2019, doi: <https://doi.org/10.1177/0266666919884352>.