

# IMPACT OF TECHNOLOGY ON DECISION-MAKING

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**ABSTRACT:** Technology is an ongoing process in all industries. The modern technology is changing rapidly because of the accessibility of extensive knowledge over the internet and faster technology transfer between the organizations and individuals. Concerning the change, optimizing the process through automation and adopting cyber-physical system will reduce the human error and provide the best performance to the value chain. Moreover, real-time data analysis of the intelligent data will speed up the decision-making between human and machine. In the value chain, one technology is dependent on another one with integrated systems that leads to customer satisfaction. Technology is linked to innovation and research practices in the organization that provides knowledge and skill development to the employees. This paper discusses the impact of technology in decision making in manufacturing units. It also discusses about the various analysis on technology, customer satisfaction, decision making, adoption and individual performance in manufacturing industries. The data analysis indicates that technology has an impact on ethics, transparency, communication, feedback and self-efficacy in decisions. Adoption of technology will help in the performance of individuals. It has been also found that the data is manipulated in such a way that it is aligned with the decisions of the manager.

**KEYWORDS :** Technology, Decision making, Transparency, Communication, Ethics.

## I. INTRODUCTION

Technology word originates from Greek in the 17th century, represents art and skills along with knowledge and development. The use of technology started from the early stage of human development as well as other living species. It is an ongoing process and enables continuous improvement and innovation in the value chain. In the 21st century, the usage of it is very high, that is why it has embedded in all sectors. Technology has a significant role in Industry 4.0, which represents a cyber-physical system as well as an extensive communication network

The role of decision making in technology is significant in business; however, it can be seen that the significant developments in the business are from customer demands. Further, the frequent technology changes are enormous in volumes that the obsolete ratio is more in the 'S' Curve process. However, keeping the customer in consideration, the technology improves in automation, innovation and process which not only reduces the waste, cost and time but also enhances the quality for the customers. Since the paradigm shift period is concise, the organization decision is quite critical which has an impact in the technological decision making. Therefore, the critical part of every decision making is data analysis. The manual refined business data will have an impact on the decision-making in the hierarchical level that leads to transparency and communication with external and internal customers.

## II. REVIEW OF LITERATURE

Industrial revolutions are the biggest platform for technological development. The paradigm shift starts from available technology to the improved one that leads to assimilated technology; it also moves from one direction to another one and dependent on another cross-fictional [1]-[1]. Technological development portfolio requires all cross-functional with multidisciplinary background knowledge and does not have allocation resources to develop and requires internal and external business team [1]-[2]. In the innovation side, one technology helps another one, and that leads to the sustainable development of the product and empowers human minds in the organization [2]. Technological innovation and strategy is essential for the growth of any organisation and it is essential to apply external and internal business boundaries. Product innovation, process innovation and service innovation are the critical factors of technological innovation. Implementing technological strategy will identify the benchmarking gaps and enhance the motivation in the employee's performance [3].

In manufacturing, automation helps to reduce error, time and cost and enhances the quality of the product. But still, proper automation in many sectors is not up to the mark. In the current Industry 4.0, cyber-physical systems (CPC) are supporting more to technology for automation and helping to optimize the technology decision making [4]-[1]. Identifying distractions is very important in automated decision-making, and ethical guidelines, legal and moral process need to be followed in automation tools [4]-[2]. The computer program cannot operate at its own; it is the

human behind the computer to program. For better decision making, the rule needs to be clearly defined, organization policies are needed to be incorporated and sub-optimization must be avoided in the model. Quality of data is critical for building the proper model to predict the accurate value for decisions. If the model is incorrect, it leads to manipulate the information and creates a vulnerability in the decisions [5]. It is also essential to practice principles for data ethics in the organization [6].

Decision-making is controlled by hierarchical autonomy, influence and control in the organisation. Technology has a powerful impact on decision making between the hierarchical levels in the organisation. Technological driven decision making approach requires high order thinking and analytic skills; it also helps the management to take better and faster decisions [7], [8]. Data quality analysis is always a challenge in any organization and retrieving the right information from the data set is more important for decision-making [9]. To provide accurate information at the right time to the system can help organisations to take the prompt decision and provide better insight into the stakeholders [10].

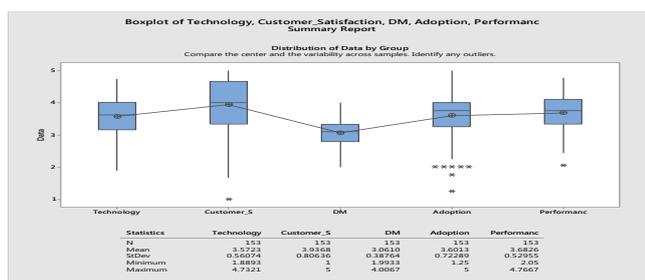
In 1950s idea of the digital computer was declared as an old concept, and machine learning was introduced. It articulated about the computing power and agent including mimicking between two computers [11] later known as ‘Digital Twin’. Automatic decision-making has significant challenges to prove the decision on its own. To identify ethical behaviour in artificial general intelligence is very challenging; it might create multi demission thinking in machines. The rapid changes of cognitive architecture creates more complexity in ethical design and creates risk for humans [12]. Artificial intelligence (AI) deals with human reasoning, does not refer to the human intelligence. Reasoning in AI helps the agent to respond and makes a decision without any human intervention [13]. In machine learning, automatic decision making is done through deep learning with multiple neural networks, and the model will adjust its weights for the accuracy, which leads to transparency. Automated decision making and human decision making shows that both are false positive in transparency [14]. AI Decision making is always based on available data and available process knowledge [15]. The retraining of the data model in AI is essential to provide an accurate value for automatic decision in the organisations.

**III. PROBLEM STATEMENT**

In industries, data is used in various cross functions and related to each other. It also communicates between the hierarchical levels with transparency and trust; decision-making is set on the basis of data analysis, experience and knowledge. It is also essential to analyse the impact of technology on organisational performance in manufacturing units.

**IV. RESEARCH DESIGN AND METHODOLOGY**

The combination of exploratory and descriptive research methodology was used in the research to gain familiarity with the concepts of technology, decision-making and employee performance. The current study is also descriptive since it attempts to offer clarification concerning the ‘who’, ‘what’, ‘when’, ‘where’ and ‘how’ associated with the present research problem.



The data collection has been done in person which provided an understanding of technology explained each parameter in local language and communicated via 'Google-translate' for shop floor employees. The digital format is created via Microsoft form and circulated through the email and social media. For analysis, Minitab, SPS and PowerBI has been used.

**DATA ANALYSIS**

A survey of 153 samples is collected from various manufacturing industries. The inventory is prepared based on the framework “Fig. 1”, including independent and dependent variables.

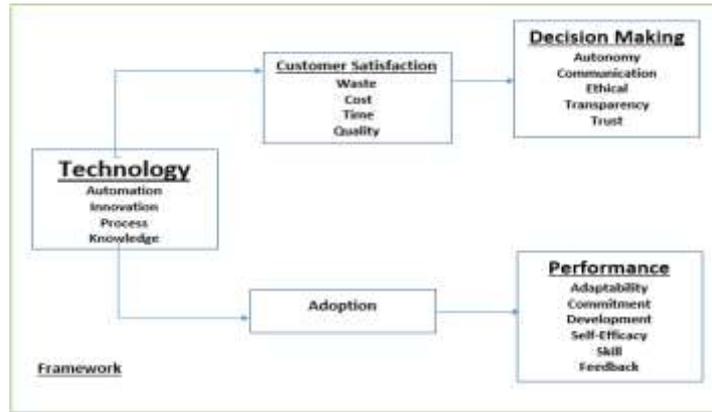


Fig. 1. Framework

Cronbach’s coefficient alpha ( $\alpha$ ) is used to identify the reliability test for the responses. The alpha value must be at 0.7 to indicate the reliability of scale [17]. As per the reliability test, the score for 153 samples with 76 inventory is 0.959 “Fig. 2” that provides high reliability in the inventory.

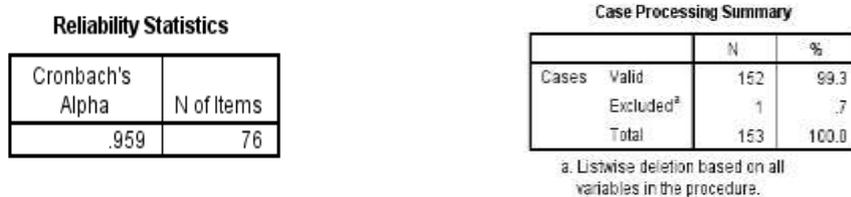


Fig. 2. Reliability Test

Based on the framework, the inventories has been grouped. Boxplot graph is used for identifying the distribution between the groups. It also displays the centre, quartiles and spread of the data. Primarily, it is to identify the distribution level with

Fig. 3. Boxplot (Technolgy, Customer, Satisfacction, DM, Adoption & Performace)

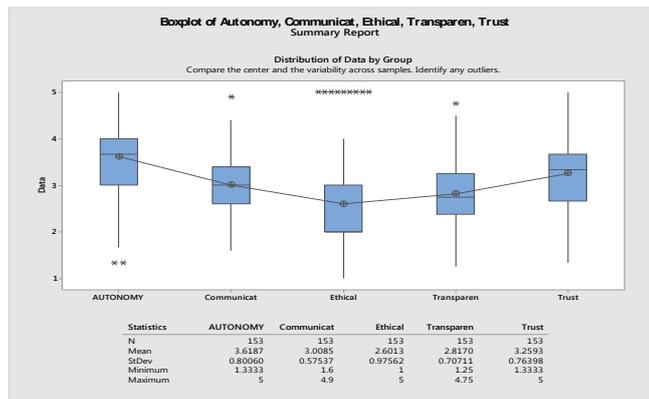


Fig. 4. Boxplot (Autonomy, communication, Ethical, Tranparency & Trust)

Based on the boxplot, it is evident that decision-making (DM) falls under lower quartile and shows that there is a significant change in DM “Fig. 3”. For better understanding, DM group has been subcategorized to autonomy, communication, ethics, transparency and trust which is plotted in the boxplot.

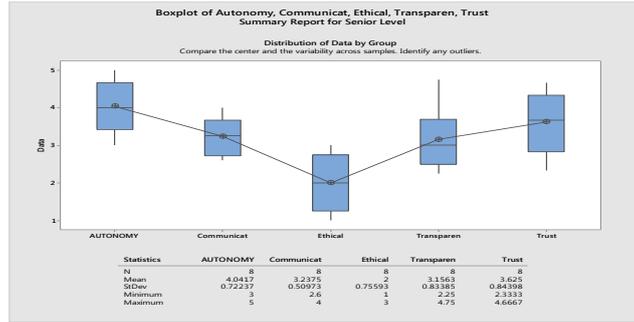


Fig. 5. Boxplot (Senior Level)

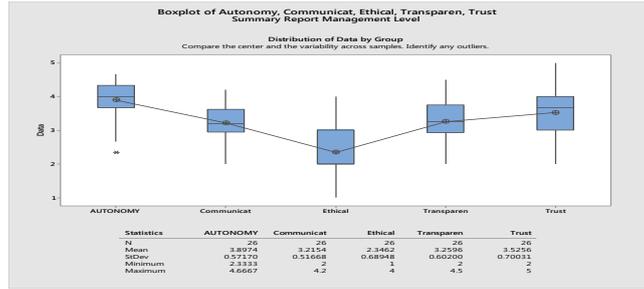


Fig. 6. Boxplot (Management Level)

In the boxplot summary for DM clearly describes that ethical data handling has an impact on the organization (Fig 4). It also needs to verify how the data is scattered between the heretical levels. The boxplot is plot under junior level “Fig. 7”, executive level “Fig 8”, management level “Fig. 6” and leadership level “Fig. 5”.

The boxplot of different roles has identified that the level of heretical levels has an impact on the ethical data . It has also been found that ethical data is proportionately linked to transparency and trust in the organization, which leads to decision-making.

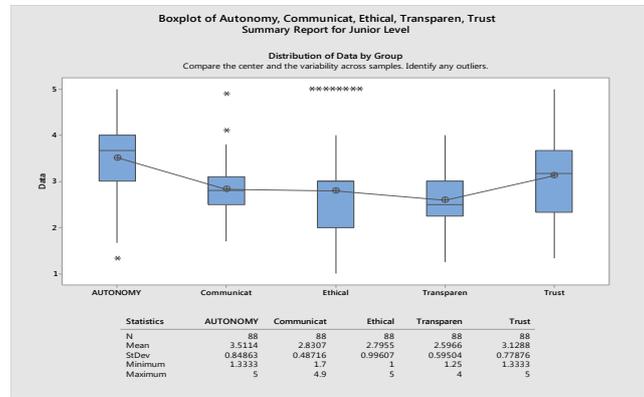


Fig. 7. Boxplot (Junior Level)

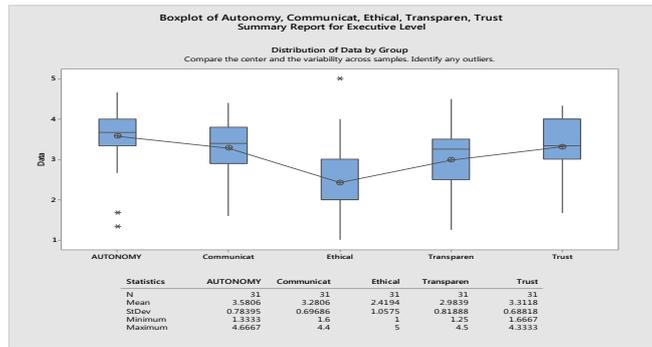


Fig. 8. Boxplot (Exucitve Level)

## V. DISCUSSION

In manufacturing, the hierarchies play a critical role in decision-making. Managers agreed that the actual data is redefined for the decision-making; this is because of their autonomy, power and hierarchical roles in the business decision. It seems that in junior-levels, data is ethically handled, and this is because of their less role in decision-making.

In the technological front, the employees support innovation and automation. Based on technological adoption, employee's knowledge level is improving. However, innovation culture in the organisation has reduced; this is because of non-interference from other cross-functional in R&D team. It is observed that knowledge and experience are interlinked for any decision-making and feedback is not adequately utilised for decision-making.

## VI. CONCLUSION

The study says that there is an impact on technological decision making in the manufacturing organization. It is because of handling ethical data and feedback from the customers. It's found that the original data is manipulated in such a way that the data is aligned with the decisions of the manager. Once the data is manipulated, communication and transparency have an impact on decision-making. Optimizing the process through automation and adopting cyber-physical system can reduce the human error and provide the best performance to the value chain. Moreover, real-time data analysis of the intelligent data will speed up the decision-making between human and machine. Data collection and knowledge are the driving forces for modern Industry [17], [18]. In the organization, technological roadmap directly influences on decision-making. Protecting real-time data through block-chain application distributed ledger which improves the autonomy, communication and trust in the process [19].

The study is limited to manufacturing and data is collected in different industries, including the government and private sectors

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