



# Future Dynamics and Forecasts in Logistics and Transportation through Digital Transformation – A Study w. r. to Manufacturing Industries

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**Abstract.** The current scenario of business both B2B and B2C had a tremendous impact in models of operation due to outbreak of the COVID-19 pandemic. However, this has also enabled the industry to overcome the same with new technologies and business model orientation. The resilience could be achieved by analysing the trends and forecast based predictions of the business and technological advancements. So, it is necessary for all the business to embrace the future trends and technology. The recent trends in AI have improved to aid the manufacturing business in their logistics and transportation operations. The introduction of predictive maintenance will certainly benefit the financials of the company. On the other hand, the customer satisfaction levels will reach new heights in delighting them with various services offered. The dependencies on Manpower and the error reduction will definitely be a concern and those can be addressed in the Logistics and Transportation through Industry4.0. This paper showcases the literature concerning technological advancements in Logistics and Transportation business and also discusses the disruptive technology embodiment in the mentioned sectors.

**Keywords:** Electronic Data Interchange, Artificial Intelligence, Application Programming Interface.

## 1 Introduction

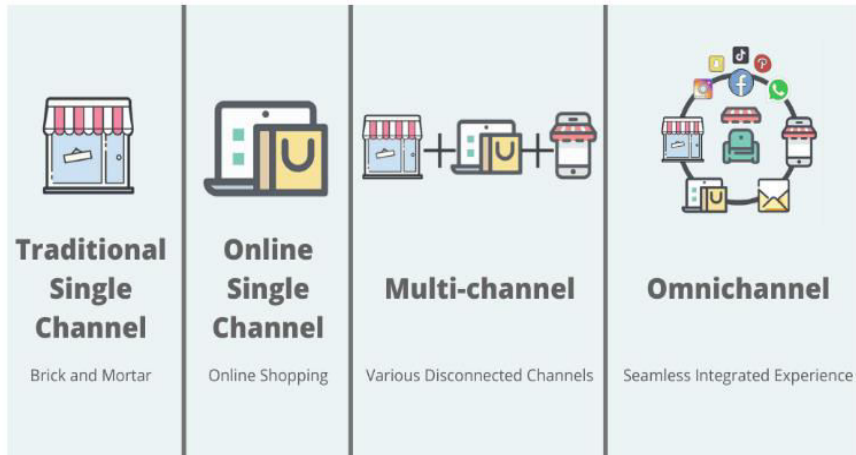
Recent business models have undergone a massive change in terms of modelling and technology thanks to development of industry revolution trends in Industry 4.0 and Post Covid impact. This is majorly made the globe as a true village where the real globalisation has started to ripe its fruits. Though Data being an important driver in this transformation journey the industrial, technology advancement have also contributed in a significant rather major change.

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Starting from the supply-chain automation of workflow till the autonomous have definitely impacted the model of B2B and B2C business models. The conventional Single Channel and modern age Online Channel or advance step of multi-channel and current trend of Omni Channel. The demographics and demand played a major role in implementing Omni channel business for most of the retail business models.



**Fig. 1.** Single Channel vs multi-channel vs Omnichannel

As a result, the expansion of business has a positive trend on it. The Omni channel can be rather called as advanced as it caters most of the stakeholders of the business model. Thereby leading the business to diversify, grow and innovate in products and markets. This was made possible in current era by various means including Industry4.0, AI and digitalization of supply-chain and its function.

### 1.1 Recent trends in Logistics and transportation:

Data is the key driving factor of any business this will not only help to run the show in business also aides the business to analyze the trends and learn from the lessons of the past. In Supply-chain the demand supply plays a key factor in the business execution. Any strategic decision made is dependent on the data of this supply-chain. The ERP / CRM systems are data points and control points for the business functions. However, adding cheery to the cake recent advancements has made the business more proactive than being reactive. Also, the connected digital era keeps the suppliers, customers intact by often adapting to the changes and advancements of the technology.

Major trends in Logistics and transportation includes digitalization of interconnected end to end supply chain systems [2] through ERP, API, EDI etc. Electronic Data Interchange has always played a vital role in supply chain. Nowadays the EDI with API and ERP has taken the supply-chain planning to a new level of growth.[1] In-

Internet of Things (IOT) has a major role in the current logistics and manufacturing. Which helps the business to analyze the buying patterns to understand the product development life cycle thereby developing the new projects effectively. Also it helps the customer to efficiently track and trace the logistics within any geography with minimal amount of resources.

Also, the autonomous driving and connected transportation has taken a new edge in the transportation industry there by leading the truck operators to operate with minimum resources and maximum accuracy. Also, the new API have made the route optimisation efficient planning and risk mitigation of any supply chain disruptions.

## 1.2 AI and its trends

- Artificial Intelligence along with Machine learning with enabled the businesses to leverage their markets across globe.[2] The AI has always been complementing the business thereby increasing the volume of sales and customer base. Machine learning being a key driver of AI the supervised machine learning and the Unsupervised machine learning has a larger impact in the market.[3]AI will enable the forecasting being more efficient in terms of quality and quantity. It can help the transportation be more predictive and proactive by ascertaining the optimal route using various algorithm commonly used one is Dijkstra's algorithm. Also, the future demand and forecast can be made efficiently by supervised machine learning which can take the retrospective data from the previous years of requirement and then ascertain the needs from current orders and back orders. In turn the proactive purchasing of strategical inventories are made efficiently.

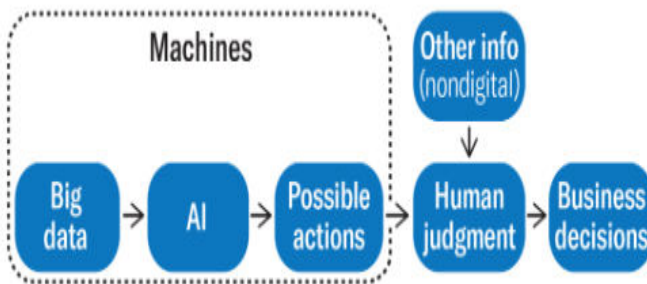


Fig. 2. Decision Making Model that combines the Power of AI and Human Judgement (Source: HBR) [1]

Predictive analytics can enable the business by indicating the risks that may be jeopardise the business. For example, the inventory planning can be made more efficiently and cost effectively if the data is analysed based on past trends. Also, it will identify the best supplier in the system to have an upper hand in terms of negotiation there by improving the cost efficiency in further contract negotiation.

The Pricing and costing engines can also be trained with Machine learning with various models to improve the revenue thereby reducing the overheads.

Inventory carry cost being a major factor determining cost of the product sold. This can be minimised by maintaining the optimal level of inventory and its cost. Integration can be made more efficiently based on the AI based ERP systems.

### **1.3 Industry 4.0 with respect to manufacturing and supply-chain**

Product need to be manufactured with quality and appropriate quantity based on the need in the market. [4]often manufacturing is accompanied by effective supplier management and on-time delivery of products to the customer. This can be achieved by improving the manufacturing capabilities. Capabilities such as material handling, Maintenance of plant through appropriate inspection and breakdown management can be effective if done at right time.

The drone used in the plants can handle the inventory even in complex storage places of warehouse. Thereby increasing the safety of workplace and optimal utilisation of time. Also, the pilferage management can be managed effective.

The AI base pilferage management can be utilised in the warehouse to manage the inventory pilferage and thereby bringing down the loss incurred due to pilferage. The machine learning supervised models can be engaged to make the machine identify a number inventories and scenarios in which loss of inventory is noted. However, this implementation requires mindset change in the organisation as this may lead to chaos if implemented in a rapid way. [5]The predictive analytics can be a better option in terms of plant ascertaining the machine breakdown. This can be enabled by linear models utilised based on the previous service details as input data along with the age of the machinery or the capacity that was purchased. In turn this will benefit the company to avoid the challenges faced due to repair of machinery there by line stoppage.

## **2. Conclusion**

Considering the current trends, it is necessary for the business to evolve and adapt to the technological advancements that are available in the market. The decision of choosing the technology or Business model should be based on specific business case rather following the industry trend alone as it may lead to failure most of the times if the relevant solution is not suitable for selected business. This can be avoided by having Proof of Concepts (POC), Consulting with stake holders and knowing the better solutions and there by implementing the same. Also, we know the data and system is for business and people and not the other way around so the business must carefully select the technology to implement seamlessly. Though AI will take over the future business activities. The AI along with Human otherwise called Collaborative Intelligence will definitely help the business in achieving business targets with optimal profits.

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