

# Emergence of Artificial Intelligence (AI) Enhances the Core Competency of Supply Chain Management Process in the Dynamic Business Environment

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## **ABSTRACT**

*In this modern world, perspectives and practices of doing businesses changes often in order to sustain, grow and compete in the dynamic business environment. On going through this aspect, each and every business practices has its major importance, through which one can be able to rule the business world similarly supply chain management of a business plays a major and crucial role in the success of the business where it is directly or indirectly meets the customers' expectations and satisfaction. Ironically, these supply chain management plays a crucial role and acts as a back bone for E-Commerce Businesses. In order to maintain the momentum of competitiveness, every businessman started to adapt the technological transformation into their business and its related core business processes. One among them are the emergence of Artificial Intelligence (AI), a hybrid technology which could bring and develop a lot of sustainability and competitiveness in to the business but it is very important to identify the core competence and that needs to be matched with the current business practices according to changing business needs then only one can be able to feel the attainability and adaptability. Here, in this conceptual paper, the researcher tries to find out the major competency on the adaptation of Artificial Intelligence (AI) in to the core supply chain management process of a business. By doing such so, the researcher can find out what kind of technological impact that could be produced in the supply chain management could be portrayed for future implications on various dimensions of business and its related practices.*

**Keywords:** Artificial Intelligence (AI), Supply Chain Management (SCM), Etc.,

## **1. Introduction**

Artificial Intelligence (AI) offers a more benefits to supply chain management professionals based on strong basic fundamentals that enlightens on the dynamic and diverse business nature of today's modern business practices of supply chain management. More importantly, time availability and data accuracy is needed to make smart decisions. In this context, AI is decisions made by machines which decide which chess piece to move where, or how to adjust an order forecast based on changing demand. The return on AI investments has severely been suppressed by these SCM limitations. For example, 60-75 days of inventory is carried by typical Retail/CPG supply chains. With promoted item service levels much lower at the 80 percent range, the average service level in the store is about 96 percent. With relatively high waste and high cost-of-goods-sold, the Casual Dining segment on the other hand, carries around 12 – 15 days of inventory. So, it's simply non deliverable until & unless AI can make a significant impact on these metrics.

## **2. Artificial Intelligence in the Global and Dynamic Business Environment**

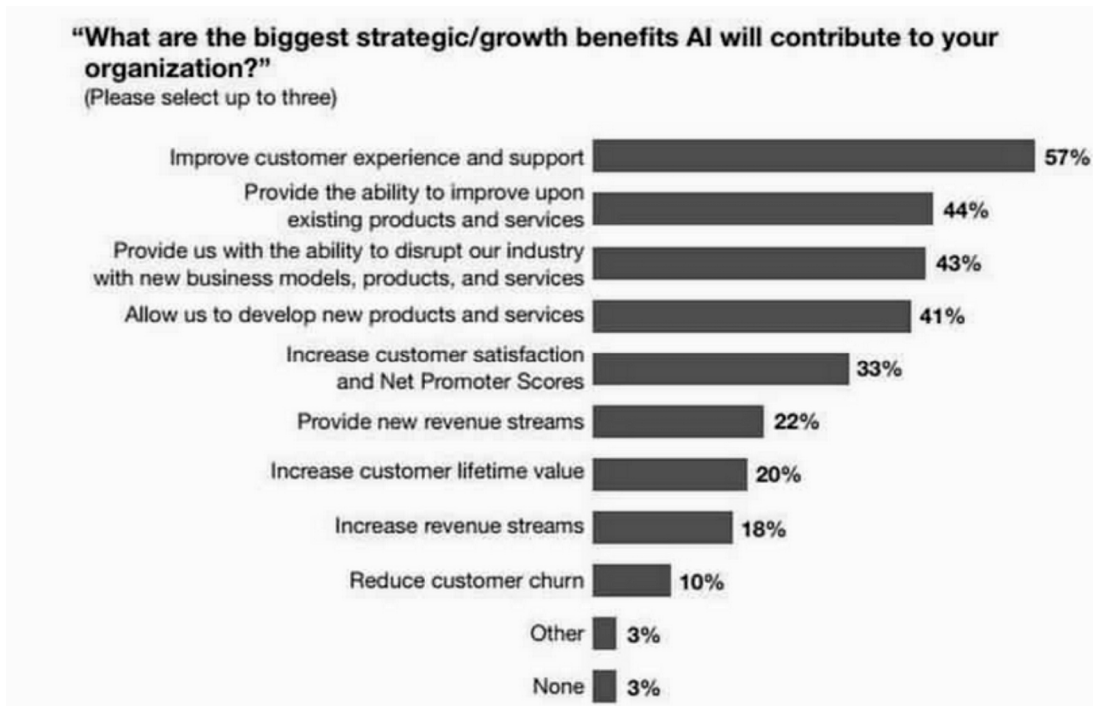
Sounding good in theory, let's see how does it work out in practice? Having addressed the key fundamentals, let's look at how some actual companies have achieved applying these criteria. For example, the major problems in casual dining are anticipating and meeting demand for the restaurants, corporate

owned or franchised. This is especially important during **Limited Time Offers (LTOs)**. Using the eight criteria mentioned above, a global, casual dining company connected to a real-time, multi-party network was able to rapidly achieve their objective function - excellent customer service at the lowest cost.

The company continuously monitors **Point-of-Sale (POS)** data, and is using AI agents to recognize and predict consumption patterns of consumers. In addition to this, intelligent AI agents create the demand forecast and then they compare it to the actual existing demand in real-time. When there is a significant deviation, the AI agents make the firm decision to adjust the forecast, and additional agents adjust replenishments. They then propagate these adjustments across the supply chain to trading partners in real time at all times considering the cost of change and the propagation impact. This drove to a remarkable development in forecast accuracy. During the time of promotions, at the store level and even higher at the DC level, the company achieved over 85% forecast accuracy. This represents at least 25% improvement over traditional approaches.

Restaurant orders are optimized autonomously by recognizing the impact of projected restaurant traffic trends and impact on LTOs and therefore the orders by intelligent agents. The system runs on an exception basis but it allows the managers to review their decision criteria and override the orders where they have local information such as inventory issues or local store traffic issues. This has resulted in much faster placement of order and order accuracy of over 82%, which reduces both the inventory and waste dramatically while increasing the service levels to the consumer. This is a significant improvement to all other implementations in the marketplace. Because the algorithms cited are highly scalable, they are being processed over 15 million stocking locations continuously throughout the day time. Restaurant managers had to interact with nine different ordering systems and manually create their own orders based on general guidelines, rules of thumb, and spread sheet-based or manual calculations, prior to the AI-based multi-party execution system.

**Figure No.1. Base: 598 Businesses and Technology Professionals**



Source: Forrester Q2 - 2016 Global State of Artificial Intelligence Online Survey

With AI implementation on a sound foundation, this company can now anticipate, handle, and serve demand at the lowest feasible cost. Intelligent agents monitor demand in real time, and autonomously coordinate the supply chain to align supply with demand during LTO's, when demand fluctuations would overwhelm a restaurant manager. Thus, the company can achieve its goal and maintain high service levels while skimming the cost to serve. These are not confinement results. CPG-Retail implementation achieved 99 % in-stock, with 25 Days of Supply (DOS) across the supply chain in the food marketplace. The inventory results are less than half the standard DOS in this marketplace and 3%point's high in-store and in-stocks. AI-based solutions are being deployed at two large automotive tier one suppliers with results ranging from 16 – 40 percent reductions in inventory as well as notable reductions in accelerate freight costs.

### **3. Artificial Intelligence (AI) Delivers Value and adds competency to the SCM**

As we can see, laying the proper groundwork for AI fetches you huge dividends. There's no doubt that AI offers even greater promise in the coming years, but, as these results show, there dramatic results and constant benefits waiting for companies that focus on the fundamentals and put AI for the best use it can fetch.

The prettiness of AI-based solutions is that they learn and drive continuous development over time. They get more sophisticated and precise as they gather more data and more exposure. The sooner you start, the better the results you'll find in the coming years, and the further ahead you will be. With the right AI solution in place, you can outpace your adversary today, and be well positioned for reaping even bigger rewards of AI's promise in the coming days.

### **4. Emerging Technology Increases the Core Competency of Supply Chain Management**

The emergence and introduction of various technologies has provided a faster and reliable, smarter decisions in the supply chain management process, which in turned increased the profitability of

the business in the global business environment. In the present scenario, Technological Transitioning has provided a uniqueness which brings down the dreams to reality. One among the evolving and emerging technological transformation is Artificial Intelligence (AI). Moreover, Artificial Intelligence is gaining an increased importance and providing rich momentum across various industries. It also creates an explosion in Computing Power and Storage, Big Data, Internet of Things (IoT) and Algorithmic Advances. This technological advancement has provided a higher sustainable competitive advantage to the existing supply chain management process, where it is providing an improved business focus in terms of profitability by faster and smarter execution of such important process. The Business Practioners needs to understand these technological advancement and they have to make use of it their business practices in a most appropriate manner, which will take the core competency of the business to the next higher level.

**Alexa Cheater (2018)**

### **5. Emerging Technologies Related To Supply Chain Planning**

Business Practioners need to understand their core business process in a most skeptical manner, so that they could be able to know, where do they can make use of evolving and emerging technologies in to their business core process accordingly to the nature and importance, which would certainly provide a higher competitiveness and unique drive which will run the business in a most reliable and profitable manner. Here are the few examples as follows: **Alexa Cheater (2018)**

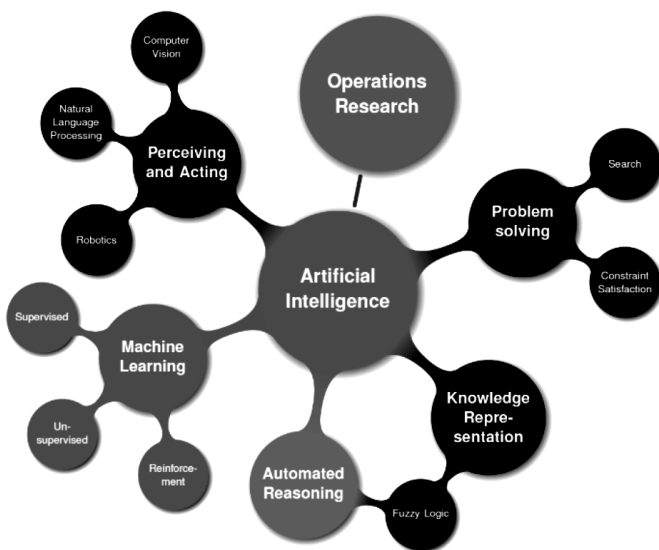
#### **5.1. Usage of Artificial Intelligence in Supply Chain Planning Process**

It certainly amplifies and increases the core value of their existing business processes and people along with the machine-assisted planning, which would certainly help and bridge the knowledge gap between planners of high experience with that of low experience and also with the help of machine assisted planners, we could gain real-time competitive recommendations based on past historical with that of the current data analysis

made through machine-assisted planning. **Alexa Cheater (2018)**

Usage of Artificial Intelligence would certainly improves a higher visibility and risk insight to their existing supply chain management process and where do they predict possible disruptions based on inputs provided in their supply chain process and provides a higher correlations across the available various multiple data sources including weather forecasts, sources available through social media. **Alexa Cheater (2018)**

**Figure No. 2. Application of Hybrid Model of Artificial Intelligence in SCM**



**5.2. Usage of Machine Learning in Supply Chain Planning Process**

By implementing a high impact oriented self-healing supply chain methodology and at the same time unlocking the major sources of revenue savings, whereas it can continuously monitor, observe, and correct out-of-tolerance with the Progressive lead times related to all products based on past historical data. **Alexa Cheater (2018)**

On using this algorithms based methodology and with the help of early-sell signals it would certainly optimize various inventory levels and thereby Increases the

customer service levels among their major clients with more accurate demand for their new products and accordingly offers various replenishment plans. **Alexa Cheater (2018)**

**5.3. Usage of Deep Learning in Supply Chain Process**

With the benefit of using deep learning methodology, it certainly saves money and time and also in addition to automated planning agent will automatically handles these low impact exceptions as they arise in the initial stage and later it delivers an detailed reports based on their observations and then certain corrective actions will takes place and sends automated alerts to the right concerned people when issues arises in larger manner. **Alexa Cheater (2018)**

**6. Major Requirements for Adapting Artificial Intelligence in Supply Chain Management**

I have studied the AI issue a lot having worked with hundreds of supply chain executives, on dozens of software implementations. What I have found is that there are eight criteria that are required for a successful AI implementation. Miss one of these and you'll be lucky to achieve mediocre outcomes, you can indeed achieve world class results when you meet them all. It is important to ensure the following, for the AI solution to offer optimal value in supply chain.

**6.1. Access to Real-Time Data**

New AI systems must eliminate the stale data problem, to improve on traditional enterprise systems with older batch planning systems. Nowadays most supply chains attempt to execute plans using data that is days old, but this result in poor decision-making that sub-optimizes the supply chain, or requires manual user intervention to address. An AI tool is just making bad decisions faster, without real-time information.

**6.2. Access to Community (Multi-Party) Data**

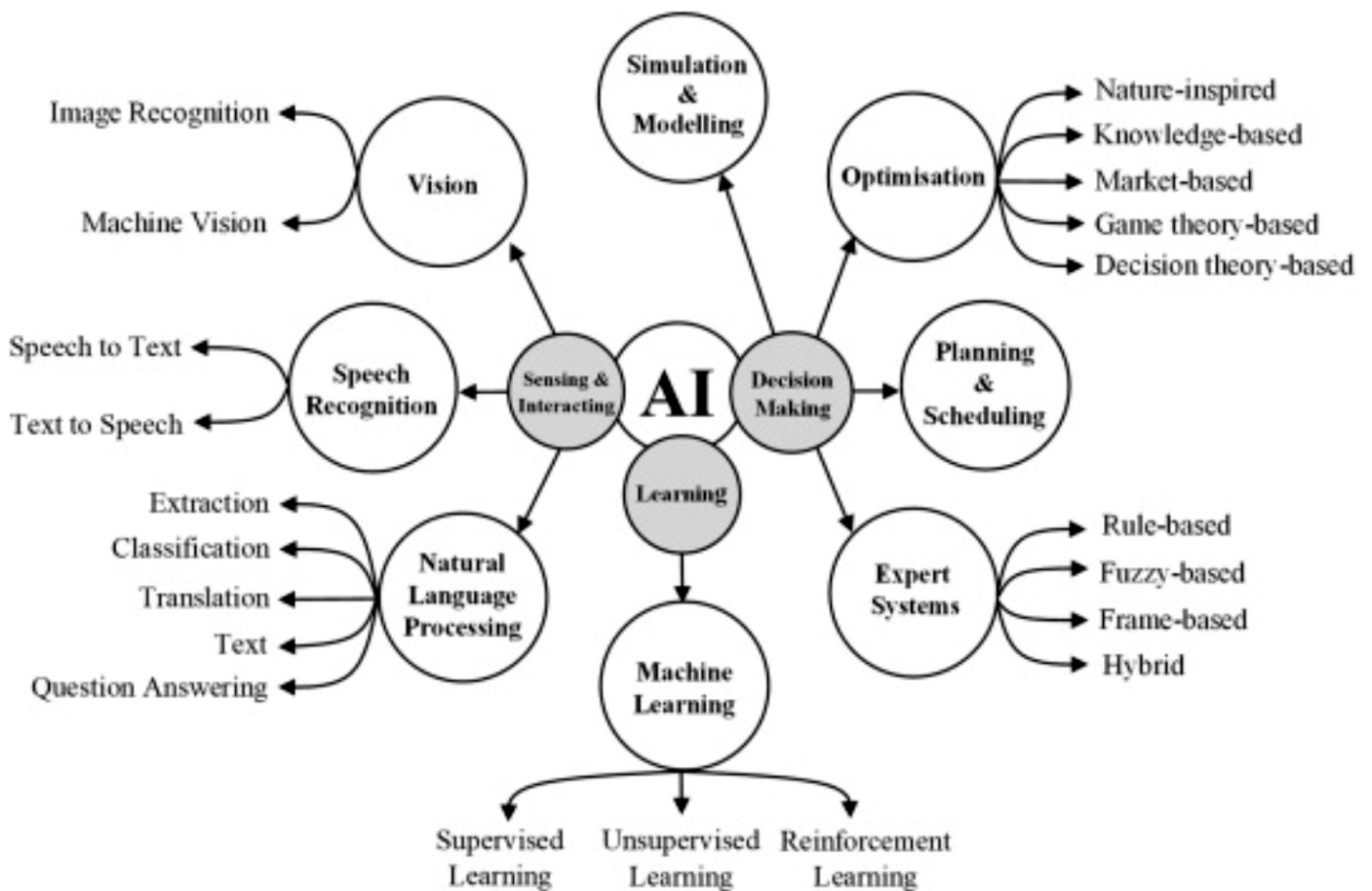
The ability to receive permission to see the data that is relevant to your trading community or, more importantly, access data outside of the enterprise, must be made available to any type of AI, Machine Learning algorithms or Deep Learning. The results will

be no better than that of a traditional planning system until and unless the AI tool can see the forward-most demand and downstream supply, and all relevant constraints and capacities in the supply chain. Unfortunately, community data is the norm in over 99 percent of all supply chains due to this lack of visibility and access to real-time. Needless to say, this must change for an AI tool to be successful.

**6.2.1. Support for Network-Wide Objective Functions**

The primary function, or objective goal, of the AI engine must be consumer service level at the best possible lower cost. This is because the final-consumer is the only consumer of true final goods products. Trading partners will not get the complete value that is derived from optimizing service levels and cost to serve, which is important as increased consumer sell-through drives value for everyone, if we ignore this fact. The decision algorithm should be further enriched to support enterprise level cross-customer allocation to address product scarcity issues and individual enterprise business policies. Though faced with constraints within the supply chain, AI solutions must support global consumer-driven objectives.

Figure No. 3. Applications of AI in Supply Chain Management



### 6.2.2. Decision Process Must Be Incremental and Consider the Cost of Change

Nervousness in the community can be created by Re-planning and changing execution plans across a networked community in real time. Constant change without weighing the actual cost of the change creates more costs than savings and reduces the ability to effectively execute. An AI tool must chew over trade-offs in terms of cost of change against incremental benefits when making decisions.

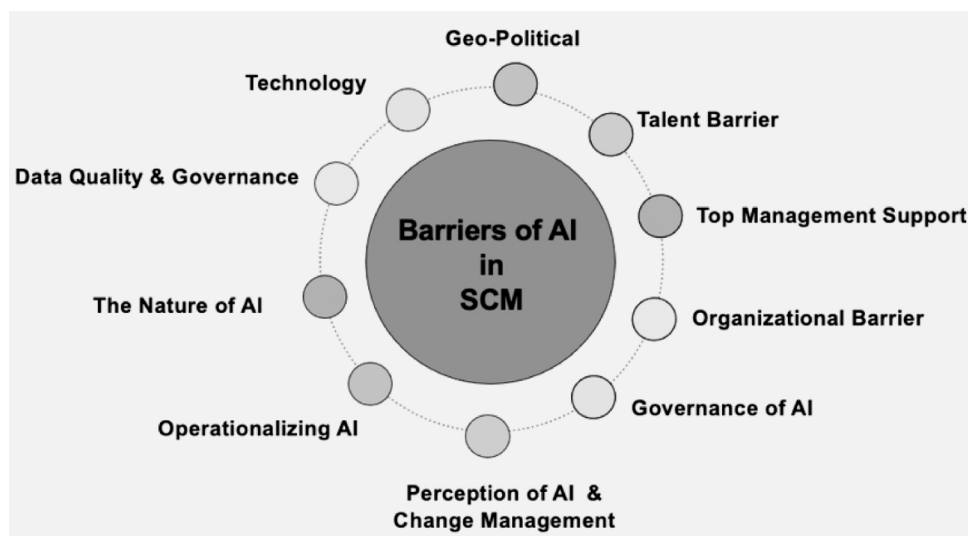
### 6.2.3. Decision Process Must Be Continuous, Self-Learning and Self-Monitoring

Real-time network is always changing because of data in a multi-party. Latency and Variability is a recurring problem, and execution efficiency varies constantly. Not just periodically, the AI system must be looking at the problem continuously, and should learn as it goes on how to best set its own policies to fine tune its abilities. Part of the learning process is to accent the effectiveness “analytics,” then apply what it has learned.

### 6.2.4. AI Engines Must Be Autonomous Decision-Making Engines

Significant value can be achieved if the algorithm can not only make intelligent decisions but can also execute them. Moreover, they need to execute not just around the enterprise but, across trading partners. This requires underlying execution system and your AI system to support multi-party execution workflows.

Figure No. 4. Barriers to AI Implementation in Supply Chain Management



### 6.2.5. AI Engines Must Be Highly Scalable

For the chain of supply to be optimized over an entire networked community of suppliers to consumers, the system must be able to process huge volumes of data very quickly. Millions if not hundreds of millions of stocking locations will have large community supply chains. Smart decisions will have to be made by AI solutions, fast, and on a massive scale.

### 6.2.6. AI Must Have a Way for Users to Engage with the System

AI should not administer in a “black box.” The UI must give users propagation impact, visibility to decision criteria and enables them to understand issues that the AI system cannot solve. The users, regardless of type, must to be able to handle and provide additional information input to override AI decisions when necessary.

However, the system of AI must be driven itself and only engage the user on an aberration basis, or to allow the user to add new information that AI may not know at the accent of the user.

## 7. Conclusion

The role of Artificial Intelligence (AI) in various business practices are growing in demand and its adaptability, applicability is based on the efforts you inculcate the technology and its involvement in to real time business scenarios. Here the researcher would like to highlight the various benefits been offered to the Supply Chain Management into the adaptation of such hybrid technology. Also, the researcher accepts that there are certain difficulties occurs and arises into this technology adaptation and implementation, But how beyond these difficulties, one who adapts such technology would certainly gets a competitive business practices, which keeps them alive always in this dynamic business environment. Hence, the acceptance and Adaptation of using such technology would certainly enhance the core competency and provides a unique kind of momentum into their business practices.

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