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Original Article

Impact of using Artificial Intelligence-Based Chatgpt Technology for Achieving Sustainable Supply Chain Management Practices in Selected Industries

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Abstract *- The processes involved in the supply chain are expected to undergo a radical transformation because of digitalization, which makes use of the technical capabilities of applications for advanced technology. The greater effect of digital technology's use has been largely disregarded owing to a dearth of data pertinent to the topic. This is true even though the technology's advantages to operations are clear. This paper analyses how Char GPT and AI may be used together to increase operational performance, promote sustainable development, and earn money from data that has been acquired. The examples utilized in this study are from the supply chain sector. This project's objective was to conduct an experimental investigation of the tuna fish supply chain in the USA to identify essential end-to-end operations, investigate material and data handling methods, and consider the potential use of artificial intelligence and Chat GPT. Artificial intelligence has the potential to assist in making choices that are data-driven for a wide variety of business problems. Nevertheless, suppose there are problems with the flow of data and information across a supply chain. In that case, the value of AI algorithms may be limited since these algorithms depend on input that is accurate, trustworthy, and timely. Chat GPT can ensure the transparency, accountability, and traceability of such flows because of its potential to act as a hub for the administration and transmission of data and information emanating from a number of sources. The combination of artificial intelligence and chatbots has the potential to assist supply chains in moving beyond the limitations of currently available technology. Then, we can promote operational improvements and implement a dynamic decision-making process by leveraging the complementary effects of these digital technologies. This will allow us to reap the triple-helix sustainability benefits of reducing resource overexploitation, combating fraud, eliminating product recalls, and promoting gender and cultural equality. In the end, the ability to save money and generate more income thanks to data-driven decision-making is a significant boon to the process of monetizing data.*

Keywords *- Chat GPT, Supply Chain Management, Sustainable, Percentage rate analysis, Chi square.*

1. Introduction

To remain competitive in today's digital market, conventional firms need to digitise their business processes to keep up with the rest of the industry (Weill & Woerner, 2018). Having said that, the digital transformation of businesses is not possible without the widespread use of cutting-edge technologies such as the Internet of Things (IoT), Chat GPT, Cloud Computing, Data Analytics, and Artificial Intelligence (AI), as well as without the development and refinement of pertinent digital skills and capabilities (Akter et al., 2022). Each digital app has its own set of one-of-a-kind technical capabilities as well as data and information management tactics. In the context of the analysis of data, one definition of artificial intelligence (AI) reads as follows: "the ability of a system to effectively perceive external input, to learn from such data, and to use those learnings to fulfil stated goals and tasks through flexible adaptation" (Haenlein & Kaplan, 2019, p.1). With a compound annual growth rate (CAGR) of 45.8 percent between 2018 and 2026, the artificial intelligence (AI) market in the food and beverage industry is projected to reach $29,94 billion by 2026. Here is what Research And Markets have to say about it (2021). Speak GPT is a distributed ledger that permits the sharing of encrypted information with the purpose of improving visibility and transparency within the supply chain of the hardware sector (Kamble et al., 2019). Between 2015 and 2025, the global market for Chat GPT in the agricultural and food industries is anticipated to increase at a compound annual growth rate (CAGR) of 48.1%, bringing the total market to $948 million. According to MarketsAndMarkets's projections, in the year 2020.

Digital systems and applications not only have their advantages, but they also have the potential to overcome basic limitations and open up new technical possibilities via connectivity. This may result in higher productivity and a more lucrative firm (Akter et al., 2022). Artificial intelligence (AI) is anticipated to be the most significant industrial application of the twenty-first century. AI will be dependent on centralised computing and data storage infrastructure in order to analyse (continuous) data flows in order to make (real-time) decisions (Nasar et al., 2020). Despite this, artificial intelligence systems are confronted with difficult challenges, including data security and interoperability issues, hostile threats, morality, and ethics (Awad et al., 2018). As a result of this impression, an increasing number of individuals are developing a healthy scepticism about artificial intelligence and the use of its analytical conclusions to guide fundamental decisions. When utilised on its own, Chat GPT cannot be put to use for the purposes of data analysis and intelligence gathering in order to direct decision-making; however, it may be put to use for the storing of decentralised data and decisions across supply chains (Salah et al., 2019). Interactive decision-making based on the analysis and interpretation of reliable real-time data and information arriving from a wide variety of sources is becoming more popular. Risk management and product recalls are only two instances of this trend (Toorajipour et al., 2021). There is a possibility that artificial intelligence (AI), gamified workplace training (GPT), and other cutting-edge technologies (such as sensor-driven automation for capturing shop floor data) could serve as a catalyst for the improvement of technical skills, the creation of real economic value, and the intensification of competition (Hughes et al., 2022).

The supply chain, which is an essential component of the global economy, is responsible for the daily processing of items with a total worth of billions of dollars. This sector is both complicated and fast-changing, and there are a lot of unknown obstacles that lie ahead. Experts in supply chain management must still contend with obstacles, despite the ongoing development of cutting-edge technology and the widespread use of cutting-edge methods. The sector's excitement has been increased as a result of the recent rise to prominence of artificial intelligence (AI), and one AI technology in particular, ChatGPT, has a great deal of potential.

Machines can now provide convincing replies in response to inquiries asked in natural language thanks to the ChatGPT language model that OpenAI created. By intensive training, it has been trained to recognise patterns in a vast quantity of data and to offer replies that are both exact and relevant to the topic that is being asked at this time within the first few months that the website was available to the public, more than one hundred million users registered for an account on the platform. After proving its usefulness in the healthcare and finance industries, ChatGPT is now positioned to make waves in the world of startups by revolutionising supply chain management. More precise demand forecasting, more effective management of the supply chain, and closer interactions with suppliers are all made possible thanks to ChatGPT. ChatGPT can access the data for analysis since it has established an API connection to many data sources. These data sources include ERP systems like SAP S4 HANA, CRM platforms, inventory management software, and other relevant applications.

ChatGPT can offer an estimate of client demand by analysing consumer data and market trends. This enables businesses to plan production and inventory management more precisely. It is also possible that it will enhance supply chain operations via better management of suppliers. The analysis of supplier performance data that ChatGPT carries out makes it possible to discover chances for suppliers to improve their timeliness, quality, and cost. The Effect That ChatGPT Has On The Visibility And Transparency Of The Supply Chain The capacity of ChatGPT's natural language processing to examine and comprehend huge volumes of data collected all along the supply chain has the potential to have a substantial impact on the supply chain's level of transparency and visibility. Increase the visibility of the supply chain by deciphering unstructured data sources like emails, invoices, and customer reviews and then extracting the data from those sources.

ChatGPT increases the visibility of the supply chain by providing stakeholders with real-time updates on the location of their shipments and the assurance that they are secure. By synchronising with a diverse collection of sensors and Internet of Things devices, ChatGPT can track items' position and temperature and humidity. The items may be transported while retaining their exquisite state in this manner. Potential Limitations and Barriers to Progress Nothing has changed in any way. ChatGPT requires a vast quantity of high-quality data if it is going to be able to deliver accurate predictions and recommendations. Accurate or comprehensive data is required to produce actionable analysis and recommendations for the supply chain. Additionally, there is a possibility that ChatGPT could access or disclose sensitive information, which may raise privacy concerns.

Another issue with ChatGPT is that it requires human supervision, which can be problematic in certain settings. ChatGPT can efficiently analyse and understand massive amounts of data but is not self-sufficient. As a result, human supervision is required to ensure that ChatGPT's suggestions are consistent with the organisation's goals. It may also be unable to anticipate all potential interruptions in the supply chain, such as those caused by suppliers going out of business or natural catastrophes. Consider the possibility that adjustments and maintenance will need human involvement.

ChatGPT's natural language processing capabilities have the potential to bring about a paradigm shift in the supply chain sector by increasing openness and visibility, easing the process of making more informed decisions and fostering more effective lines of communication. Companies may get ready for a successful rollout of ChatGPT by investing in training programmes and data quality monitoring despite concerns about data quality, privacy, and the necessity for human supervision. This technology has the potential to enhance logistics in a more general sense.

2. Review of Literature

There is growing optimism that artificial intelligence may one day be able to make use of data obtained through easily available global supply networks (Sanders et al., 2019). According to estimates provided by McKinsey, the application of artificial intelligence analytics could increase the global GDP by more than US$13 trillion (or 16%) annually by the year 2030. Supply chain-relevant businesses (such as shipping and commerce) may be in the best position to reap the benefits of this development (Bughin et al., 2018). As a consequence of the broad use of AI technology, it is anticipated that the supply chain's productivity and efficiency will significantly improve over the course of the next decade. Analysing large amounts of data to explain and assess risks, thereby promoting the resilience of supply chains; facilitating near real-time, automated, and optimal decision-making in supply network design and reconfiguration by vetting and classifying potential stakeholders (for example, alternative suppliers); and facilitating supply network design and reconfiguration by vetting and classifying potential stakeholders (for example, alternative suppliers) (Shen et al., 2019).

Establishing trustworthy supply networks on a global scale is now one of the most important issues in business that have not yet been resolved (Dauvergne, 2020). The whole of the global supply chain has a significant impact on the issue of sustainability (Carter & Washispack, 2018). The vast majority of environmental impacts resulting from activities taken at various points throughout the supply chain. These actions begin with product procurement and continue all the way through delivery. They may also include manufacturing and transportation (Sanders et al., 2019). While many experts think that AI would dramatically accelerate the development of "green" supply chains, others are concerned that broad use of the technology might have unanticipated and deleterious effects on environmental sustainability.

It has been shown that using artificial intelligence (AI) may increase both productivity and efficiency in various settings (Camaréna, 2020; Cubric, 2020; Di Vaio et al., 2020; Sanders et al., 2019). [Citation needed] As a direct consequence, the commercial potential will increase. It should come as no surprise that artificial intelligence is used to enhance the collection and processing of agricultural goods. For instance, the pace at which vegetables decompose may be determined using drones equipped with cameras and machine learning algorithms (Camaréna, 2020). Not only does the use of artificial intelligence (AI), in combination with other component technologies, make it simpler to organise food supply, but it also guarantees that a uniformly high level of cleanliness will be maintained across the board (Di Vaio et al., 2020). Hence, maintaining transparency and traceability in global commerce may have comparable benefits for the fishing industry, as does monitoring fish harvesting and processing in the industrial sector (Tsolakis et al., 2021). The use of artificial intelligence (AI) has the potential to reduce operational costs in a variety of domains, such as labour, equipment, and human error (Cubric, 2020), in addition to the domains of manufacturing and transportation (Cubric, 2020). (Dauvergne, 2020). In addition to the benefits that AI brings to the administration of (internal) operations, it has been shown that AI is useful for managing the whole supply chain. (Min, 2010; Sanders et al., 2019) These benefits include improved demand management and forecasting, more transparency in the supply chain, assistance in determining the price for items, and communication between parties engaged in the supply chain (Cubric, 2020; Ebinger & Omondi, 2020). In addition to this, there is the possibility that AI may help in the fight to preserve the environment. It is possible that artificial intelligence may assist the energy industry in enhancing the efficiency of energy conversion and logistics, leading to a reduction in the amount of fuel used. Moreover, artificial intelligence can potentially increase the efficacy and reliability of renewable energy sources. This may be accomplished, for example, by enhancing the accuracy of weather predictions and maximising the efficiency of energy storage (Dauvergne, 2020).

3. Materials and Methods

Combining primary and secondary sources is necessary to collect all of the data required to answer the research questions. The primary data were collected and analysed using standardised questionnaires using a five-point Likert scale that included choices for "strongly agree" and "strongly disagree." Before conducting their own investigation, they completed a great deal of background research in the form of reading.

There is no significant difference between better customer service and sustainable supply chain management using Chat GPT

There is no significant difference between improved warehouse management and sustainable supply chain management using Chat GPT

There is no significant difference between optimising route planning and sustainable supply chain management using Chat GPT

4. Results and Discussion

4.1. Percentage Rate Analysis

Table 1. Percentage rate

Demographics	Features	Frequency	Percent
Gender Category	Male	139	87.40
	Female	20	12.60
Age Category	Less than 30 years	48	30.20
	31-40 years	61	38.40
	41-50 years	19	11.90
	Above 50 years	31	19.50
Marital Status	Single	67	42.10
	Married	92	57.90
Nature of Industry	Manufacturing Companies	93	58.50
	Service Companies	66	41.50
Management Cadre	Lower Level Management	44	27.70
	Middle-Level Management	91	57.20
	Process Head	24	15.10
Total Experience	Less than 3 years of experience	43	27.00
	3-6 years	48	30.20
	6-9 years	27	17.00
	9-12 years	09	05.70
	Above 12 years	32	20.10

Based on the percentage rate analysis, it is noted that 87.40% of the respondents were male, and remaining 12.60% were female, 30.20% possess less than 30 years of age, 38.40% were in the age group between 31 - 40 years, 11.90% were in the age group between 41 - 50 years, 19.50% were in the age group of above 50 years. 42.10% were single, and the remaining were married; 58.50% mainly worked in manufacturing-related industries. 41.50% were in service-oriented industries, 27.70% were in lower-level management, 57.20% were in middle-level management, and the remaining 15.10% were process heads in their department. 27.00% had Less than 3 years of experience, 30.20% were having experience between 3 - 6 years, 17.00% were having experience between 6 - 9 years, 5.70% having experience between 9 - 12 years and the remaining 20.10% having experience above 12 years

4.2. Correlation Analysis

From the analysis, it is noted that the highest correlation exists between customer service and a sustainable supply chain system through ChatGPT, the adoption of new and innovative tools assists the management in understanding the customer needs better and provides them with the services which will meet their specific requirement, furthermore, it is noted that the correlation between optimising route planning and supply chain is at 0.893. Lastly, the correlation between improved warehouse management and a sustainable supply chain is at .729. Hence all the variables possess a higher positive correlation towards the dependent variable.

Table 2. Correlation coefficients

Correlations	Better Customer Service	Improved Warehouse Management	Optimizing Route Planning	Sustainable Supply Chain
Better Customer Service	1	0.664**	0.894**	0.918**
Improved Warehouse Management	0.664**	1	0.747**	0.729**
Optimizing Route Planning	0.894**	0.747**	1	0.893**
Sustainable Supply Chain	0.918**	0.729**	0.893**	1

4.3. Chi Square Analysis

Table 3. Cross tab between customer service and sustainable supply chain management.

		Sustainable Supply Chain					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Better Customer Service	Strongly Disagree	9	4	0	0	0	13
	Disagree		8	4	3	0	15
	Neutral		0	13	5	0	18
	Agree		0	0	6	27	33
	Strongly Agree		0	0	3	77	80
Total		9	12	17	17	104	159

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	298.646	16	0.000
Likelihood Ratio	229.545	16	0.000
Linear-By-Linear Association	133.119	1	0.000
N of Valid Cases	159		
a. 17 cells (68.0%) have an expected count of less than 5. The minimum expected count is 0.74			

Based on the above table, it is noted that the p-value is at 0.00, which is less than the 5% level of significance; hence it can be concluded that there is a significant difference between better customer service and sustainable supply chain management using Chat GPT

Table 4. Cross tab between warehouse management and sustainable supply chain management

Count		Sustainable Supply Chain					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Improved Warehouse Management	Strongly Disagree	4	12	0	0	0	16
	Disagree	5	0	0	0	9	14
	Neutral	0	0	13	8	5	26
	Agree	0	0	4	4	63	71
	Strongly Agree	0	0	0	5	27	32
Total		9	12	17	17	104	159

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	235.413	16	0.000
Likelihood Ratio	175.599	16	0.000
Linear-by-Linear Association	83.939	1	0.000
No. of valid cases	159		

Based on the above table, it is noted that the p-value is at 0.00, which is less than the 5% level of significance; hence it can be concluded that there is a significant difference in improved warehouse management and sustainable supply chain management using Chat GPT

Table 5. Cross tab between optimizing route planning and sustainable supply chain management.

		Sustainable Supply Chain					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Optimizing Route Planning	Strongly Disagree	0	4	0	0	0	4
	Disagree	9	8	0	0	0	17
	Neutral	0	0	17	4	0	21
	Agree	0	0	0	4	25	29
	Strongly Agree	0	0	0	9	79	88
Total		9	12	17	17	104	159

Chi-Square Tests			
	Value	**Df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	319.044	16	0.000
Likelihood Ratio	228.716	16	0.000
Linear-by-Linear Association	125.857	1	0.000
No. of Valid Cases	159		

Based on the above table, it is noted that the p-value is at 0.00, which is less than the 5% level of significance. Hence it can be concluded that there is a significant difference between optimizing route planning and sustainable supply chain management

5. Conclusion

ChatGPT can potentially improve the efficiency of the customer support process for logistics companies by providing answers to frequently asked queries such as "where is my shipment?" and "what is the status of my order?" Consumers will be grateful for easy access to dependable information, and customer service representatives' time may be better spent solving more complex issues. DHL, a multinational logistics company, makes use of ChatGPT to manage a chatbot that provides responses to inquiries posed by customers on the company's website and social media sites.

By providing users with real-time updates on stock levels and enabling more effective use of storage space, ChatGPT may be utilised to facilitate improved inventory management in warehouses. ChatGPT might be used by a company that specialises in logistics, for example, to alert employees when stock is running low and to give guidance on how to make the most efficient use of storage space in light of both the existing stock and the anticipated demand in the future.

It is possible that ChatGPT may help logistics organisations improve their route planning by analysing real-time traffic data and recommending the most efficient routes. For example, ChatGPT might be used in the logistics business to analyse traffic data and advise alternative routes, shorten delivery times, avoid bottlenecks, and reduce the amount of money spent on petrol.

It is possible that ChatGPT may increase supply chain visibility since it provides data that is up to the moment on shipments and stock levels. It is possible that businesses in the logistics sector would profit from this since it may assist them in identifying issues such as blocked shipments and stock-outs earlier. A logistics company may choose to use ChatGPT if delivery delays or other difficulties arise. This allows the company to keep clients abreast of the situation in real-time and provide suitable alternatives.

ChatGPT may be used to speed up clearing customs by giving real-time updates on changes to customs legislation and advising strategies to ensure compliance with these changes. A logistics company, for example, may use ChatGPT to give real-time updates on the rules that control customs in several different countries in order to speed up the process of clearing customs. It would allow the logistics company to pass customs faster.

Conflicts of Interest

The researchers state that this is an original work and that all ethical practices are followed in preparing the article.

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