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## NEWSLETTER # 15 – OCTOBER 2023

### – SUPPLY CHAIN MANAGEMENT –

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**L**everaging Artificial Intelligence can significantly enhance supply chain management through improving forecasting accuracy. Machine learning models today analyze historical data and real-time information to predict demand, allowing companies to optimize the flow of goods and services, avoiding stockouts, and/or minimizing the costs of unneeded inventory.

Moreover, AI-powered predictive maintenance can help minimize equipment breakdowns and improve overall operational efficiency, reducing downtime and maintenance costs.

AI can also fuel dynamic routing and logistics optimization, helping companies streamline transportation, reduce fuel consumption, and lower shipping costs. The benefits of AI investments here include demonstrable cost savings, a more agile approach to global and local networking, and improved customer satisfaction.

This said, there remain notable challenges to successfully integrating AI in logistics and inventory management. Because many companies struggle to collect, clean, and harmonize data from disparate sources, data quality and accessibility constitute significant obstacles. When dealing with sensitive supply chain information, privacy, accountability, and security concerns are also prevalent.

A third challenge is the need for personnel who can design, implement, and manage AI solutions effectively in real-world situations.

Finally, AI algorithms are rarely transparent, making it difficult to explain the significance of the model's predictions to management. Striking the proper balance between automation and keeping the human in the loop once again proves critical to the future value of AI in supply chain management.

In this month's newsletter, after our introduction to the practice of supply chain optimization, various aspects of the transformation of supply chains are explored in a series of articles. Another article delves into the implementation of AI in supply chain management, highlighting its potential benefits for logistics, inventory control, and customer analytics. Nea Laine and her colleagues discuss how data standards and artificial intelligence are reshaping supply chains by optimizing resource allocation and reducing waste.

**Sanjib Biswas and Jaydip Sen** propose a dedicated infrastructure for big data-driven supply chain analytics, emphasizing security and confidentiality.

Finally, **Anusha Thakur** examines blockchain and distributed ledger technology as solutions to combat counterfeit medicines in the healthcare sector, despite facing technological, organizational, and legislative hurdles.

Don't hesitate to leave us a comment, to share our newsletter.

Enjoy reading!

To make the following articles easier to understand for newcomers, here's a quick overview of what the supply chain is all about. Please feel free to point out any mistakes.

**When we talk about the supply chain, we're not just talking about logistics.** Logistics is **only one link** in the supply chain.

The key players in the supply chain are **raw material suppliers, transporters, wholesalers, retailers, and end users.**

### Processes

According to Douglas M. Lambert (*Supply Chain Management: Processes, Partnerships, Performance*, 3rd Edition, 2008), the supply chain includes 8 processes:

- Customer Relationship Management;
- Customer Service Management;
- Demand Management Style;
- Order Fulfillment;
- Manufacturing flow management;
- Supplier Relationship Management;
- Product Development and Marketing;
- Returns management.

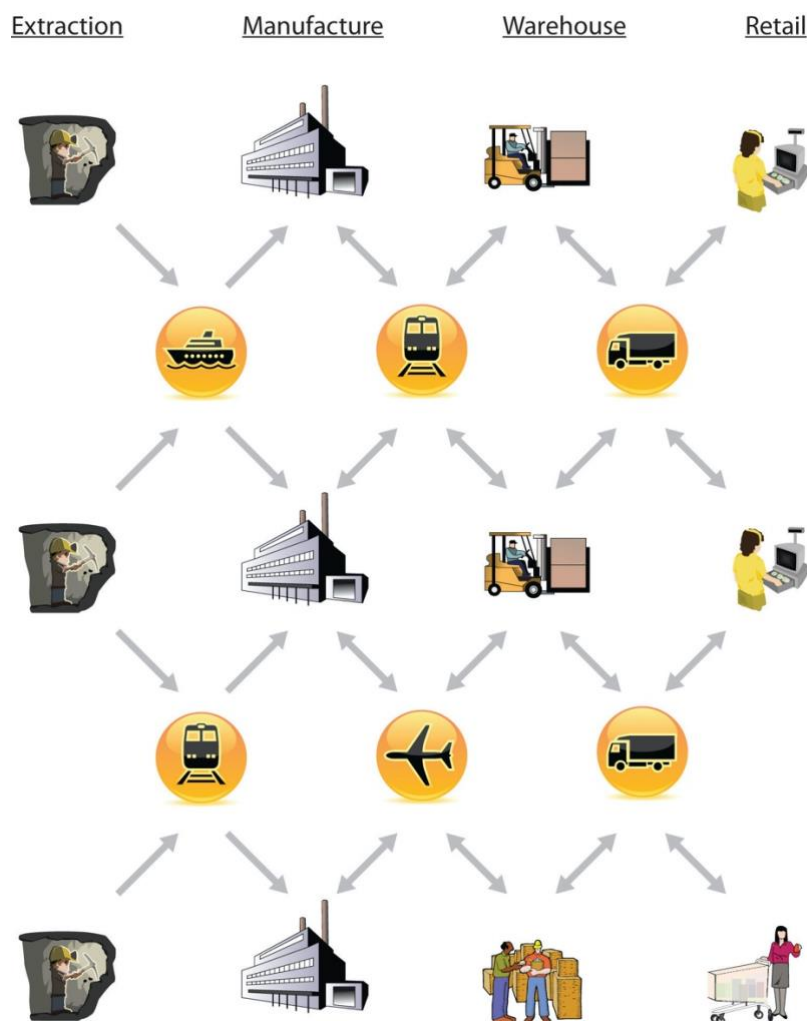


Figure 1 - Material Flows in a Supply Chain.

Source: [Small Business Management](#), ch.11 – Supply Chain Management, Jason Anderson

## Flows

There are **3 types of flows** in the supply chain: product flows, information flows, and financial flows.

**Financial flows** relate to payment schedules, credit terms, and title management.

**Product flows** refer to the movement of goods. This begins with the transportation of raw materials and ends with delivery to the customer. Product flows also include the return of defective products.

**Information flows** relate to order management and delivery status.

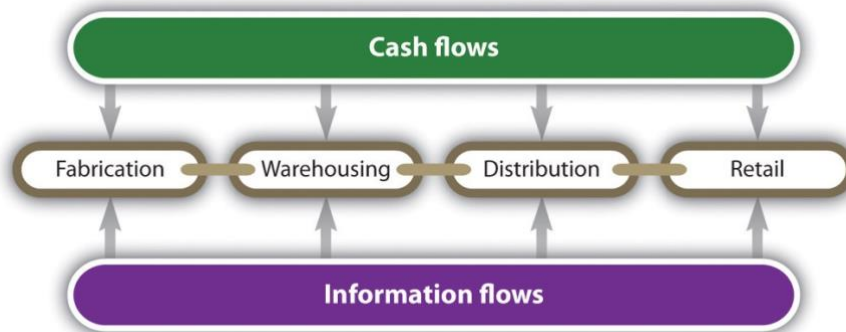


Figure 2 - Additional Flows in a Supply Chain

All of these **processes** and **flows** can be **managed** and **optimized** through supply chain management.

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- [How data standards can transform supply chains into supply circles](#) – WEF

In this article from the World Economic Forum (WEF), the authors show that supply chains are undergoing radical change as new technologies are gradually introduced into business.

This disruption begins with improved resource allocation. For example, to address breakdowns in production machinery, manufacturing industries stockpile excess parts to repair these machines. This overstocking comes at a financial cost to the industry. Thanks to the use of artificial intelligence (deep learning, machine learning), these industries are able to optimize the distribution of spare parts and reduce the costs generated by this overstocking.

Beyond the financial aspect, the use of AI makes it possible to avoid excessive and unnecessary waste of spare parts. For example, a small-to-medium sized manufacturer may have approximately **\$200,000 worth of spare** parts in inventory and approximately **\$100,000 worth of waste**.

If AI can save companies a significant amount of time and money, that's a good thing. The implementation of AI will help to develop, and even improve, a circular economy model in the manufacturing sector.

- **[The Role of AI in Optimizing Supply Chain Management](#) – Swiss Cognitive**

From the receipt of raw materials to the point of sale, the implementation of artificial intelligence (AI) in the supply chain can improve every stage that characterises the supply chain.

Using AI, companies can optimise logistics, inventory management and more.

Marketing departments can use predictive analytics to analyse the behaviour of (future) customers. AI is not limited to analysis, and the use of AI with robotics will improve and optimise the handling of goods, as well as the quality of life of the people who handle them.

If AI brings improvements to supply chain management, its use also brings two major challenges. The first is integrating AI into existing supply chains. The second, and by no means insignificant, challenge is data quality.

- **[How AI will strengthen the supply chain industry in India](#) – INDIAai**

Over the past decade, India has embraced and invested heavily in artificial intelligence (AI). According to the [World Economic Forum](#) (WEF), AI spending in India will increase at a Compound Annual Growth Rate (CAGR) of approximately 39% through 2025.

This increase in investment in India is reflected in the massive adoption of AI across industries, as well as in supply chain management. This investment has enabled [Indian startups](#) to develop applications for warehouse management, shelf optimization, truck route optimization, etc., with the aim of eliminating bottlenecks.

- **[Supply Chain Forecasting: The Machine Learning Revolution](#) – SupplyChainBrain**

With the evolution of manufacturing and delivery techniques, as well as globalization, supply chain management is becoming increasingly complex and dense.

The results of key figure calculations for inventory management, forecast reliability calculations, and even delivery management are also becoming more complex with these developments. Spreadsheet formulas have reached their limits for medium and large companies and do not provide the granularity of results.

However, with computerization, companies are generating large amounts of data (datalake) at all stages of the supply chain. With this data, it is possible to bring granularity to the results. But to achieve this, algorithms must be put in place to process the data and generate forecasts or decision support.

In addition to improving decision making, the use of machine learning also enables executives to be more responsive to sudden changes in market trends.

- **[A Proposed Architecture for Big Data Driven Supply Chain Analytics](#) - arXiv**

By the early 2020s, mastering supply chain management will be critical to differentiating your business. In addition to an ever-increasing number of competitors, industries face a growing number of demands and customers. Add to this the evolution of information and communication technologies, and supply chain management becomes even more complex.

Researchers Sanjib Biswas and Jaydip Sen propose a specific infrastructure for big data analysis for the supply chain, while respecting confidentiality and security requirements.

## [\[2308.01741\] Supply chain emission estimation using large language models](#) - arXiv

**Study in pre-publication status as of September 7, 2023**

Combat the effects of climate change and limit the impact of business on the climate (Sustainable Development Goals - SDGs). Companies must meet a number of targets, one of which is to reduce emissions from their supply chains (SDG 13), which account for around **90%** of all emissions.

Despite the titanic task of collecting this data upstream and downstream from suppliers, a group of researchers ([Ayush Jain](#), [Manikandan Padmanaban](#), [Jagabondhu Hazra](#), [Shantanu Godbole](#), [Kommy Weldemariam](#)) proposes using a subset of natural language processing (NLP), large language models (LLM), to estimate emissions tracking.

- [A Comprehensive Study of the Trends and Analysis of Distributed Ledger Technology and Blockchain Technology in the Healthcare Industry](#) - **Frontiers**

This scientific article is part of a research study consisting of 4 other articles available [here](#). In this study, research scientist [Anusha Thakur](#) examines the problem of counterfeit medicines destined for developing regions. Due to inconsistencies in supply chain processes, approximately 10% of pharmaceuticals or medicines are counterfeit. In addition to an estimated financial loss of approximately 200 billion US dollars to companies, there is also a significant human cost associated with the use of counterfeit medicines or products.

The study highlights the solutions offered by blockchain and distributed ledger technology (DLT). The incorporation of blockchain and DLT technology will improve the traceability and security of all supply chain processes. Beyond supply chain processes, blockchain and DLT technology will also help secure the patient database (personal and medical data).

Despite the benefits of blockchain technology, it is hindered by 3 factors: Technology, Organization and Legislation. On the technological level, blockchain and DLT are immature technologies. At the organizational level, replacing current processes with these new technologies is time-consuming and costly, and there is a lack of interoperability between different systems. And at the regulatory level, the lack of legislation and standardization limits the large-scale adoption of these technologies.

# Social Network

 **Business Blog and Website**

<https://listentoyourmuse.com/>

 **LinkedIn**

<https://www.linkedin.com/company/ia-muses>

 **LinkedIn Group**

<https://www.linkedin.com/groups/12627306/>

 **newsletter**

<https://www.linkedin.com/newsletters/muse-newsletter-6984537877409865728/>

 **Mastodon**

[https://mastodon.world/@AlexandreMartin\\_AI\\_Muse](https://mastodon.world/@AlexandreMartin_AI_Muse)

 **Twitter**

[https://twitter.com/musetm\\_grenoble](https://twitter.com/musetm_grenoble)

 **Bluesky**

<https://bsky.app/profile/muse-tm.bsky.social>