



## UTILIZATION OF ROBOTICS AND ITS PRODUCTION EFFECTIVENESS IN AUTOMOBILE INDUSTRY - A STUDY REPORT

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### ABSTRACT

The utilization of robots has revolutionized production effectiveness compared to manpower in various industries. With advanced automation, robots can work around the clock with precision, consistency, and speed, leading increased productivity and reduced operational costs. Additionally, robots can perform tasks that are hazardous or repetitive for humans, improving workplace safety and employee satisfaction. This paper highlights the robotics utilization and the production effectiveness as compared to humans. Through this study, I found that organisation need to upgrade the robots for better utilization and the production effectiveness is better than humans. The data collection was done through interview schedule. To analyse the collected data, I used Percentage analysis, one way ANOVA, Paired sample statistics, Krushkal wallis, Wilcoxon sign rank test. Thorough this study I can suggest something to the companies. Organisation need to upgrade the existing robots for better utilization of materials. The programs should be updated appropriately to the robots. They need to provide proper training to the employees who are working with the robots. Improper knowledge leads to accident and reduction in the production rate. Organisation should insist the employees to wear the Personal protective equipment while working with the robots. Reducing the material fixing time can shorten the robotic cycle time, by selecting the appropriate material and fixture for the placement it can be decreased. And also, it is better to invest more on robotics than hiring human workers because robots productivity is better than humans. Frequent testing of the safety systems and the robot's operation mechanism is necessary to prevent mishaps and to boost productivity. This may help the organisation to be better in the robotics and to increase the company's profit level. It is advised to use the robots in the entire production process to increase output with high quality. It is recommended that the management should appoint competent personnel to operate the robots. Organisation should consider the above suggestions for better productivity.

**KEYWORDS :** Robots, Production effectiveness, Quality and Personal protective equipment etc.

### INTRODUCTION:

Robots can perform tasks that are hazardous or repetitive for humans, improving workplace safety and employee satisfaction. This shift towards automation has reshaped manufacturing processes, optimizing efficiency and output quality while also creating opportunities for upskilling and redeployment of human workers in more strategic roles. The utilization of robots in production process has significantly enhanced efficiency and productivity compared to manpower alone. Robots can work continuously without breaks, leading to higher overall production rates. This shift towards automation not only boosts productivity but also allows human workers to focus more complex tasks that require creativity and problem solving skills.

### Automobile Industry Overview

The automotive industry comprises a wide range of companies and organisations involved in the design, development, manufacturing, marketing, selling and repairing and modification of motor vehicles. The word automotive comes from the Greek autos (self) and latin motus (of motion), referring to any form of self powered vehicle. This term was proposed by Elmer Sperry. The automotive industry began in the 1860s with hundreds of manufacturers pioneering the horseless carriage. Early car manufacturing involved manual assembly by a human worker. The process evolved from engineers working on a stationary car, to a conveyor belt system where the car passed through multiple stations of more specialized engineers. Starting in the 1960s robotic equipment was introduced to the process, and most cars are now mainly assembled by automated machinery. When it comes to advancement in technology, the possibilities for the future of automobile spare parts and components are practically endless. One exciting development is the increasing use of 3D printing technology. It is capable of printing spare parts and components from a wide range of materials allowing for customized on demand

production of parts that are specific to individual vehicles. This could greatly improve efficiency in the industry, as it eliminates the need for excess inventory and lead times.

### Statement of the Problem

The problem of the study was to determine the robotics utilization and to compare its production effectiveness with manpower, identify ways to improve its efficiency. By involving knowledgeable people in the robots, efficiency may be increased, and it is vital to keep the material fixture time.

### Need of the Study

This study helps to improve the effectiveness of robots by utilizing them at an optimum level. To understand the issue location that lowers robotic performance. This helps to understand about the safety measures for the equipment and humans. This helps to engage the knowledgeable employees with the robots to improve the efficiency.

### Research Objectives

- To analyse the efficiency of robots.
- To examine the resource utilization of the robots.
- To compare the production effectiveness of robot and manpower.
- To ensure the robots are utilized with safety measures to protect both workers and equipment.

### Research Design

Research design is the overall strategy or plan for conducting a research study. It outlines the methods and procedures that will be used to collect and analyse data, as well as the goals and objectives of the study. Cluster sampling method is used in this research. A part of the population selected for the study is called Sample. Here, 20 employees of UNO Minda limited (seating division), Hosur are selected as sample. The present research study is descriptive and analytical in nature and therefore, data are collected from both primary and

secondary sources. Survey is conducted while working hours of the employees. The data gathered is analyzed using percentage analysis, Paired Sample T- Test, Wilcoxon sign rank test.

**Wilcoxon sign rank test:**

**H0: Null Hypothesis:** There is no significant relationship between the productivity and material quality of the robots.

**H1: Alternate Hypothesis:** There is significant relationship between the productivity and material quality of the robots.

**Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
Q6	20	2.20	1.056	1	5
Q7	20	1.45	.605	1	3

**Table 6.1.1 Wilcoxon sign rank table**

Ranks				
		N	Mean Rank	Sum of Ranks
Q7 - Q6	Negative Ranks	10 <sup>a</sup>	7.90	79.00
	Positive Ranks	3 <sup>b</sup>	4.00	12.00
	Ties	7 <sup>c</sup>		
	Total	20		

- a. Q7 < Q6
- b. Q7 > Q6
- c. Q7 = Q6

**Table 6.1.2 P value table for Wilcoxon test**

**Test Statistics<sup>a</sup>**

	Q7 - Q6
Z	-2.391 <sup>b</sup>
Asymp. Sig. (2-tailed)	.017

- a. Wilcoxon Signed Ranks Test
- b. Based on positive ranks.

**Interpretation**

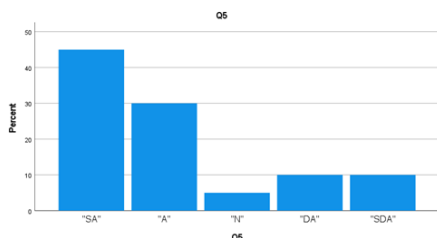
Since P value is less than 0.05, H0 is rejected and H1 is accepted at 5% level of significance. There is significant relationship between the productivity and the material quality of the robots. Based on mean rank, the quality of material is better than productivity of the robots.

**Percentage Analysis**

**Table 6.2.1 Investing in robots is more beneficial than hiring human workers**

**Investing in robots is more beneficial than hiring human workers**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
"SA"	9	45.0	45.0	45.0
"A"	6	30.0	30.0	75.0
"N"	1	5.0	5.0	80.0
"DA"	2	10.0	10.0	90.0
"SDA"	2	10.0	10.0	100.0
Total	20	100.0	100.0	



**Chart 6.2.1 Investing in robots is more beneficial than hiring human workers**

**Interpretation**

The above table shows that 45% of employees strongly agree that investing in robots is more beneficial than hiring human workers, 30% of employees agree that investing in robots is more beneficial than hiring human workers, 5% of employees are neutral with the statement and 10% of employees are disagree and strongly disagree that investing in robots is more beneficial than hiring human workers.

**Findings**

- By the Wilcoxon test, it is found out that "quality of material is better than productivity of an robot".
- 45% of employees strongly agree with the statement that investing in robots is more beneficial in the long run compared with hiring human workers.
- 40% of employees belongs to the age group "18-25".
- 80% of employees are "Male".
- 45% of employees had the qualification upto "Diploma".
- 35% of employees had "1-3" years of experience.

**Suggestions**

- Future robotics investments should be increased. It is better than employing people. Technology will reach its pinnacle growth in the near future. Increased investment in robotics results in better productivity.
- The robots programme has to be updated correctly. It is important to correctly weld the material during the welding process. When the robots receive an accurate programme update, this occurs. In the event of an error, the robots will not know where to weld. This results in increased resource usage.
- Reducing the material fixing time can shorten the robotic cycle time. By selecting the appropriate material and fixture for the placement, it can be decreased.

**CONCLUSION**

This study focuses on the utilization of robotics and its production effectiveness as compared to humans. This study investigates the use of robotics and compares its productivity to that of humans. Advanced technologies and robotics are the way of the future. Therefore, in order to increase productivity, robots technology must be implemented in the automotive industry. It is better than employing people. The automotive industry should be prepared to invest a larger sum of money on technology. The only negative is that mishaps can happen if appropriate safety measures are not taken and personal protection is not worn.

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