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IMPACT OF TECHNOLOGY ON DECISION-MAKING AND EMPLOYEE PERFORMANCE

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Abstract—*Adoption of technology is now a continuous process and an integral aspect of all sectors. The availability of vast amounts of information online and its quick distribution across businesses and consumers are the main reasons why modern technology is evolving so quickly. To stay up with this modification, human error is significantly decreased and the value chain may operate at its best thanks to process optimization through automation and the adoption of a cyber-physical system. The effect of technology on manufacturing units' decision-making is covered in this study. Additionally, it covers the different analyses of technology, individual performance, decision-making, adoption, and customer satisfaction in manufacturing businesses. The study intends to examine how the adoption of new technology affects organizational performance, assess against a range of benchmarks, comprehend cross- functional dynamics, and comprehend Industry 4.0 decision-making in general, as it relates to the industrial sectors.*

INTRODUCTION

Technology-based decisions were previously centralized, evaluated on a regular basis, and produced from data analysis at predetermined intervals. The term "business intelligence" was created in the late 1980s to support business choices. Businesses also started using sophisticated tools to model, detect, and pinpoint company possibilities and vulnerabilities. Before then, in the 1990s, technology-based decision-making improved consumers' capacity to make wise purchasing choices. In order to meet managers' practical demands, the decision support system was established (Leigh & Andrew, 2006). Around 1960, inventory management was the first use of enterprise resource planning (ERP) in decision-making (Majstorovic & Stojadinovic, 2020). Later, ERP was expanded to include cross-functional integration across a range of industries.

Before the digital age, decisions were made by hand based on the final product. Following the onset of mass production, statistical applications were used in manufacturing for cost reduction, quality control, and maintenance (Pinkard 1934). Later on, it was integrated with machines and made it easier to make decisions across several lines. Artificial intelligence, machine learning, and live simulation were combined to improve instantaneous decision-making in the 20th century. In addition, it enhanced prediction accuracy, maximized yield, and minimized downtime. In addition to lowering overhead, the machines can now make judgments with little assistance from humans. Technology-skilled employment replaced blue-collar jobs. Simultaneously, virtual systems took over and automated consumer connections.

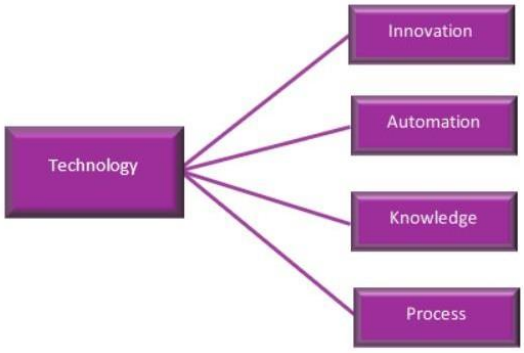
LITERATURE REVIEW

Technology:

Pannabecker (1994) defined technology as the application of knowledge and abilities, particularly for new development; in the field of mechanics, it denotes three levels: design or modeling, activities or processes, and physical products or artifacts. In order to save money and time while simultaneously improving quality, it converts information into traditional modes of development, especially on innovation (James,2017).

According to Palta (1996), technological development is planned according to market and resource demands that are connected to consumer needs. It also shifts from one direction to another while involving associated cross-functional domains. Customers' feedback on the current technology is replaced by the technological paradigm shift, which also shifts to better technology through internal research and development (R&D) and innovation.

According to Donghua and Alan (2002), technology road maps and technology forecasting facilitate strategic decision-making regarding the organization's technical operations. Advanced robotics, machine learning, big data, and digital innovation are the main areas of technological advancement in modern production. These advancements have a significant effect on decision-making and higher order thinking, which encourages highly skilled and multiskilled workers by giving them additional options within the company due to their aptitude for automation and prompt decision-making.



Customer Satisfaction:

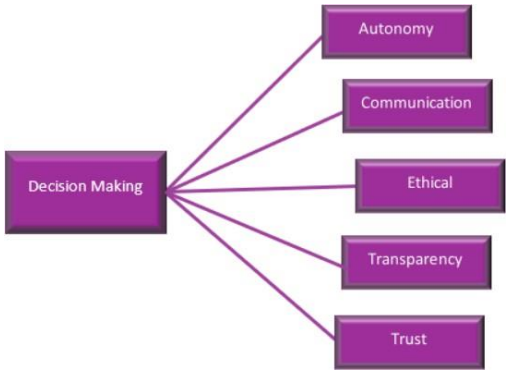
Customer satisfaction, according to Muffatto & Panizzolo (1995), forges a strong bond between the company and its clients, with a primary emphasis on delivering high-quality goods and services. In addition to meeting required criteria, the fundamental product design must minimize waste, errors, and related expenses, all of which enhance the customer satisfaction experience. Additionally, it improves the company's reputation and brand value.

By avoiding middlemen, integrating blockchain and AI into the production process drastically lowers costs, particularly in the areas of networking, auditing, and governance control. There are several advantages. It enhances the quality of the products and lowers the costs of surveillance and verification. Furthermore, it enhances real-time transparency, lowers prospective costs that are likely to be incurred, and boosts the firm's credibility among its stakeholders. Management can make decisions more quickly and with greater quality control thanks to blockchain technology (Taehyun., 2019). Blockchain technology that incorporates AI greatly lowers system failures and promotes long- term organizational sustainability (Binoj et al., 2020).

Decision Making:

According to Grimes & Klein 1973 Making sure that political and emotional decisions have a place in the decision-making process is equally important. Because automated decision models are created by people, decision-makers must receive sufficient training to prevent system vulnerabilities. To avoid sub-optimization of the decision models, it also necessitates cross-functional interdependence, prompt policy inclusion for restructuring, and adherence to a logical procedure for the model developer (Grimes & Klein 1973).

In addition to promoting "ease of use," using cutting-edge technology helps managers make better decisions (Rejikumar et al., 2020). The Internet of Things (IoT), Big Data, Data Science, Artificial Intelligence, and other recent technological advancements are streamlining the decision-making process. Additionally, these speed up the decision-making process (Flores, 20 et al., 2018). To prevent biases that might make decision-making vulnerable, it becomes imperative that data-set training be carried out ethically.



Adoption:

Hall and Khan (2016) define technological standards as the interaction between different technologies. Market demand and cost-benefit analysis both play a role in choosing the right technology. The S-curve thoroughly verifies the investment made in implementing new technologies. Slow adoption is followed by faster growth and finally a slowdown in the classic S-curve. Before the saturation threshold is reached, the choice between investing in new technology and getting rid of the old must be made.

Technology roadmaps, which incorporate metrics like benchmarking, user engagement, new simplified processes, new opportunities, new design, cost reduction, automation, and market demand, demonstrate strategic and innovative direction in the use of technology. Therefore, it is an effective instrument for cooperative strategic planning to generate knowledge for its stakeholders and establish future plans (Abbasi et al., 2017). A technology roadmap improves the organization's innovation cycle's performance and adoption process. A technology roadmap's implementation aids in achieving the intended outcomes and supports the business plan. To help firms embrace better technologies, it is crucial to identify 28 gaps in the market, product, technology, and monitoring process before adoption (Robert et al., 2001).

OBJECTIVE OF THE STUDY

Therefore, the objectives of the study are:

- To investigate how technology influences decision-making.
- To determine how technology affects worker performance.
- To create plans for efficient technology management in production facilities.

HYPOTHESES OF THE STUDY

H_{01} (Null Hypothesis): There is no significant relationship between the evaluation of new technology using benchmarking and best practices and improvements in manufacturing performance.

H_{11} (Alternative Hypothesis): The evaluation of new technology using benchmarking and best practices significantly enhances manufacturing performance.

H_{02} (Null Hypothesis): Aspects of technological ability do not significantly influence the decision-making process in manufacturing.

H_{12} (Alternative Hypothesis): Key aspects of technological ability, such as automation, data analytics, and AI, significantly influence the decision-making process in manufacturing.

SCOPE OF THE STUDY

This study concentrated on how technology affects employee performance and decision- making in major manufacturing sectors, mostly in South India. Only production and allied departments are included in the study. Current technological advancements in the industry, particularly those in the early stages of Industry 4.0 adoption, could alter how the study is seen.

RESEARCH METHODOLOGY

The examination of data from major manufacturing sectors involves a variety of demographic information. Chi square-

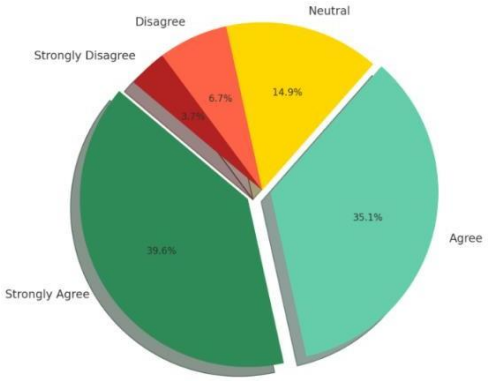
test has been used for descriptive statistical analysis and Excel has been used for statistical modeling analysis with 134 sample.

DATA ANALYSIS AND INTERPRETATION

PERCEPTION OF IMPACT OF TECHNOLOGY ON DECISION-MAKING AND EMPLOYEE PERFORMANCE

How has new technology been evaluated with benchmarking and best practices in manufacturing?

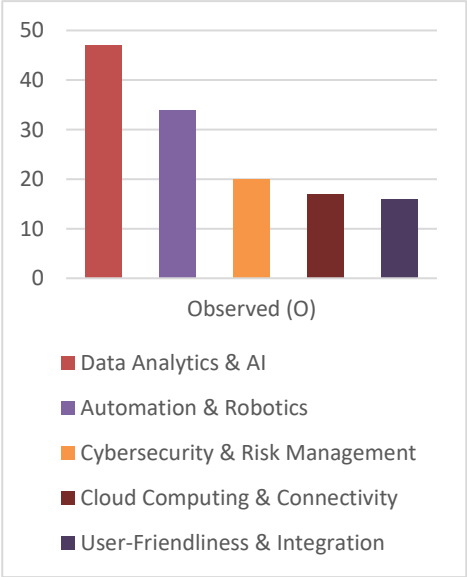
Response	Observed (O)	Expected (E) (Total responses ÷ 5)	$(O - E)^2 / E$
Strongly Agree	53	26.8	26.85
Agree	47	26.8	12.68
Neutral	20	26.8	1.72
Disagree	9	26.8	11.19
Strongly Disagree	5	26.8	19.68



Interpretation: A significant majority (75%) of respondents agree that benchmarking and best practices positively impact manufacturing performance, we reject the null hypothesis (H_{01}) and accept the alternative hypothesis (H_{11}). This indicates that the evaluation of new technology using benchmarking and best practices significantly enhances manufacturing performance.

Which aspects of the technological ability influence the decision-making process?

Technological Aspect	Observed (O)	Expected (E) (Total Responses ÷ 5)	$(O - E)^2 / E$
Data Analytics & AI	47	26.8	15.48
Automation & Robotics	34	26.8	1.95
Cybersecurity & Risk Management	20	26.8	1.72
Cloud Computing & Connectivity	17	26.8	3.59
User-Friendliness & Integration	16	26.8	4.34



Interpretation: The statistical test strongly supports the alternative hypothesis (H_{12}), indicating that key aspects of technological ability, such as automation, data analytics, and AI, significantly influence the decision-making process in manufacturing.

SUGGESTIONS

Understanding the strength of the level in technology, market, quality, and goods requires regular technical audits with benchmarking. This aids in

- Decision-making to lower expenses and time while boosting productivity and effectiveness inside the company.
- By putting a technology plan into practice, benchmarking gaps may be found and staff motivation raised.
- Employees needed further education based on their experience. Innovation, critical thinking, quicker adoption, and employee performance will all be improved as a result.
- Making decisions requires real-time analysis, and crucial data binding technologies like blockchain will significantly affect data transparency. This procedure will prevent decision-making vulnerabilities and support the organization's ethical data handling.
- Instead of only analyzing historical performance data, management information systems should also examine current and future performance reports.
- The R&D department must collaborate with cross-functional divisions, including through ongoing engagement and brainstorming sessions, to strengthen the technical capabilities.
- The business process and cross-functional components should be revised at least every three years to bring them into line with technology and identify any possible gaps.

CONCLUSION

According to the report, manufacturing firms' technical decision-making is impacted. This is a result of managing consumer feedback and ethical data. It is discovered that the original data has been altered such that it supports the manager's choices. Decision-making is impacted by communication and openness after the data has been altered. Automating the process and implementing a cyber-physical system helps minimize human error and optimize the value chain's performance. Furthermore, sophisticated data analysis in real time will expedite the decision-making process between 105 machines and people. Modern industry is driven by knowledge and data collecting. A technology roadmap has a direct impact on organizational decision-making. Using a distributed ledger (Blockchain) to protect real-time data enhances process autonomy, communication, and trust (Binoj et al. 2019).

The majority of operators in manufacturing have only one skill set and a diploma or ITI as their baseline certification. As they gain experience, they require further training or technological know-how. Employees will be able to adapt technology more quickly as a consequence, improving their performance. Employees on the shop floor are empowered by automation, which also fosters creativity and innovation.

The findings unequivocally show that Industry 4.0 must be adopted, and that employees need analytical abilities that boost their degree of autonomy so they can make decisions quickly and without oversight. Without a question, technology is affecting individuals' and companies' overall performance and decision-making. Along with cloud computing procedures, person- dependent decision-making processes are moving from cognitive to machine-level algorithms. This has made it possible for different prediction techniques to produce high-quality results while saving money, time, and effort. Adoption of technology increases employee autonomy and empowers them to make decisions. Performance levels and organizational trust eventually rise as a result of this.

REFERENCES

1. Abbasi, M., Vassilopoulou, P., & Stergioulas, L. (2017). Technology roadmap for the Creative Industries. Creative Industries Journal, 10(1), 40-58.
2. Abdallah, A., Phan, A., & Matsui, Y. (2016). Investigating the effects of managerial and technological innovations on operational performance and customer satisfaction of manufacturing companies. International Journal of Business Innovation and Research, 10(2-3), 153-183.
3. Addison, J., & Teixeira, P. (2020). Trust and Workplace Performance. British Journal of Industrial Relations, 1-30.
4. Ahlskog, M., Bruch, J., & Jackson, M. (2017). Knowledge integration in manufacturing technology development. Journal of Manufacturing Technology Management, 28(8), 1035-1054.
5. Rigotti, T., Schyns, B., & Mohr, G. (2008). A short version of the occupational selfefficacy scale: Structural and construct validity across five countries. Journal of Career Assessment, 16(2), 238-255.
6. Ritu, S., Jatinder, K., Jaspreet, S., & Niraj, S. (2020). Effect of Internal Customer Satisfaction Index on Revamping of ISO Implementation Structure in a R&D Organization. 13-20.
7. Robert, P., Clare, F., & David, P., (2001). Technology Roadmapping: linking technology resources to business objective., Centre for Technology Management, University of Cambridge. Saeed, R., Mobin, M. (2017). Empowering Benefits of ERP Systems Implementation: Empirical
8. Schwab, K. (2018). the Fourth Industrial Revolution (Industry 4.0) a Social Innovation Perspective. Tạp chí Nghiên cứu dân tộc, 7(23), 12-21.

9. Zahra, S., & Covin, J. (1993). Business strategy, technology policy and firm performance. Strategic Management Journal. Strategic Management Journal., 14(February 1991), 451- 478.
10. Zbuchea, A., & Vidu, C. (2018). Knowledge Management in the Digital Era. Strategica, Buchares, 696-704S.
11. Zarubin, S., & Deev, K. (2017). Process model of digital manufacturing. Russian Engineering Research, 37(8), 714-719.

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