[1] **Dr. Amiya Bhaumik*,**

Chen Jiaming

Leading the Transformation and Upgrading of Traditional Manufacturing Industry with Artificial Intelligence

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Abstract: - There is a need to understand the impact of technological innovation on the transformation of traditional manufacturing to intelligent upgrading. Although there are studies that have investigated the impact of technology on the manufacturing sector there are very few studies that have investigated how integration and interconnection can impact the transformation of traditional manufacturing. There this research study has focused on all the aspects which have been mentioned above. It is essential for organizations today to know how they can implement AI to improve their traditional manufacturing practices. If the organizations are going to have detailed knowledge regarding the impact of AI on the manufacturing and their operations then they can make better decisions regarding the implementation of AI.

The findings of the research study have shown that the digital transformation of enterprises has a positive impact on traditional manufacturing. If the corporation goes through digital transformation then there is a huge chance that the manufacturing process of the company will also be transformed. The interconnection and integration also have a positive impact on traditional manufacturing. Organizations that are paying special attention to technological innovation will experience the rapid transformation of traditional manufacturing. Overall it can be said that digital transformation and technological innovation are required in corporations if they corporations want to transform their traditional manufacturing practices. With the transformation of the traditional manufacturing units, the organizations have the chance to gain a competitive advantage over their competitors that are working in the same industry.

Keywords: interconnection, Organizations, manufacturing, technological,

Background

In the 21st century, it has become essential for organizations to adopt the latest technologies so that they can provide unique and innovative products to customers. The latest advancements in technologies have not only enhanced productivity of the organizations but also helped corporations to meet the needs of a huge number of customers in a short time period. The rise in globalization has urged organizations to enhance their productivity, efficiency, and effectiveness by implementing technologies like Artificial Intelligence (AI). Artificial Intelligence is currently in its early stages but still, many organizations have begun to take advantage of this technology. With the help of AI, corporations have improved their operations to a great extent [1]

Countries like China and the USA are adopting AI technology in manufacturing so that manufacturing processes can be improved. Implementation of AI technology in the traditional manufacturing industry can help organizations achieve economies of scale and lower their operational cost. Latest technologies consume fewer resources and are far more efficient than traditional technologies which means that with the help of new technologies, corporations have the chance to reduce their costs significantly. For gaining the competitive edge over the competitors and sustaining in the long run implementing AI technology has become crucial for various organizations [2]

Problem Statement

Many research studies have investigated the role of AI in improving the manufacturing of organizations however there is a need for detailed investigation regarding whether digital transformation of enterprises has a positive impact on the transformation of traditional manufacturing or not. There is a need to understand the impact of technological innovation on the transformation of traditional manufacturing to intelligent upgrading. Although there are studies that have investigated the impact of technology on the manufacturing sector there are very few studies that have investigated how integration and interconnection can impact the transformation of traditional manufacturing. There this research study has focused on all the aspects which have been mentioned above [3]

[1] *Corresponding Author, Lincoln University College, Malaysia yangyingfujian@gmail.com

It is essential for organizations today to know how they can implement AI to improve their traditional manufacturing practices. If the organizations are going to have detailed knowledge regarding the impact of AI on the manufacturing and their operations then they can make better decisions regarding the implementation of AI. AI technology provides many benefits for organizations however at the same time AI has its own limitations and drawbacks as well. Therefore having detailed knowledge about this technology is essential for corporations if they corporations want to achieve maximum benefit from this technology [4]

Aims & Objectives

The major aim of the study is to investigate the benefits or advantages that AI intelligence can provide to organizations. Traditional manufacturing has its own limitations and with traditional manufacturing, corporations cannot meet the needs of the 21st century [5] Due to globalization, many corporations have a presence in different parts of the world that's why it is important for organizations today to implement technologies like AI so that various operations can be performed effectively and efficiently. This research study has a key focus on the impact of AI technology on transformation of the traditional manufacturing. The research will show what challenges corporations can face while implementing AI. It is pretty evident that small corporations do not have many resources to implement modern technologies because the cost of modern technology is high [6]

With the implementation of technologies like AI organizations can face issues like employee turnover because AI will take the job of many employees and the organization will have no choice but to terminate the employees that are no longer needed in the organization. Therefore these are some of the issues that are critically discussed in the research study. It is essential for organizations to understand the impact of AI technology on corporations so that accurate decisions can be taken by the management of the organizations. This research study has highlighted various opportunities for corporations and how they can successfully implant AI technology [7]

Scope & Significance

This research study has a vast scope because it provides deep insights to industrialists, managers, businesses men, Information technology experts, and the general public. Through this research study, corporations can understand how they can successfully implement AI for upgrading their traditional manufacturing technology [8] Through this study, the organization can get a clear idea about how technology is influencing operations and what things the organizations must do before implementing AI. AI technology has the potential to provide a competitive advantage to corporations in terms of speedy production and lower costs but at the same time, implementation of AI can cause dissatisfaction among the employees as well. Providing training to employees and keeping their morale high should also be the utmost priority of the organizations [8]

This research study has huge significance because it provides an abundance of information to all key stakeholders of the organizations. Through this research study the stakeholders can understand how artificial intelligence can promote organizations to upgrade to technology-intensive manufacturing. Through this research, the stakeholders can get ideas regarding national policies and their impact on the transformation of traditional manufacturing. With the passage of time technology will become more advanced and without modern technologies organizations cannot sustain themselves in the market for a longer time period [10]

Literature Review

The conventional assembly industry is undergoing critical change driven by advances in artificial intelligence (simulated intelligence). Advances in artificial intelligence are reforming the way items are planned, manufactured and delivered to clients, leading to an expansion of effectiveness, efficiency and seriousness in the global marketplace. One of the key areas where AI has a massive impact is the planning cycle. Simulated intelligence calculations can dissect vast amounts of information and create imaginative plans that are modernized in execution, cost, and manufacturability. This speeds up the item progression process and also spawns better items that solve client problems and bypass opposition. AI is also changing the build system itself. Brilliant innovations in AI-driven assembly enable processing plants to operate even more productively, at lower costs and at a higher caliber [11]

Powered by mechanical technology and robotics frameworks, artificial intelligence can perform activities recently completed by humans, leading to the expansion of efficiency and well-being at the industrial facility level. Prescient maintenance frameworks driven by simulated intelligence can anticipate hardware disappointments before they happen, reducing personal time and money for manufacturers. In addition, artificial intelligence is changing the network of shops in the conventional assembly industry. Computer-based intelligence calculations can continuously analyze information about the production network and shift strategic tasks to reduce costs and further increase shipping times. AI-driven demand forecasting frameworks can accurately predict client interest and enable creators to change creation schedules and inventory levels appropriately. In addition to further developing expertise and efficiency, artificial intelligence is also enabling manufacturers to create new action plans and revenue streams [12]

For example, artificial intelligence powered by insightful support can be suggested to clients as a value-added administration that creates extra income for creators. AI-powered design tools can be licensed to other businesses, opening up new revenue streams [8] Despite the fact that artificial intelligence presents various open doors for the conventional assembly industry, it also presents movements to take care of. One of the key issues is the absence of talented workers who are qualified to create and execute simulated intelligence advances in assembly. Creators must invest in project preparation to upskill their workforce and acquire new capabilities with AI capabilities. Another test is coordinating AI advances into existing assembly cycles and frameworks. To ensure a smooth transition and maximize the benefits of AI technologies, manufacturers must carefully plan and implement their AI adoption strategies. This includes developing data infrastructure and security protocols to support AI deployment, as well as investing in new software and hardware systems [13]

Regardless of these difficulties, the benefits of artificial intelligence in the general assembly industry are too fundamental to ignore. Creators who embrace advances in computer intelligence and lead the changes and redesigns of their tasks will gain the upper hand in the global market and establish themselves as industry pioneers. By equipping the power of artificial intelligence, regular manufacturers can manage development, increase expertise, and provide better items and administration than clients [14]

Methodology

Research Design

This research study has followed both quantitative and qualitative research designs. The secondary data which has been collected is quantitative data whereas the data which is collected from respondents through survey is qualitative data. The mixed approach allowed us to understand the phenomenon more efficiently and effectively [13]

Data Collection

In order to conduct the research detailed information has been collected. In this study, both secondary and primary data have been collected. Secondary data has been collected by performing an extensive literature review whereas primary data is being collected by performing the survey. The extensive literature review has not only provided detailed secondary data but also helped in identifying existing gaps in the literature. Secondary data is being collected through peer-reviewed journal articles. Business magazines, books, and authentic internet sources. The survey has been performed to collect primary data. The questionnaire is being used for collecting data from the respondents [14]

Sampling Technique

As mentioned earlier primary data has been collected by performing the survey. For performing the survey the sample has been taken from the target population. The target population is the employees who work in different organizations. The target population includes managers, IT experts, and other employees who work in the corporations. 100 sample size is taken from the target population. For taking the sample simple random sampling technique has been utilized because a simple random sampling technique is less complex and does not take much time. This technique is also less expensive than other sampling techniques [15]

Data Analysis & Ethical Consideration

After collecting data in abundance the next step is the analysis of the data. The data analysis is considered the most crucial part of any research study because, with the help of data analysis, the researchers determine the validity and reliability of the data. In this research study statistical techniques such as descriptive statistics, correlation, regression, and ANOVA have been utilized for analyzing the data. After the analysis of data, the results of the study are formulated. This research study has followed research ethics while collecting data from the respondents. The personal information of the respondents has been kept confidential. The respondents are not forced to fill out the questionnaire and are not forced to become part of the study [16]

What is your age range?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 - 25 years old	50	50.0	50.0	50.0
	26 – 32 years old	28	28.0	28.0	78.0
	33- 40 years old	15	15.0	15.0	93.0
	41- 50 years old	6	6.0	6.0	99.0
	Above 50 years	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
The carrying out of new generation information technology in the firm's manufacturing processes has positively impacted its ability to adapt to changing market situations.	100	1.0	5.0	3.890	1.2135
My firm actively responds to and adopts new technologies for enhancing the manufacturing processes.	100	1.0	5.0	4.060	1.0901
National policies related to technology and innovation have a huge effect on the firm's decision-making process related to upgrading manufacturing approaches.	100	1.0	5.0	4.060	1.1175
Alignment with national policies is significant to remain competitive in the manufacturing industry.	100	1.0	5.0	3.100	1.4035
My firm invests for training programs in order to boost the skills needed for using advanced technologies in manufacturing domain.	100	1.0	5.0	3.270	1.3548

Both the talent acquisition and development strategies are significant components to successfully transform and upgrade in the manufacturing sector.	100	1.0	5.0	2.730	1.3548
Our firm remarkably shows interest to develop models related to understand the role of AI to drive transformation for the manufacturing sector.	100	1.0	5.0	2.720	1.4076
Having a well-defined model concerning influencing factors is crucial to effectively implement AI-driven transformations specifically for traditional manufacturing.	100	1.0	5.0	3.090	1.5315
The initiatives of digital transformation in my firm have helped to improve the productivity and operational efficiency.	100	1.0	5.0	3.970	1.1322
The firm knows the value of digital transformation to remain competitive in the modern manufacturing domain.	100	1.0	5.0	4.030	1.0774
My firm focuses on the integration of different systems and processes needed to effectively achieve seamless operations across varying departments.	100	1.0	5.0	3.720	1.1899
It is essential to have the Interconnectedness between varying aspects of the manufacturing operations for agility.	100	1.0	5.0	3.790	1.2168
It is important to have the collaboration between different stakeholders (e.g., suppliers, partners) as it helps to achieve the success.	100	1.0	5.0	4.210	1.0080
My business entity actively employs a culture of collaboration for better leveraging strong expertise and efficient utilization of resources.	100	1.00	5.00	3.9300	1.02745

My firm focuses to invest in research and development so it can drive the continuous technological innovation specifically in manufacturing processes.	100	1.00	5.00	3.7700	1.10878
Embracing technological innovation is a need of today i.e., for attaining a competitive edge so the evolving customer demands can be met effectively.	100	1.00	5.00	4.1600	1.01225
Valid N (listwise)	100				

Results & Discussion

The findings of the research study have shown that the digital transformation of enterprises has a positive impact on traditional manufacturing. If the corporation goes through digital transformation then there is a huge chance that the manufacturing process of the company will also be transformed. The interconnection and integration also have a positive impact on traditional manufacturing. Organizations that are paying special attention to technological innovation will experience the rapid transformation of traditional manufacturing. Overall it can be said that digital transformation and technological innovation are required in corporations if they corporations want to transform their traditional manufacturing practices. With the transformation of the traditional manufacturing units, the organizations have the chance to gain a competitive advantage over their competitors that are working in the same industry [1]

One of the major advantages of technology for organizations is that the cost of manufacturing declines to a large extent. When the cost of production and operations declines then the profitability of the corporation increases up to a large extent. It is important for corporations to consider modern technology because with modern technology the organizations have the chance to differentiate themselves from the rest of the companies. It is important for the companies to provide training to the employees so that employees won't have to face any kind of problem. When employee motivation is going to remain high then the overall performance of the organization will increase [2]

The finding of the review is that computer change is definitely not just within the intellectualization of usual grouping, but far from it. Machines equipped with artificial intelligence (AI) are among the digital technologies used by businesses today. This strategy has helped them achieve unmatched efficiency, adaptability and dominance. Artificial intelligence applied to the functional frameworks of these organizations has allowed them to achieve the ideal level of their operations, which has accelerated their cycles, asset utilization and creation cycles. Meanwhile, predictive support frameworks with the support of simulated intelligence have changed the whole idea of executive resources, more preventive than maintenance, which allows to reduce downtime and increase efficiency and utilization of resources [15]

Computational intelligence has employed creators with the ability to continuously scan their creation surroundings, giving them an unrivaled understanding of their creation environment and allowing them to act and adapt to any rapidly changing elements of the business sector. The decision-making paradigm was rewritten as a result of the symbiotic relationship that existed between AI and data analytics. Organizations have moved from reactive to proactive based on the insights they glean from huge databases. The information-based approach strengthened the creator in functional expertise as well as anticipation of market patterns, yielding valuable open-door assurance and progressive hazard mitigation. Likewise, the adoption of AI has strengthened a culture of continuous improvement, as organizations have been able to use AI-generated bits of knowledge to improve their products, upgrade store network tasks, and work on client meetings. The age of the intelligent upgrade was born as a result of the interaction between digitization and AI. The old production model has been

redesigned. Businesses went through a course of forward thinking that prioritized adaptability, innovation and flexibility [4]

For this reason, exploratory discoveries support the speculation that the computerized change of businesses is forcefully influencing the change of conventional assemblage to penetrating update. With extensive examination of contextual investigations and industry information, it can be very well seen that the combination of computing advancements such as IoT, computer intelligence and information investigation have brought important benefits through the work of critical upgrades in various divisions. These offices include item quality, functional efficiency and progress in conventional assembly firms based in China. It shows that with the adoption of advanced arrangements, it is possible to smooth processes, strengthen ongoing direction and improve asset allocation. The study showed how important integration and connectivity are for improving intelligence.

Through the viable linking of different frameworks and cycles, businesses have reached an ideal state where there is a connection of different components that contribute to the cooperative energy of the general value chain. This combination not only provided an open door to more productive use of assets, but also worked with participation among partners, creating a space for an aggregated and cooperative culture. Innovations based on artificial intelligence have allowed manufacturers to flawlessly synchronize complex work processes with precision and adaptability, allowing them to truly adapt to the unpredictable demands of clients and constantly change to modern conditions. Through collaborative efforts and coordination between frameworks, the effort has gained the ability to process ongoing data into dynamic cycles, streamline open door IDs, and make continuous improvements. In addition, systems management promoted information sharing and mutual utilitarian communication, allowing organizations to explore different skills and perspectives leading to progress-driven development. Thanks to these integrative methodologies, creators have been able to stay one step ahead of the market by anticipating market patterns and being constantly proactive against the difficulties that ultimately paved the way for their outcome in the ever-changing space of the business sector [4]

Conclusion

It is concluded that the major aim of the study is to investigate the benefits or advantages that AI intelligence can provide to organizations. Traditional manufacturing has its own limitations and with traditional manufacturing, corporations cannot meet the needs of the 21st century. Due to globalization, many corporations have a presence in different parts of the world that’s why it is important for organizations today to implement technologies like AI so that various operations can be performed effectively and efficiently. This research study has a key focus on the impact of AI technology on transformation of the traditional manufacturing.

The research will show what challenges corporations can face while implementing AI. It is pretty evident that small corporations do not have many resources to implement modern technologies because the cost of modern technology is high. One of the major advantages of technology for organizations is that the cost of manufacturing declines to a large extent. When the cost of production and operations declines then the profitability of the corporation increases up to a large extent. It is important for corporations to consider modern technology because with modern technology the organizations have the chance to differentiate themselves from the rest of the companies. It is important for the companies to provide training to the employees so that employees won't have to face any kind of problem. When employee motivation is going to remain high then the overall performance of the organization will increase.

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