The Impact of using AI for Inventory Management in Company's Profitability

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ABSTRACT

Artificial intelligence is the future of tomorrow in any field. It has so many capabilities that it has got incorporated in various areas of mankind. It is not unknown how AI has helped in increasing the efficiency and accuracy of any work that it does. AI has worked incredibly across a lot of businesses all around the globe in every aspect of the business. This research paper focuses on inventory management which is a huge part that indirectly affects the overall profitability of the company. In previous times business were dependent on traditional methods of forecasting such as demand forecasting, exponential smoothing and autoregressive integrated moving averages, though these methods are still efficient for business that generate less data but in world where data is growing at an exponential rate, there is a critical need of a robust system that will accurately identify demand patterns, automate and optimize when and how much inventory has to be renewed. The purpose of incorporating AI into managing the inventory because traditional methods are not just time consuming but there is lot of times when the forecasting is affected due to human error. AI processes real time data and gives the prediction very quickly. The demand prediction is of higher accuracy and therefore also helps in reduction of errors in supply chain by a big margin. This in turn helps in saving a lot of monetary capitals which were previously lose due to unplanned consumer demand and incorrect stock numbers. Talking about traditional methods in relation to the profits of the firm are a little on the opposite side of the bank where it is much more accurate along with acceptable to use AI in the firms. This research paper focuses on the profit margins that the company makes because of the efficient work done by AI in managing the inventory. In this paper the method of research that is been used is quantitative research. Quantitative research is the type of research in which variables involved are measurable. It involves collection and analyses of numerical data which are extracted from doing some experiments or surveys which have some scaling. The paper is based on the in-depth analysis of financial statements data of ten companies before and after using AI in their inventory management system for studying how drastically AI aided system have affected the profit margins of the companies. The findings suggest that AI can enhance inventory management efficiency, reduce operational costs, and increase revenue by improving customer satisfaction through timely delivery and optimized inventory levels. In conclusion, a company's profitability may be significantly impacted by the implementation of AI in inventory management. Speaking of which has positive and negative viewpoint, looking at its positive side businesses may manage their inventory levels, cut waste, and raise profits by utilizing machine learning algorithms and predictive analytics. The adoption of AI, however, necessitates thorough analysis of the costs and advantages, and businesses should make sure they have the infrastructure and resources required to fully utilize this technology.

Keywords— Artificial Intelligence (AI), Sustainable, Inventory management, Company's profitability, Logistics.
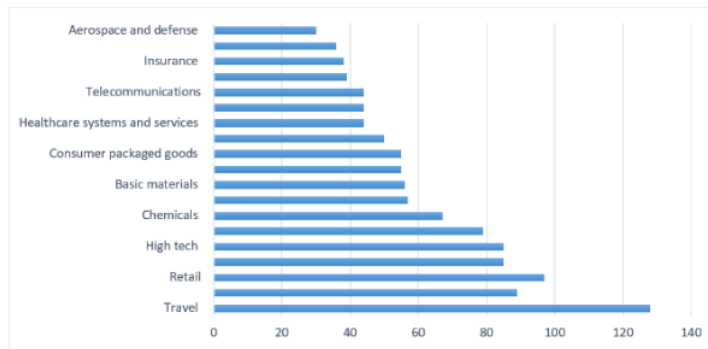
I. INTRODUCTION

Artificial Intelligence (AI) is a rapidly growing field of computer science that focuses on the development of intelligent machines that can perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and natural language processing. AI involves the use of algorithms and statistical models to analyze and interpret complex data, and to learn from past experiences in order to improve performance on future tasks. AI systems can be broadly categorized into two main types: narrow or weak AI, which is designed to perform a specific task or set of tasks, and general or strong AI, which is capable of performing any intellectual task that a human can. Some of the key technologies used in AI include machine learning, natural language processing, robotics, computer vision, and expert systems. These technologies are used in a wide range of applications, from autonomous vehicles and virtual assistants to medical diagnosis and financial forecasting.

AI-powered inventory management systems can also help companies reduce stockouts and overstocking, leading to fewer lost sales and less inventory holding costs. By avoiding stockouts, companies can ensure that they have the products customers want, and by reducing overstocking, companies can minimize the costs associated with excess inventory. Additionally, AI can help improve supply chain visibility, enabling companies to track inventory levels in real-time and quickly respond to changes in demand or supply chain disruptions. This can lead to improved delivery times and customer satisfaction.

In summary, AI-powered inventory management can help companies improve their profitability by optimizing inventory levels, reducing waste, improving supply chain visibility, and enhancing customer satisfaction. Post AI implementation there were relative changes in the cash flows or potential incremental value from Ai over other analytics techniques.

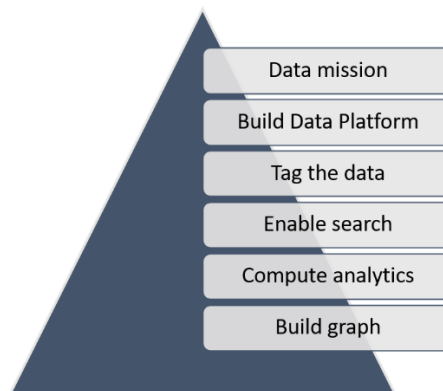Introduction to AI in Inventory management on company's profitability:

Figure 1: Percentage growth of AI in various industries
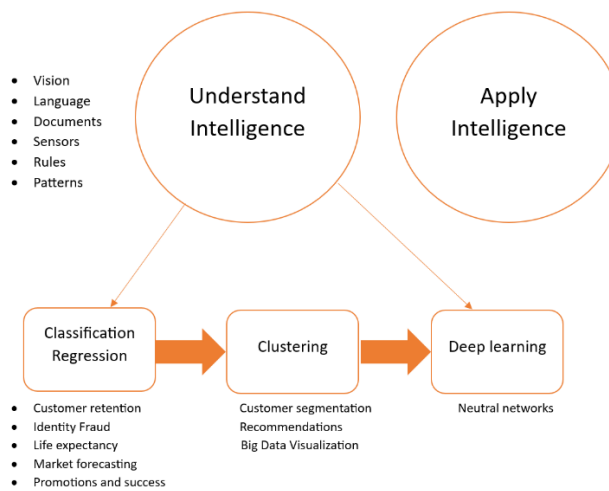
Figure 2: How to Build AI

Figure 3: Steps to enable AI

1. Data mission: The first step in enabling AI is to define the data mission. This involves identifying the business problems that AI can help solve, as well as the data that will be needed to train machine learning models. The data mission should be aligned with the company's overall strategy and goals.
2. Build Data Platform: Once the data mission has been defined, the next step is to build a data platform. This involves creating a system for collecting, storing, and managing data. The data platform should be designed to handle large volumes of data, and should be scalable and flexible enough to accommodate changing business needs.
3. Tag the data: In order to make the data useful for machine learning, it is important to tag it with metadata. This metadata should include information such as the type of data, the source of the data, and any relevant contextual information. Tagging the data in this way makes it easier to search and analyze.
4. Enable search: The next step is to enable search functionality on the data platform. This involves creating a search interface that allows users to query the data based on various criteria. The search interface should be intuitive and user-friendly, and should provide relevant results quickly.

5. Compute analytics: With the data platform in place, it is now possible to compute analytics on the data. This involves using tools such as statistical analysis, data visualization, and machine learning algorithms to extract insights from the data. The insights gained from this analysis can be used to inform business decisions and drive innovation.

6. Build graph: Finally, it is important to build a graph of the data. This involves creating a visual representation of the relationships between the various data points. By visualizing the data in this way, it becomes easier to identify patterns and connections that might not be immediately apparent from a simple analysis of the data. This graph can also be used to create predictive models that can help anticipate future trends and behaviours.

II. LITERATURE REVIEW

L. Mengmeng, M. Shinji (2022) explains in their research paper "Dynamic pricing and inventory management of a dual-channel supply chain under different power structures" is a popular research topic in supply chain management. A study in this area investigated the impact of three different power structures, i.e., centralized, decentralized, and hybrid power structures, on the profitability of a dual-channel supply chain using dynamic pricing and inventory management. The authors developed mathematical models for each power structure and conducted numerical experiments to compare their performance. The results suggest that a hybrid energy structure that combines the advantages of both centralized and decentralized decision-making can achieve the greatest benefits for the supply chain. In addition, the authors found that optimal pricing and inventory decisions are affected by factors such as channel cooperation, channel capacity, and channel coordination costs. The study also highlights the importance of considering the impact of power structures on supply chain performance when planning pricing and inventory management strategies. Overall, this study provides insights into the design and management of dual-channel supply chains using dynamic pricing and inventory management, which can help companies optimize their profitability and customer satisfaction.

Artificial intelligence can be used in many parts of the business, one of the parts is inventory management. The authors Samiat Bola-Matanmi, Ini-Usoro Suashi Queiroz, Maciel M.2, et.al. , (2022) in his paper entitled "Exploration of Artificial Intelligence in Inventory Management" talks about, the manufacturing, food service, and retail industries all depend on supply chain management (SCM), as inventory shortages can result in lost resources and income. Smart systems are developed using AI to carry out tasks that require human intelligence, such as preventing theft, forecasting stock levels, providing customer service, and keeping track of amount, cycle times, temperature, faults, and downtimes. The way artificial intelligence (AI) systems operate is by absorbing a lot of data and looking for trends or patterns. The machine can only do this by training and then validating that training using the patterns for future prediction. AI is a useful tool for inventory management since it sometimes outperforms humans and offers a wealth of information about how businesses operate. Demand forecasting, increased productivity, better order management, enhanced warehouse management, automated material procurement, and marketing strategies can all be accomplished with its help. Automation of inventory management systems thanks to artificial intelligence has increased productivity with little error and boosted customer satisfaction scores.

B. Camelia (2011) explains in their research paper "Factors influencing company profitability", there are numerous important elements that effect a firm's financial success. Market competitiveness, macroeconomic conditions, cost of capital, managerial efficiency, and technological adoption are some of these issues. Nevertheless, firm-specific features like as size, industry, and business strategy can all have a substantial impact on a company's profitability. Firms may build strategies to improve their financial performance and remain competitive in their particular sectors by recognising these elements and their influence. According to research on the factors influencing company profitability, there are numerous important elements that affect a firm's financial success. Market competitiveness, macroeconomic conditions, cost of capital, managerial efficiency, and technological adoption are some of these issues. Nevertheless, firm-specific features like size, industry, and business strategy can all have a substantial impact on a company's profitability. Firms may build strategies to improve their financial performance and remain competitive in their particular sectors by recognising these elements and their influence.

In the paper by authors Bashir Muhummed Osman, Srirag Alinkeel, Dhwani Bhavshar, Huang, Tingliang (2022) entitled "A Study on Role of Artificial Intelligence to Improve Inventory Management System" explains that, the process of ordering, storing, using, and selling a company's inventory is known as inventory management. A vast area of computer science known as artificial intelligence (AI) enables the development of intelligent machines that are capable of doing tasks that would typically need human intelligence. The increased accessibility of real-time data generated on the internet and through other channels has led to this change. In order to effectively exploit this new data and maintain their competitiveness, managers must rearrange their supply-chain processes. For instance, Amazon has implemented artificial intelligence on a scale never before seen in its inventory management. All levels are being led by artificial intelligence or machine learning systems.

Ahmed, Waqas, Jalees, Muhammad, et.al. (2022) in their research paper entitled "An inventory management for global supply chain through reworking of defective items having positive inventory level under multi-trade-credit-period" provides a model that combines inventory management with option contracts to reduce risk and achieve a profit target under spot pricing uncertainty. While making inventory selections, the article emphasises the need of considering both the cost of maintaining goods and the risk of price volatility. To hedge against price unpredictability, the model includes option contracts, which allow the corporation to buy or sell items at a predetermined price. The authors also establish the concept of a profit objective, which allows the corporation to define a precise profit goal and modify its inventory and option holdings appropriately. The model seeks to establish a balance between risk and profit while taking into consideration the individual conditions and goals of the firm. The paper includes numerical examples that show how the model may be used in practise. The findings demonstrate that the model may successfully limit risk while achieving the intended profit objective, even when spot price uncertainty is considerable. In terms of risk management and profit maximisation, the authors conclude that the model beats existing inventory models. Moreover, the research paper "Risk Minimization Inventory Model with a Profit Goal and Option Contracts under Spot Price Uncertainty" gives useful insights into how businesses may successfully manage inventory and

reduce risks in the face of spot pricing uncertainty. Companies can boost their bottom line by introducing option contracts and profit objectives into inventory decision-making.

G. Mustafa et.al (2020) in their paper entitled "The rising proportion of inventories in total investment makes supply chain management a significant issue in today's business environment." explains that one of the most efficient and successful strategies for enhancing supply chain performance is the implementation of an inventory control policy, but to compete in regional and international markets, logistic costs must be kept under control. Artificial intelligence (AI) concepts and simulation-based techniques can be combined to enhance simulation performance. The two main motives of AI are modelling motivation and engineering motivation. AI is a large field that represents the cutting edge of research in computer science on many fronts. Although AI's use in supply chain management is restricted, it can be modified to increase efficiency.

In Dosdoğru, Ayşe Tuğba, Boru İpek, Aslı et.al (2021) paper entitled "A novel hybrid artificial intelligence-based decision support framework to predict lead time" talks about a decision framework for leveraging an optimized supply chain simulation model to collect more realistic lead time statistics. Simulated outcomes are predicted and utilised to map complicated interactions. AI and simulation are combined to form a hybrid. The following is a description of the steps in the suggested approach for IRP: Inventory-related parameters are determined using the SO process, lead time for supply chain participants is predicted using a GA-based ANN, and approximation signals are fed into MODWT using the SO method.

P. Deniz, K. Michael (2021) explains in their paper entitled "Artificial intelligence-based inventory management: A Monte Carlo tree search approach" that Supply chain management, from the supply source to the end user, is the integrated planning and control of the inventory of all players in the supply chain. Since inventory expenses make up a significant amount of a company's overall logistics costs and have a significant impact on its profitability, reducing these costs is crucial. The bullwhip effect, which describes an increase in order variability as one move up the supply chain, hinders this attempt. An appropriate order policy should not only aim to reduce or even do away with overall inventory costs. AI refers to the creation of computer systems that can comprehend and imitate human behaviour. It can be used for a variety of supply chain management tasks, including forecasting, routing, choosing suppliers, and inventory control. When an optimal order strategy is either impractical or too expensive to adopt, AI-based solutions can be especially helpful.

Yan Houmin, Yano, Candace Arai et.al (2018) in their paper entitled "Inventory Management under Periodic Profit Targets" talks about how stock price frequently drops when a significant company does not achieve the profit goal that stock market analysts had anticipated. Publicly listed companies in the United States are required to declare earnings on an "accrual basis," which means that costs are deducted when products are sold rather than when they are purchased. As overall procurement and production choices are made quarterly, which coincides with corporate financial reporting periods, this directly affects them. Via a series of planning meetings, quarterly profit goals are established for each product line, and weekly choices are made on the distribution of material to stores. According with this quarterly decision-making pattern, 78% of executives would forgo economic value in favor of more stable earnings.

S. jia, Z. Juliang, C.TSE (2021) explains in their research paper entitled "Inventory Management and the Value of Quick Response to the Retailer Facing Boundedly Rational Strategic Customers" provides several important learnings. First, the study emphasizes the importance of considering customer behaviour when developing inventory management strategies. Retailers should recognize that customers with limited rationality tend to value immediate availability of products, and therefore, offering quick response times and reducing inventory can increase profitability. Second, the study suggests that retailers can benefit from using data-driven forecasting models to optimize inventory levels and better predict demand. Third, the research highlights the potential for retailers to increase their profitability by reducing inventory and offering quicker response times without sacrificing customer satisfaction. Overall, the study underscores the importance of strategic inventory management in retail, and the need for retailers to take a data-driven and customer-focused approach to inventory management.

E. Jim (2019) explains in their research paper entitled "Little AI, Big AI—Good AI, Bad AI: The State of the Art in Ethical AI Education" outlines the present status of ethical AI education and discusses the problems and prospects in this field. The study underlines the relevance of AI education in fostering responsible and ethical use of AI, as well as the necessity for a balanced approach to AI development that takes into account both the advantages and hazards connected with AI. The report cites three major obstacles in ethical AI education: a lack of consensus on what constitutes ethical AI, the rapid speed of technological progress and its influence on ethical concerns, and the difficulty of building AI systems that are both technically sound and ethical. According to the study, ethical AI education should be based on both technical knowledge and a larger awareness of AI's social and ethical consequences. The report also emphasises the need of taking a multidisciplinary approach to ethical AI education, incorporating collaboration among computer scientists, ethicists, social scientists, and other stakeholders. According to the study, ethical AI education should be integrated into existing educational programmes ranging from primary school to higher education, with a focus on developing abilities such as critical thinking, ethical reasoning, and responsible innovation. Finally, the article emphasises the need of ethical AI education in encouraging responsible and ethical use of AI, and argues that a balanced approach to AI development is required to ensure that the advantages of AI are achieved while reducing its hazards. The report also emphasises the need of a multidisciplinary approach to ethical AI education, and advises that such education be integrated into existing educational programmes at all levels.

Taleizadeh, Ata Allah Zarei, Hamidreza1, et.al (2019) in their paper entitled "The development of an optimal ordering policy for a visitor-based purchasing system with stochastic delivery time and partial prepayment" is a crucial research area that can help businesses maximize their profits. A research paper in this domain proposed a model that takes into account the probability distribution of delivery time, the demand rate, the selling price, and the prepayment rate. The authors derived an optimal replenishment policy that balances the inventory holding cost with the revenue generated from the prepayment and the selling price, while considering the potential lost sales due to stockouts. The study also showed that the optimal prepayment rate is influenced by the delivery time uncertainty and the customer's willingness to prepay. Another research paper explored the impact of different payment and delivery options on the optimal ordering policy. The authors found that offering multiple payment and delivery options can increase the demand and revenue, but can

also increase the complexity of inventory management. Additionally, the study showed that offering a premium delivery option can increase the profit margin, but may lead to lower demand for standard delivery. Overall, these studies provide valuable insights into the design of optimal ordering policies for visitor-based purchasing systems, which can help businesses to enhance their profitability and customer satisfaction. The findings of these studies suggest that businesses should carefully consider factors such as delivery time uncertainty, customer preferences, and payment and delivery options when designing their ordering policies.

Cai, Xiaoli Li, Jun et.al (2022) in their research paper entitled "Joint pricing and inventory control in a make-to-stock queue with delay-sensitive customers" investigates the problem of joint pricing and inventory control in a make-to-stock queue with delay-sensitive customers. The authors consider a system in which a firm sells a perishable product to customers with differing product valuations and waiting time sensitivities. The paper also investigates the impact of two types of customer behaviour on optimal pricing and inventory policies: impatient customers who leave the system without purchasing if they have to wait too long, and loyal customers who wait longer and are willing to pay a higher price. The authors discover that the optimal pricing and inventory policies are determined by the proportion of each type of customer in the system as well as their sensitivity to waiting time. The proposed model and numerical examples can help practitioners design pricing and inventory policies for their perishable products while accounting for the diversity of their customer base.

Mandal Buddhadev Dey, Bikash Koli, et.al (2021) in their research paper entitled "The research paper "Leveraging Advertisement and Trade-Credit Policy to Advance Sustainable Inventory Management" examines the role of advertisement and trade-credit policies in promoting sustainable inventory management practises. It provides a framework for businesses to follow in order to effectively implement these strategies. The paper suggests incorporating sustainability into inventory management processes, such as selecting sustainable suppliers and materials, optimising inventory levels to reduce waste, and promoting sustainable products and practises to customers. To communicate these efforts to stakeholders, the paper suggests using advertising and social media to promote sustainable products and practises, as well as offering favourable credit terms to suppliers who adopt sustainable practices. Additionally, tracking energy usage, waste generation, and supplier sustainability performance to measure and track sustainability performance is suggested to help businesses identify areas for improvement and demonstrate progress over time. In this way, companies can contribute to a more sustainable future while also achieving business benefits such as cost savings and increased customer loyalty.

De Giovanni, Pietro (2021) in their research paper entitled "Smart Supply Chains with vendor managed inventory, coordination, and environmental performance." how AI can improve supply chain performance by reducing lead times, lowering inventory costs, and increasing product availability. It can also improve supplier-customer coordination by allowing for real-time information sharing and collaborative planning. Smart supply chain practises can help to improve environmental performance by minimising waste and carbon emissions, reducing transportation planning and optimization, and improving coordination between suppliers and customers. However, there are challenges in implementing smart supply chains, such as investing in new technology and infrastructure, and employees and suppliers opposed to transformation. Companies must carefully consider the challenges and trade-offs associated with implementing these practices

Hasan, Md. Rakibul Daryanto, Yosefetal (2020) in their research paper entitled "The research paper on inventory management with online payment and pre-order discounts", emphasizes the importance of these methods for operations and improving customer experience. It recommends implementing a system that tracks inventory levels, orders, and sales, providing customers with secure and simple online payment options, and offering pre-order discounts to incentivize customers to order ahead of time. It also emphasises the importance of integrating inventory management, online payment, and pre-order discount systems to improve efficiency and avoid errors. Effective customer communication is also emphasised as a critical factor in pre-order management. The research paper offers useful insights and recommendations for businesses interested in implementing these strategies to optimise their operations, improve customer experience, and increase profitability.

III. METHODOLOGY

The 'Year to Net Income' data of five companies that are inventory intensive are taken to know how incorporation of AI in their inventory management has affected on their overall profitability.
The five companies we have taken are; Amazon, Samsung, Zara, Microsoft and Walmart. Considering the data to be quantitative in nature and collected through secondary research, the aim is to read the vertical and trend analysis of the financial data of the companies.

1. Amazon: Ronny Henry (2022) in his article entitled "The Complete Guide to Amazon Inventory Management in 2023" gave insights about the systems for managing your Amazon inventory can be used to monitor your stock levels, deliveries, sales, and orders coming from your Amazon sales channels. They try to cut down on fees, minimise carrying costs, and coordinate inventory across all of your listings. Forecasting and inventory planning are made simpler by using inventory management software that can monitor inventory across all of your warehouses, including Amazon FBA.

2. Samsung: In an article of Forbes published in 2020 entitled "3 Must-Haves for Intelligent Manufacturing" explained that in a contemporary manufacturing facility, a single production line could have 2,000 separate pieces of machinery, each having 100–200 sensors that record data every second. Without using artificial intelligence, it becomes difficult to collect and categorise this data at an incredible 2,200 TB each month. Yet, with the correct tools, organisations like Samsung SDS have been able to recognise patterns and gain a greater understanding of the information flow throughout their facilities. Additionally, this data can be used to enhance procedures, lower errors, and improve operations using deep learning technology based on AI.

3. Zara: Author Victor Gosselin (2020), content writer at Heuritech wrote in an article entitled "How can Zara maintain its leadership in fast fashion thanks to Artificial Intelligence?" about how enhancing demand forecasting, artificial intelligence can help close the "just-in-time" manufacturing gap. Since 85% of its production is completed during the current season, the company places more of an emphasis on meeting current fashion needs than on predicting trends for some time in the future. Zara can prevent overproduction, a problem shared by rival H&M, and improve its sustainability by doing this. The retailer will be able to introduce products that customers actually want if they can anticipate customer needs months in advance and offer specific product designs.

4. Microsoft: Greg Vigil (2020) in an article entitled "Establishing a smarter supply chain with artificial intelligence" talked about how manufacturers can increase efficiency, establish a more reliable supply chain, and make better inventory management decisions thanks to AI and machine learning. Predictive analytics can assist in determining when it's appropriate to replace supplies, parts, and machinery. By connecting people, processes, and cutting-edge technology, this proactive strategy aims to delight customers and build an intelligent supply chain.

5. Walmart: Roberto Torres (2022) wrote in an article entitled "How Walmart enhances its inventory, supply chain through AI" that Walmart employs AI to improve daily supply chain workflows and forecast demand cycles, particularly during periods of high or unforeseen customer activity. But finding solutions has taken years of work in data curation and collection, flexible algorithm development, and a global, not piecemeal, technology approach.

The data is taken according to when AI was incorporated for managing these five companies' inventory.

a) For Amazon "Year to Net Income" data was taken from 2019 to 2020, for Samsung 2018 to 2022 is taken, for Zara 2010 to 2022 was taken, for Microsoft 2018 to 2022 was taken, for Walmart 2017 to 2022 was taken.

b) It was taken in the Excel sheet.

c) Line Chart were drawn for the data.

d) Trendline was made for checking the trend in the data.

Table 1: Amazon Year to Net Income (2019-2022)

Year	Net Income (KRW Millions)
2018	4,38,90,877
2019	2,15,05,054
2020	21505054
2021	3,92,43,791
2022	5,47,30,018

Table 2: Samsung Year to Net Income (2018-2022)

Year	Net Income (Millions of US $)
2019	$2,80,522
2020	$3,86,064
2021	$4,69,822
2022	$5,13,983

Table 3: Zara Year to Net Income (2010-2022)

Year	Net Income (billions of US $)
2010	$1.60
2011	$2.00
2012	$2.20
2013	$2.80
2014	$2.90
2015	$3.40
2016	$3.40
2017	$3.70
2018	$3.90
2019	$4.20
2020	$3.90
2021	$1.30
2022	$1.93

Table 4: Microsoft Year to Net Income (2018-2022)

Year	Net Income (Millions of US $)
2018	$16,571
2019	$39,240
2020	$44,281
2021	$61,271
2022	$72,738

Table 5: Walmart Year to Net Income (2017-2022)

Year	Net Income (Millions of US $)
2017	$4,85,873
2018	$5,00,343
2019	$5,14,405
2020	$5,23,964
2021	$5,59,151
2022	$5,72,754

IV. RESULT AND ANALYSIS

1. **Amazon**
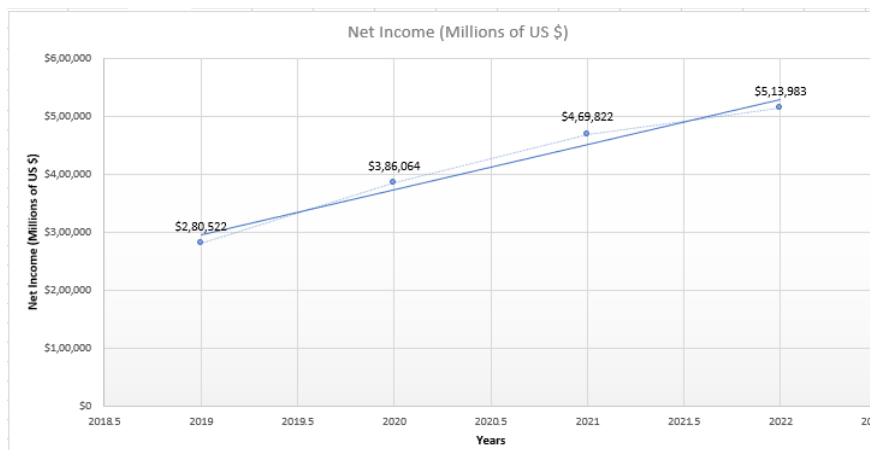
Figure 4: Graph of Net Income of Amazon for 2019 to 2022
(While Amazon has invested in artificial intelligence to improve customer experiences and operations, its profit streak from 2019 to 2022 is mostly driven by growing e-commerce demand, AWS growth, expansion into new areas, and cost-cutting efforts.)
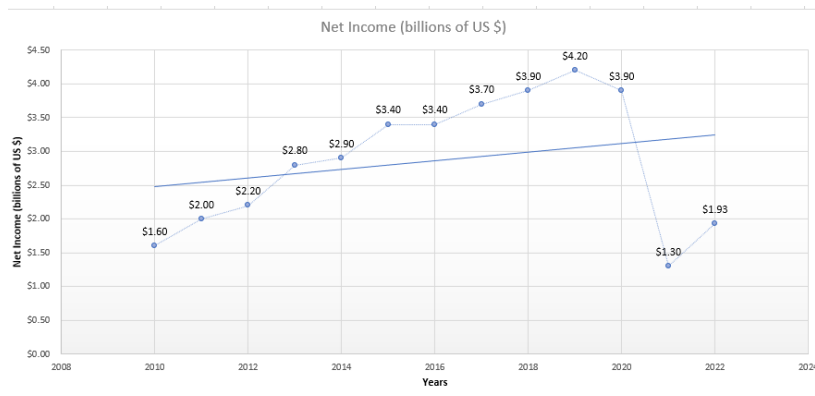
2. **Samsung**
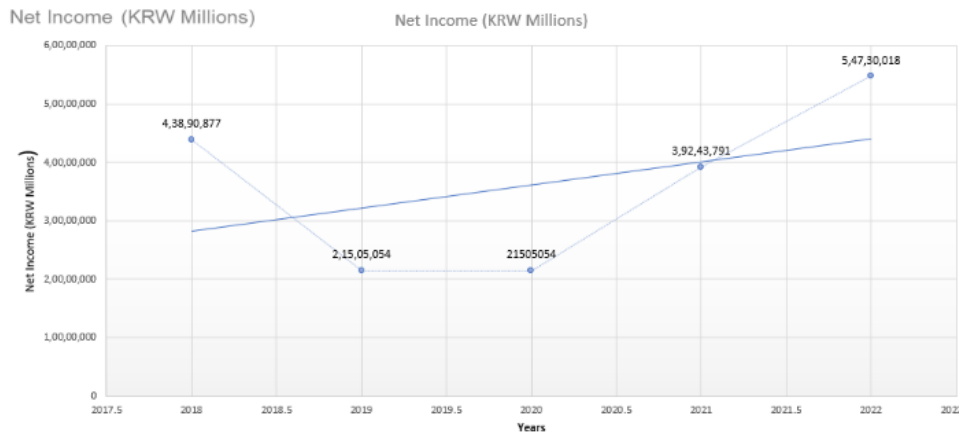
Figure 5: Graph of Net Income of Samsung for 2018 to 2022

(Samsung's earnings growth from 2018 to 2022 has been mostly driven by strong consumer electronics sales, expansion in the semiconductor sector, and cost-cutting efforts, with AI playing a supporting role in parts of its activities.)
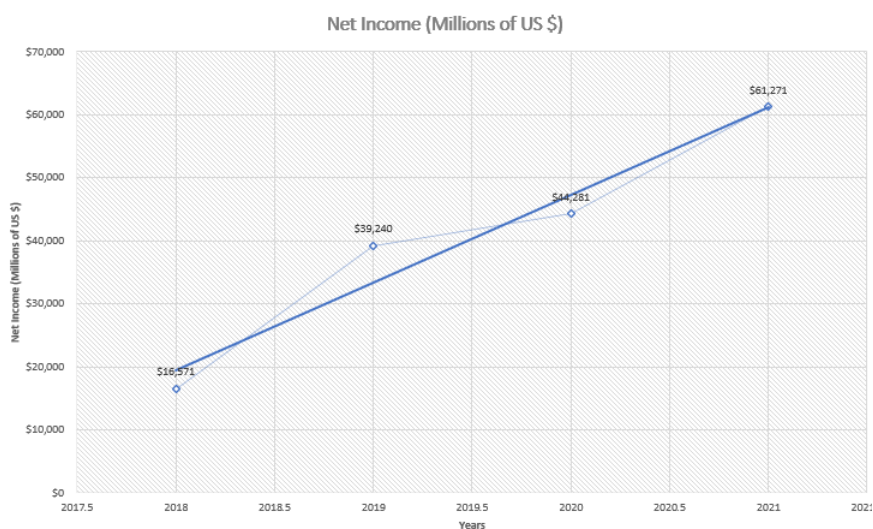
3. Zara

Figure 6: Graph of Net Income of Zara for 2010 to 2022

(Zara's profits may have fallen from 3.90 billion in 2020 to 1.93 billion in 2021-22 because of a variety of factors including the COVID-19 pandemic, changes in customer behaviour, supply chain interruptions, and increasing competition.)
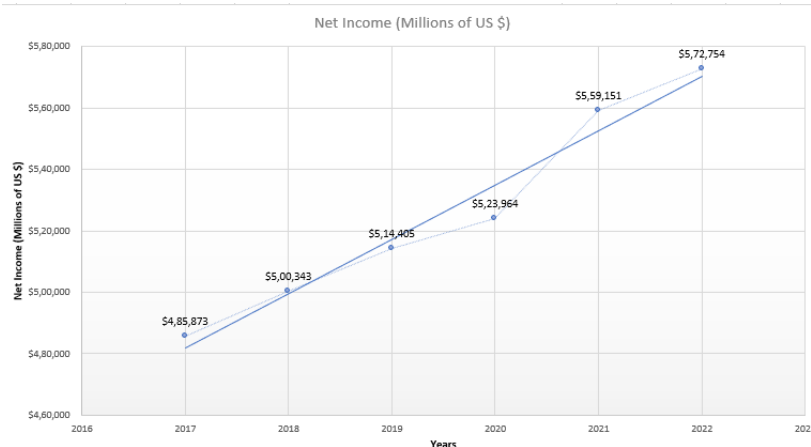
4. Microsoft

Figure 7: Graph of Net Income of Microsoft for 2018 to 2022

(From 2018 through 2022, Microsoft's earnings growth has been predominantly driven by cloud computing expansion, robust software and hardware sales, and the purchase of LinkedIn, with AI playing a supporting role in certain of its activities.)

5. Walmart

Figure 8: Graph of Net Income of Walmart for 2017 to 2022

(From 2017 to 2022, Walmart's profit growth has been driven mostly by strong sales and e-commerce development, as well as cost-cutting efforts, with AI playing a supporting role in parts of its operations.)

V. CONCLUSION

The aim of this study was to investigate how artificial intelligence (AI) is affecting supply chain management and logistics in the business world, particularly in the area of inventory control. The study employed a qualitative methodology that included a review of prior research and case studies. By using this strategy, the researchers were better able to comprehend how AI has altered various logistical operations, particularly inventory management, and how this has resulted in a value chain that boosts productivity and efficiency while lowering costs and increasing investment returns. The study discovered that the improvement of these jobs was largely due to AI as inventory management transitioned from manual to automated operations. In conclusion, the case studies and literature research show that AI is an essential tool for improving inventory management in the corporate sector.

VI. LIMITATIONS

There are several potential limitations to using AI for inventory management and its impact on a company's profitability. The effectiveness of AI systems is significantly influenced by the calibre of the data used to train and run them. The AI system's recommendations may not be trustworthy if the data is erroneous or incomplete, which could have a detrimental impact on inventory levels and overall profitability. Especially for small and medium-sized firms, implementing an AI-based inventory management system might be expensive. This is because it costs money to hire competent staff to manage the system, buy the necessary gear and software, and train employees. It can be challenging to integrate an AI system with an organization's current ERP and inventory management systems. Making ensuring the AI system is properly integrated with the current systems and procedures might take more effort and money. Even though AI can offer insightful analysis and suggestions for inventory management, it shouldn't completely take the place of human judgement. Overreliance on AI may lead to rigidity and a lack of agility in dealing with unforeseen changes in supply or demand. There are ethical issues with the use of AI for inventory management, notably with regards to data security and privacy. Establishing and putting in place the proper safeguards for sensitive data and privacy protection is essential.
AI systems are constrained in their use and can only make decisions based on data. they have been trained on. They may not be able to take into account abstract elements like consumer preferences, market trends, and other outside variables that could affect inventory management choices. To make sure AI systems are operating properly, they need ongoing maintenance and care. This could drive up the overall cost of the system, and skipping maintenance could lead to bad advice and potential revenue losses.

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