AI in Supply Chain

An Indispensable Ally

AI in Supply Chain:
An indispensable ally

While it is predicted that over 60% of supply chain companies will adopt AI (Artificial Intelligence) over the next five years, seldom do we see an organization that is fully AI enabled – yet.

Supply chains face constant unprecedented disruptions, significantly impacting labor, productivity, efficiency, and end customers, signifying the future will no longer reflect the past.[1] The introduction of AI and ML (machine learning) has the potential to transform supply chain operations but is currently met with anxiety by many.

We spoke with Dr. Kim Oosthuizen, Head of Artificial Intelligence at SAP ANZ and PhD of AI in business, Aaron Ling, Founder and CEO of LXOpt Ltd, and Glen Borg, Head of Simulation at TMX Transform on how businesses can consider AI – where to start, where it should be used, the future employee, and remaining competitive.

"The relevant question is not simply what shall we do tomorrow, but rather, what shall we do today in order to get ready for tomorrow?"

Peter Drucker

[1] Brenda Westbrook & Caleb Thomson. Embracing the Future: A Guide to Successfully Implement AI/ML in Supply Chain Planning. Embracing the Future: A Guide to Successfully Implement AI/ML in Supply Chain Planning (gartner.com).

Where to Start:

Don’t implement AI for the sake of AI...

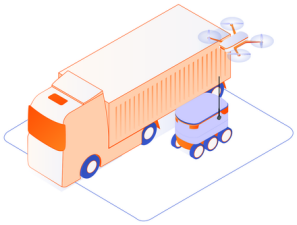
There’s no ‘one-size-fits-all' approach to implementing AI and it should not be a mere checkbox exercise; rather, it demands a strategic and thoughtful approach, applied to a particular business need.

Mr. Borg emphasizes that enhancing existing supply chain operations through the implementation of AI requires a thorough assessment of your organization, processes, and assumptions to identify precise areas where AI and ML can not only challenge existing assumptions but enhance overall functionality.

The approach to implementing AI can be tailored using either the ‘Inside Out’ approach, starting conservatively and building upon core strengths, or the ‘Outside In’ approach, where inspiration is drawn from observing competitors, explains Mr. Ling.

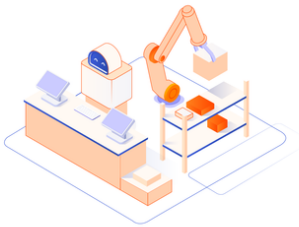
Leadership, as highlighted by both Dr. Oosthuizen and Mr. Ling, plays a pivotal role in AI integration, necessitating a comprehensive understanding of the mechanics and constraints of AI. They stress that AI is not a standalone entity but an integral part of organizational operations.

When used correctly, AI applications can significantly improve traditional supply chain operations, such as:



Customer experience

The supply chain directly impacts customer experience as it dictates both price and delivery. Leveraging AI can revolutionize supply chain operations, support route optimization, enhance workflow, and simplify complex procedures, allowing for significant improvement and an opportunity to reinvest in the customer.



Reducing operational costs

Microsoft Excel is still a widely used tool for managing forecasting and other conventional supply chain activities, and will no doubt continue to be an essential tool in most business operations. However, this system doesn't allow for dynamic or efficient use. AI can predict product quantities, nearest store location, weather patterns, and more, looking at all data and price points, and allowing for more accurate, quicker forecasting.

Warehouse automation

AI-powered robots are now prevalent on warehouse floors, responsible for simple tasks such as moving product and speeding up order fulfillment. While this influences the workforce, a recent study found that companies who adopted robots were more competitive than others, leading to business growth and the expansion of workers.[2]

Demand planning and inventory management

Predict changes in customer demand by analyzing customer trends. AI powered demand planning improves inventory management and minimizes stockouts by recognizing patterns, relationships within datasets, and signals for demand fluctuation.

Predicting the future

ML, a subset of AI, involves training a neural network with large datasets to predict outcomes. The primary challenge in implementing ML is often insufficient training data. Simulation addresses this challenge by running thousands of scenarios and recording data to train the neural network, accelerating data preparation and delivering more accurate results. Effectively used, simulation can solve complex problems, such as addressing supply chain disruptions, improving efficiency, and predicting future-state scenarios.

Often, the biggest confusion with AI is understanding how to use it. **The purpose of AI is to provide better decision-making, helping businesses to predict and plan for their futures.**

[2] NYU Stern School of Business. The Robot Revolution: Managerial and Employment Consequences for Firms. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3422581

The Biggest Challenges:

70% fail when implementing AI...why?

Mr. Ling emphasized that, "AI is only as good as the entire organization working behind it, requiring everything to work together—people, process, and technology."

Achieving successful AI implementation necessitates a comprehensive strategic approach. This, in turn, brings multifaceted challenges, demanding a transformative shift in organizational culture.

Challenge 1 **The need for a holistic, top-down approach.** Many AI initiatives fail due to the absence of this approach, leading to siloed implementations. According to Mr. Ling, understanding, defining, and educating about AI must permeate the entire organizational structure to ensure transformative impact.
However, with many unsure where to start, bringing together both technology and business leaders to develop a comprehensive data strategy and vision, while identifying quick wins, will help build momentum from early success.

Challenge 2 **Training and trust,** where inadequate training and a lack of trust among employees pose significant hurdles. Clear communication of an organizational definition of AI, as highlighted by Mr. Ling, fosters a unified understanding and approach, explaining that upskilling employees is crucial to addressing the trust deficit, and increasing the very small pool of skilled resources in AI.

Challenge 3 **Quality data.** Mr. Borg notes that data quality, encompassing legacy systems, accessibility, information gathering, security, and accuracy, is critical.
Simulation offers a solution to generate training data for the neural network, providing opportunities for building 'what if' scenarios. According to Mr. Borg, simulation helps visualize the future, fostering trust within the organization.

Addressing the complexities of AI implementation demands strategic leadership, a culture of adaptability, data quality assurance, comprehensive training, and a cohesive organizational synergy across people, processes, and technology. As Dr. Oosthuizen suggests, it is the collective effort of the entire organization that propels the success of AI initiatives.

Where Ethics are Involved:

The ‘Black Box’ Mentality

Dr. Oosthuizen highlights the challenge of 'The Black Box Mentality' in AI, where certain outputs from AI are difficult to interpret. This lack of transparency raises concerns about accountability, ethics, and bias in AI decision-making.

Despite AI's ability to analyze intricate networks and produce results, clarity around outputs and decisions becomes challenging. In industries relying on AI for customer segmentation, inherent bias can significantly influence decision outputs.

The ethical dilemma extends to the selection and storage of data for AI utilization, as companies hesitate to grant full decision-making authority due to the black-box nature of sophisticated AI models.

While data will never be 100% accurate, ensuring suitable data quality for your use case is crucial, despite possible variability. Mr. Borg explains that combining AI with BI (Business Intelligence) offers a recipe for analytical solutions based on historical data. This allows AI to discern patterns and make predictions for the future, addressing concerns about decision-making in AI.

Simulation can test AI performance and its decision-making hierarchy based on historical data and synthesized data, representing future possible scenarios. Comparing the AI models’ decisions with data patterns helps to interpret the decision tree logic, and rectify bias within the model, says Mr. Borg.

Benefits of AI Within the Supply Chain:

Employee 2.0

AI introduces a transformative model in supply chain management, revolutionizing processes and fostering efficiency. By streamlining operations, AI mitigates human errors and automates manual tasks, allowing time for employee innovation.

Dr. Oosthuizen notes that AI technology can automate approximately 60% of existing work processes. This highlights the need for creative and balanced utilization of both machine and human capabilities across various domains, including knowledge management, customer engagement, operational optimization, and inventory management.

While benefits to organizational process is evident, Mr. Ling cautioned business leaders must ensure employees understand that implementation of **AI does not reduce the value of human work.** The intent is to reduce the effort and time taken to complete specific tasks, allowing employees to enhance their performance and automate typically manual and time-consuming tasks.

Significant benefits are achieved by AI's ability to make small, but consistent, minute-by-minute or hour-by-hour adjustments to decisions, translating to substantial gains over the course of one year, says Mr. Borg. Its predictive modelling capabilities consider multifaceted factors such as seasonality and historical data, offering insights that might be overlooked via human intervention. Simulation uses these capabilities to highlight the options in visualization, telling a story that showcases both the problem and solution.

As AI permeates the supply chain, it reshapes the workforce, emphasizing the emergence of high-value roles. Contrary to job displacement fears, AI transforms job functions, prompting organizations to strike a balance between technology integration, employee education, and fostering trust in the evolving work landscape, explains Dr. Oosthuizen.

However, for companies to move toward a data driven future, while enhancing the value of human work, a cultural shift is required. People are not going to make decisions based on data, if they are allowed to make decisions based on opinion, Mr. Borg explains.

"It's a trend and all businesses are going to use AI. If we go back 20-years, we had bookstores, now we have Amazon. We had DVDs and Blu-Ray and now we have Netflix."
Aaron Ling

The Future:

Don’t wait! Trust equals opportunity

AI has become an integral part of our culture, and it is here to stay. It, therefore, demands businesses overcome their reluctance, and foster trust among employees and citizens. A fear of AI, despite ever-evolving regulations and cybersecurity threats, risks loss of competitive advantage, says Dr. Oosthuizen.

Cybersecurity attacks can cripple a supply chain, with AI both feeding and combating cybercriminals. Skilled cybercriminals use AI to action sophisticated attacks and leave businesses vulnerable to disruption. But, investing in strengthening cybersecurity infrastructure requires businesses to incorporate AI in their cybersecurity strategy as it plays a crucial role in identifying threats and further addressing the need for talent development in the AI space.

Cisco Global Security Chief, Jeetu Patel, said to combat the increased level of cyber-attacks, machines are required. “You cannot take people to a security war, you have to take machines,” and defenses for security are going to be based on data and AI, he explains.[3]

Education is foundational to building trust, whereby a top-down approach, and sharing the vision through simulation, allows for clear communications that promote understanding and confidence. Mr. Ling underscores that there must be a clear vision, genuine belief in, and support of AI for total business buy-in. Collective examination and an understanding of AI's benefits, coupled with collaborative planning, are crucial for executing plans that build trust. Mr. Borg emphasis that the focus of AI should be on the “points of difference that make a difference”, an approach preventing wasted time and effort, while highlighting the value.

With maturity and trust levels in AI adoption varying by country, despite fears and risks, those who are slow to take advantage of the benefits run the risk of lagging behind others.

[3] Peter Ryan. "The bad guys are winning" - Cisco global security chief warns on rising cyberattack risks. "the bad guys are winning" - Cisco global security chief warns on rising cyberattack risks - ABC listen.

Conclusion

Throughout the supply chain, the opportunities for AI and ML are endless, particularly in transactional data and informed decision-making, explains Dr. Oosthuizen. Leveraging existing resources, upskilling teams, and empowering employees in the creative process are essential for seizing these opportunities.

A proactive, informed approach rooted in education, strategic utilization, and collective belief ensures businesses can navigate the AI landscape with confidence and understanding, while building the trust required for effective implementation.

Simulation within the supply chain ensures companies can generate datasets for the training of neural networks, allowing them to evaluate their performance, understand decision logic, enhance operations and network, and improve their cost-to-serve.

While cybersecurity risks and evolving regulations remain a concern, the benefits of implementing AI outweigh the complexities, offering solutions to address potential supply chain threats and never-ending disruptions by predicting future-state scenarios.

"We build models that we can use to explain the past, predict the future, understand the subject and control the world."
Patrick H Winston
Ford Professor of Artificial Intelligence at MIT

About TMX

TMX Transform is an end-to-end supply chain consultant, partnering with clients worldwide to optimize supply chains and transform businesses.

Taking the time to understand the businesses it works with, TMX implements cutting-edge, tailored solutions to transform the journey from source to end customer. Its specialist team brings years of industry experience to optimize the entire supply chain, working with world-leading brands across retail, manufacturing, FMCG, food & beverage, and more.

Powered by its integrated property, project management, and supply chain services, TMX implements practical and efficient solutions that deliver tangible improvement.

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