



Introduction

In this era of technological revolution, very few innovations have sparked as much excitement and shown as much potential as Artificial Intelligence (AI). The introduction of large language models (LLMs) such as ChatGPT by OpenAI have taken the world by storm and set the record for the fastest growing user base with over 100 million users within two months of launch. This technology which falls under the banner of Generative AI, with its ability to generate unique and original content and ability to converse in natural language, has created a large number of use cases including code generation, content creation and augmentation, content classification and more.

While the initial application of Generative AI has been largely restricted to a disconnected pre-trained model being used to generate content and answer queries, the possible use cases tremendously increase when these models are able to interact with new sources of data. Especially in the enterprise context, when these LLMs can interact with real-time enterprise data along with external data sources, they will help improve productivity, make the value chain more flexible, adaptive and responsive. Companies have already started reaping the benefits of LLMs in addressing complex problems across functional areas, and one key area is supply chain management (SCM). As consumer demands and expectations evolve rapidly, supply chains are under constant pressure to adapt and deliver goods and services efficiently. The integration of Generative AI into supply chain operations offers a remarkable opportunity to optimize processes, drive operational efficiencies and unlock unprecedented levels of agility and responsiveness. This article explores the transformative power of Generative AI across the supply chain ecosystem and highlights the benefits of integrating Generative AI with enterprise data, use cases and examples of companies leveraging Generative AI in SCM and how we believe companies can adopt this new-age technology to unlock value across the supply chain.

"Generative AI" Decoded _____

At a broad level AI is the ability of machines to perform cognitive tasks, which is otherwise associated with human intelligence. We have all come in contact with AI while interacting with Siri, Alexa or Google Assistant. Machine Learning (ML) falls within the scope of AI. ML is an algorithm that uses large volumes of data to detect patters and predict outcomes when new data points are fed in. For instance, a key application of ML in the supply chain context is for demand forecasting, where historical sales data is fed in to train the model to predict future sales. Traditionally ML has been used to classify data – character recognition, sentiment analysis etc., – looking for patterns based on what the model has been trained on. Generative AI, however, is a sub-set of ML, that can produce original new content, including text, imagery, audio, and synthetic data which 'resemble' a training data set, but are not explicitly present in the training data.



Exhibit 1: Difference between Machine Learning and Generative AI Technology

Some of the latest, most popular Generative AI interfaces are based on LLMs: _____



A multimodal AI application that identifies connections across multiple media such as vision, text and audio trained on large datasets of images and their text descriptions. Dall-E 2 enables users to generate imagery in multiple styles driven by user prompts.

OpenAl has provided a way to interact and fine-tune text responses via a chat interface with interactive feedback. ChatGPT incorporates the history of its conversation with a user into its results, simulating a real conversation.

Google released Bard built on a lightweight version of its Language Model for Dialogue Applications (LaMDA) family of advanced large language models.

The Magic of Generative AI on Enterprise Platforms

In an increasingly data-driven enterprise landscape, organizations have begun to realize the impact that Generative AI can have. By integrating Generative AI with their ERP data and other external data sources, businesses are unlocking valuable opportunities for efficiency, cost savings and enhanced competitiveness. Generative AI has found its applications across product lifecycle management, customer relationship management and supply chain management.



Generative AI to Drive Resilient and Adaptive Supply Chains

Supply chains play a critical role in the global economy, ensuring efficient flow of goods from manufacturers to end-consumers. Supply chains have been subjected to continuous disruptions due to the pandemic, natural disasters, geopolitical events, supplier issues and unforeseen market changes, which has increased the complexity of business operations. Even though companies have made radical improvements to make supply chains more resilient, there are limitations to what a human can pre-empt. Generative AI can play a crucial role in helping address these complexities during disruptions. With its ability to analyze vast amounts of real-time data (including supply chain events, external factors, and market trends) and identify patterns and correlations, Generative AI can help businesses proactively identify potential risks and their impact on operations. Using past and real-time data, it can also generate adverse scenarios for companies to evaluate the potential impact of disruptions. Generative AI can also incorporate changes in models by capturing data from revised market dynamics, consumer preferences, supplier performance, impact on routes and logistics costs. This can help companies generate optimal forecasts, sourcing strategies, identify alternate suppliers, routes and customers during disruptions, thus minimizing the impact on operations. Integration of Generative AI with existing AI/ML models through IOT sensors and other monitoring devices helps in real-time monitoring, detecting/predicting anomalies and recommending corrective/preventive actions. Companies can then test and simulate their supply chain strategies and improve their preparedness and decision making during actual disruptions.

The immense potential that Generative AI presents has not gone unnoticed by leaders, and companies are increasingly adopting solutions in various forms within their supply chains. The highest adoption of Generative AI-based software solutions has been witnessed in North America, followed by Europe, Asia Pacific and the Middle East. The global Generative AI supply chain market size is expected to grow multifold to ~USD 10.3 billion by 2032 (from USD 269 million in 2022), at a CAGR of a whopping 45.3 percent during this period.



Exhibit 3: Global Generative AI in Supply Chain Market Estimates (2022-32)

Organizations can leverage Generative AI across the supply chain in areas like planning, sourcing, manufacturing and logistics to unlock higher efficiencies. Generative AI can also support in achieving ESG goals by minimizing fuel consumption and emissions during transportation, optimizing packaging materials, reducing waste and supporting environment-friendly practices across the supply chain. Interesting use cases of Generative AI in each of these functional areas with some real-life examples are captured below:



Exhibit 4: Generative AI applications across the supply chain



Generative AI can significantly improve the accuracy of demand sensing and forecasting by analyzing vast amounts of data from diverse sources, including historical sales data, seasonal variations, market trends, social media sentiment, and external factors such as weather patterns and geopolitical issues. It can create new realistic demand scenarios by proactively identifying risks even in times of disruption, which enables organizations to align their production and inventory levels, resulting in minimal stockouts, improved customer satisfaction, higher operational efficiencies, and cost savings.

Replenishment signals in response to this advanced demand sensing will ensure optimal inventory levels and prevent stockouts/overstocking, thus reducing costs. Generative AI can help determine efficient distribution strategies basis demand fluctuations, leadtime variability and transportation costs.

Walmart

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Case Study: Generative AI based Demand Forecasting

Walmart is using large language models (LLMs) for demand forecasting. This helps Walmart ensure that the right amount of inventory is on hand, which can help reduce costs.

Walmart also built a "deep learning" AI technology to recommend product substitutes in a stock-out situation for online grocery shoppers. The technology considers hundreds of variables - size, type, brand, price, aggregate shopper data, individual customer preference, current inventory etc., to determine the next best available item in real time. It also proactively seeks customer approval for the substituted item, which moves into the feedback loop for the learning algorithm to improve accuracy of future recommendations.

Walmart's AI and ML components have been built over years of data collection and curation, the creation of flexible algorithms and a global, not piecemeal, approach to technology. Walmart's EVP of Omni Tech highlighted a three-pronged approach to AI/ ML adoption – foundation of data (collection and curation), assuming an ensemble approach, where the models need to adapt to specific problems and an end-to-end thought process to optimize processes at a global level.





Generative AI can enhance procurement and supplier management, starting with the generation of complex specifications/scope of work, scenarios for supplier selection and evaluation criteria. Various aspects of the supplier identification process can be automated by analyzing supplier performance metrics, price, delivery times, quality, reliability, and market assessment in real time. The AI model can identify risks, best-suited suppliers, and negotiate contracts on its own, thus aiding businesses to mitigate risks and take informed decisions in real time. It can also support in contract management processes such as auto-reading of contracts, identifying risks and misalignment vis-à-vis company policies, and contract drafting based on the organization's standard terms and conditions. Further, Generative AI can aid in ongoing supplier relationship management, by analyzing past supplier interactions, contract terms and performance records.

Walmart

Case Study: Generative Al for Automated Supplier Negotiation

In partnership with **Pactum**

Walmart uses Pactum's automated supplier negotiation solution, wherein a text-based interface negotiates with verified suppliers on behalf of Walmart. The system can read contracts, understand the priorities of both parties to the agreement, integrate instructions from those parties and negotiate on behalf of one of the parties via a chatbot. Basis the understanding of Walmart's budgets, discount and payment term requirements, the system negotiates with the supplier basis historical trends, commodity values and competitor costs.

Walmart first piloted the tool in Canada. The focus was on shopping carts, fleet services and other store essentials, rather than finished goods. In the pilot run, tail-end ~64 per cent supplier contracts were successfully negotiated with an average turnaround of 11 days, resulting in average savings of 1.5 per cent and extension of payment terms by an average 35 days. Additionally, the chatbot can run 2,000 negotiations simultaneously which boosts procurement productivity.

Post the pilot success, Walmart's business owners supported in the creation of negotiation use cases and scenarios. The key was to set specific trade-offs the buyer was willing to make (e.g. improved termination terms, more business share with Walmart) in exchange for improved terms (e.g. payment terms). The script used by Chatbot in the negotiations was also vetted by the legal team to ensure adherence to Walmart's contracting standards and policies. Successful production pilots helped Walmart extend rollouts to other parts of the business, with deployments in the U.S., Chile, and South Africa, as well as Mexico, Central America, and China. The categories have also been expanded.

BT Group

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Case Study: Generative AI-powered Scoping and Vendor Selection

In partnership with **Globality**

BT Group leveraged Globality's AI-enabled program Glo to introduce autonomous sourcing in consulting, marketing, IT, HR, legal and other service categories. Generative AI-powered scoping helped in defining complex project requirements and discovering new suppliers from Globality's diverse global network in real time, in addition to BT's existing suppliers. Significant bandwidth of the procurement team was saved for more value adding activities, since the AI tool guides take users through a step-by-step process to automatically generate the statement of work, which can be directly sent to suppliers.

Key benefits included higher efficiency, cost optimization, improved quality and advancement of BT's ESG strategy. The implementation was also quick and took less than six months. With over 3 billion euros worth of transactions on the platform, Glo has realized double digit savings for the group.



Integration of Generative AI with shop floor machinery and equipment involves advanced computational techniques that can analyze sensor data, historical maintenance records, and equipment performance. By leveraging generative AI, this data can be processed to identify patterns and indicators preceding equipment failures, empowering maintenance teams to take proactive measures by scheduling maintenance activities in advance. This predictive capability minimizes equipment downtime, boosts productivity, optimizes spare parts inventory and prevents costly breakdowns.

Generative AI also significantly enhances quality control in manufacturing processes. By utilizing IoT-enabled machinery and equipment and extensive legacy databases, the AI model can recommend actions to improve machine process capability, perform root cause analysis, and suggest corrective actions. Other use cases include identification of potential bottlenecks, deviations, or suboptimal parameters in the manufacturing process, allowing organizations to make adjustments and enhancements that improve both quality and efficiency.

Delta Galil

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Case Study: ChatGPT enabled CAPA Recommender

In partnership with **Inspectorio**

Delta Galil is a global leader in intimates and activewear, a high-tech apparel company harnessing the power of innovation and technology to create next-generation products. Delta Galil was facing challenges in bringing its different business units, factories and inspectors across the world on to the same platform.

Inspectorio was utilized to get real-time data for its factories and connect them to improve overall quality. Inspectorio has enabled quality assurance teams to spend 80% of their time on the product rather than reporting, and helped Delta Galil achieve 94% inspection first pass rate. Inspectorio developed a failure redressal system which assisted Delta Galil in RCA and CAPA to quickly identify and address defects.

Now with integration of ChatGPT, Inspectorio can automate the CAPA resolution process with its customized CAPA recommender which provides fast, personalized responses to help its client quickly identify, diagnose and solve defects and non-conformities, and also reduces the need for manual interventions.





One of the major use cases of Generative AI in logistics is identifying and mitigating risks in supply chain operations. By analyzing external factors such as weather conditions, traffic congestion, transport capacities, and customer preferences, generative AI models can create optimized delivery routes, dynamically adjust schedules, and allocate resources efficiently. During the training process, these models learn from historical data to optimize factors such as fuel consumption, delivery times, and resource allocation. The ability of generative AI to analyze multiple external factors and generate optimized strategies can have a transformative impact on supply chain operations, leading to improved performance, reduced risks, and increased competitiveness. This can directly improve the bottom-line and help minimize the supply chain's carbon footprint by reducing fuel consumption.

Project 44

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Case Study: Generative AI assisted dynamic shipment management

Traditional supply chain management interfaces often lack efficiency owing to extensive manual input, that leads to time-consuming processes and potential errors. To address this issue, Project44 has introduced Movement GPT, a generative AI-powered tool which enables users to interact conversationally with real-time internal and external data.

Movement GPT enhances the user interface, saving time and reducing the learning curve associated with traditional supply chain systems. User can perform complex analyses with a simple prompt. By leveraging generative AI, users can dynamically identify shipments and proactively mitigate risks, optimizing logistics processes. Movement GPT empowers supply chain professionals, saving time and enhancing overall efficiency in managing shipments.

Challenges and Growing Concerns

Amidst the magical capabilities that Generative AI models possess, widespread experimentation has also led to concerns around cybersecurity, ethical issues, and job displacement.

Job displacement- As AI systems automate tasks and processes, one of the biggest concerns revolve around job security and displacement of manual jobs. Generative AI may also be a double-edged sword for transportation companies, which will benefit from efficiency gains but may witness a drop in demand for third-party logistics services such as packing, storage and shipping.

Bias and misinformation- The output of AI-trained models is based on statistical probabilities and may not always be accurate. This may lead to misrepresentation of data and derivation of incorrect insights, thereby impacting decision making.

Cybersecurity risks- As AI systems become more complex and interconnected, they may become vulnerable to hacking and other malicious attacks. Developers are trying to tighten the systems to mitigate these risks.

Ethical issues- As systems begin to take decisions autonomously, there arises a high risk of malfeasance and the ethical implications of these decisions. Leaders need to be cognizant of this and use technology with the necessary checks and balances in place.

Generative AI Is the Future of Supply Chain Transformation

Despite the challenges and concerns discussed above, we strongly believe that Generative AI will continue to transform front-end customer experience and supply chain management. There will always be apprehensions around the adoption of new technology. And while some concerns over job displacement may be true, Generative AI will enhance productivity gains and free up employee bandwidth for activities that add value. Ethical concerns may also not be as significant in business operations as compared to creative fields such as art or music with more serious copyright implications.

Organizations must consider the following to ensure successful implementation of Generative AI technologies:

1. An ROI-driven Approach Is Key

While most organizations are aware of the benefits associated with AI-based technologies, they are often in a dilemma on whether to invest in these capabilities due to high upfront investment. While making this decision, some important questions need to be addressed: 1) When is the right time to adopt this technology? 2) Where in the value chain should this technology be adopted? 3) How to execute this in operations?



Exhibit 5: Quotations on implementation of digital programs

Generative AI implementation, like any other digital program, needs to be driven by a robust business case with an attractive ROI, execution plan and change management. Organizations must adopt a "Digital EBITDA model", which focuses on creating value and boosting the bottom-line. It is also important for companies to evaluate where technologies like Generative AI can create most value, in context of their industry, operating model nuances and digital maturity curve.



Exhibit 5: Digital EBITDA model

Given the large investments and efforts required for training and contextualizing complex multi-modal AI models, deployable solutions that give ROI in the short horizon are required to gain the trust of business leaders.

Puneet Mathur, Data Science & Analytics Leader Ex-J&J, Target and Deloitte "

2. Off-the-shelf Tools Can Be Leveraged to Minimize Implementation Time and Cost

There are numerous tools and solutions that have already been developed for businesses to kickstart their journey of re-invented supply chain using Generative AI. Most of these tools can operate in a "plug-and-play" model with global ERP platforms. Organizations may consider leveraging such solutions with the necessary customization to fast-track implementation timelines and minimize the investment required. The booming startup ecosystem in India, which focuses on AI-based solutions and open-source projects has helped improve the availability of such tools and solutions at a reasonable cost.

Below, are examples of some tools available currently, along with their functionalities:



3. Checks and Balances Need to Be Established to Combat Risks

Organizations must establish the necessary checks and balances to overcome the biases or misinterpretation of information by Generative AI technologies and ensure deployment in a transparent, ethical and responsible manner. Businesses must adhere to regulatory and data protection requirements relevant to their industries.

It is important to evaluate the extent of risk associated with misinterpretation of data (e.g., inaccurate advice given by a chatbot for booking a flight ticket vis-à-vis instructions provided to a worker for repairing a piece of heavy machinery, which can have safety implications), and strategically introduce human oversight to monitor such processes that have high risk or value associated with them.

Any uncertainty related to generative AI responses must be validated by people, by evaluating the model's sources of information, reasons for the AI response and necessary boundaries must be created to prevent some tasks from being fully automated.

Lastly, Generative AI cannot operate on a one-time set-up basis. The tools need constant oversight and testing, for which organizations can explore automation of the review process by collecting metadata and developing standard mitigations for specific risks.

The benefits offered by the technology and the impact it can have in managing risk, improving efficiency and creating truly adaptive supply chains is too strong to overlook. The opportunity only increases by the day, with the emergence of new targeted models for specialized applications and plug-ins which can work with varied data sources expanding the canvas to much more than Chat GPT.

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