Impact of Automation on Human Capital & Management: A strategic shift for new opportunities & rising challenges.

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Abstract

While conducting any business, whether it is Manufacturing, service-oriented or agricultural-related related the factors of production play an essential role for the smooth functioning of the entire business. In this research paper, we will discuss the impact of this automation and related techniques on human capital as well as on the entire management of the organisationIn this research, we will analyse the level of impact of automation on human resources, on management, as well as the necessity of re-skilling and up-skilling that arises because of automation. We are also analysing different types of automation techniques adopted as well as starting to adopt by the organisation for the smooth functioning of their organisation and to bring operational efficiency. In this research, we are going to use primary as well as secondary data in order to make our research more reliable, valid and practical. In the primary method of data collection, we are collecting the data by circulating the structured questionnaire with the five-point Likert scale with the targeted population of employees, manager-level professionals and individuals working in the top-level management. In this research, we will use a stratified random sampling method as we divide the responses between the three different groups that are operational level staff, mid-level staff & top-level management. In the secondary method of data collection, we will analyse the existing literature, articles, and journals already published regarding this subject. Through this method, we will analyse the different types of automations in detail. This study has expected outcomes with respect to the impact of automation on human capital, organisation and management.

Keywords: Human capital, operations, organisation, management, employees, automation, artificial intelligence, Industry Revolution 4.0.

1.1 Introduction: Automation and human capital are both essential for any organisation to function smoothly. Human capital represents all the essential resources represents labourers; employees from different levels, such as operational staff, mid-level and upper-level. And automation represents the essential technology required to increase operational efficiency. In this era of globalisation, technology has no geographical barrier; it is freely transferring from one country to another, one organisation to another, without any resistance or hassle. Automation refers to technology that reduces manual tasks, time, and utilises the resources in such a way that it increases the operational as well as the production efficiency. Human capital is a resource that is responsible for driving this technology or automation in the best possible way. Various Organisations have implemented these automation techniques across the different departments. Various software like Oracle, SAP, Microsoft Office Suite, MS-Word, Tally, Zoho Office Suite, etc. Artificial Intelligence tools like ChatGPT, Perplexity, Co-Pilot, OpenAI, Meta, and Gemini are getting popular for their advanced and rapid solutions. There are three different levels of automation. Level one represents Partial automation, Level two is Semi-Automation, and Level three is full automation. Organisation adopts automation and its level as per its needs and requirements.

1.2 Research problem: Management of human capital in an increasingly automated scenario at an organisation.

1.3 Research Questions:

I) Does automation increase operational efficiency?
II) What is the impact of automation on human capital?
III) What is the impact of automation on managerial decisions?
IV) Are employees comfortable adopting automation?
V) What is the overall impact of the automation?
VI) Does automation require reskilling & up-skilling programs?

1.4 Research objective:

I) To analyse the impact of automation on operational efficiency.
II) To analyse the impact of automation on human capital.
III) To analyse the impact of automation on managerial decisions.
IV) To analyse the employee adaptability with respect to automation.
V) To analyse the overall impact of the automation.
VI) To analyse the need for reskilling & upskilling requirements for automation.

1.5 Research Hypothesis:

1. To analyse the impact of automation on operational efficiency.

H1: Automation increases operational efficiency.
H0: Automation does not increase the operational efficiency.

2. To analyse the impact of automation on human capital.

H2: There is a positive impact of automation on human capital.
H0: There is no impact of automation on human capital.

3. To analyse the impact of automation on managerial decisions.

H3: Managerial decisions are impacted by automation.
H0: Managerial decisions are not impacted by the automation.

4. To analyse the employee adaptability with respect to automation.

H4: Automation was accepted by the employees.
H0: Automation wasn't adopted by the employees.

5. To analyse the overall impact of the automation.

H5: Automation Impacts the organisation.
H0: Automation has no impact on the Organisation.

6. To analyse the need for reskilling & upskilling requirements for automation.

H6: Automation has required re-skilling & up-skilling of the employees.
H0: Automation has not required re-skilling & up-skilling of the employees.

2. Literature Review.

i) The organisation should continuously invest towards human capital and their upskilling and reskilling with respect to automation. This will constantly match their knowledge and skills with the increasing level of automation. Continuous improvement in human capital will lead to an increase in societal progress and development at large. Business organisations should stop replacing labour with excessively capital-intensive techniques, which could create a misbalance between automation and the labourers. **(Jia Yang et al.)**

ii) Technological adoption is a key process for the economic prosperity of any business organisation. It further adds growth and development opportunities for the business organisation in an increasingly competitive business environment. Due to the enhanced implementation of automation workplace is becoming more collaborative as well as interactive, which leads to the creation of team team-based environment at the workplace where social, technical and cognitive skills are being valued. **(D, Thillaivasan et al.)**

iii) Implementation of Automation, Artificial Intelligence, Robotics at the workplace increases the efficiency of the employees and workers at the workplace; it not only enhances their skills, but also increases the productivity of an employee. As automation vanishes, the manual jobs that employees fear losing jobs because of the automation, which forces them to learn new skills with respect to automation, hence automation acts as a negative motivation for the employees, which motivates them to adopt new skills and new technologies. Retraining intentions are exerting because of the fear of automation in an organisation, which affects the internal locus of control of the employees at large. **(Stefania Innocenti et al.)**

iv) Automation & Artificial Intelligence replaced the traditional and manual jobs in the asset management industry. Automated data and Artificial intelligence are replacing the traditional as well as manual modes of analysis, which reduces the time of an analyst. Junior employees who have more learning potential should be trained with analytical abilities, with automation and AI-based operations. In an Asset management company, automation facilitates data-driven analysis with easy interpretation and accurate analysis. Human capital efficiency could be increased if automation and the responsible use of Artificial Intelligence take place. **(Benjamin L. Britton et al.)**

v) Automation and Artificial Intelligence tools like Machine Learning Algorithm, Deep learning, big data, Robotic process automation, computer vision and natural language processing, applications of other AI and automated tools are impacting the working environment of the organisation. Employees' potential is increasing because of automation, but the level of acceptance of automation among senior employees is not as per the expectations. Other than that, it is creating

a knowledge gap between the senior employees. Because of this, senior employees are becoming more irrelevant and incompatible towards the new technologies and automation. **(Daniel Gnanapragasam et al.)**

vi) Automation and Artificial Intelligence play a crucial role in enhancing human capital. Automation and Artificial Intelligence play a key role in the Industrial Revolution 4.0, and they are being adopted by various organisations, societies, and businesses to increase operational efficiency. It has a positive social impact on the employees who accept the technological reforms, and a negative social impact on the senior employees who are not comfortable with the technology and automation. Even though there are various benefits of automation as compared to its cons. **(Mansour Amini et al.)**

vii) Implementation of Automation and Artificial Intelligence changes the working conditions of the employees at different levels of employment in the organisation. Industrial Revolution 4.0 has the primary goal of implementing automated technology in order to facilitate the operational ability of the organisation. Human capital may face possible changes due to the implementation of Industry 4.0. Automation and its adjoining arms play a crucial role in deciding the level of human capital requirement, which raises concerns among human resources and employees. **(Ostrouskyi S et al.)**

viii) According to Gary Becker, a renowned economist, reskilling and upskilling of the human capital is a long-term investment that is required to develop a skilled human capital to attain the organisation's goals. According to him, investment in reskilling and other training activities of the employees can give future economies of scale to the organisation. It is equivalent to investment in long-term assets such as plant and machinery, Land, Intellectual property rights, etc. He also raised the major question, "Who should bear the cost of training the human capital"? Later in his book, he gave a solution to these by introducing the concept of the apprenticeship, where the human capital works for negligible pay during the training period to avoid the post-training resignations of the employees and increase the retention ratio. **(Gary Becker)**

Research Gap:

- A comprehensive analysis of the impact of Automation on Human capital and managerial decisions is missing.
- A longitudinal or empirical study is needed to analyse this topic in detail.

3. Theoretical Perspective.

I) Concept of Automation:

- **Meaning & Definition:**

  i) Automation is a comprehensive term that includes any technology that reduces or eliminates manual tasks, resulting in time reduction, cost savings and overall increase in productivity.

  ii) Automation can be defined as a system or technology that operates via computers, reduces manual tasks by reducing human intervention or eliminating them, brings effectiveness to operations and reduces the time and cost of the organisation.

- **Evolution of Automation & Industrial Revolution (IR):**

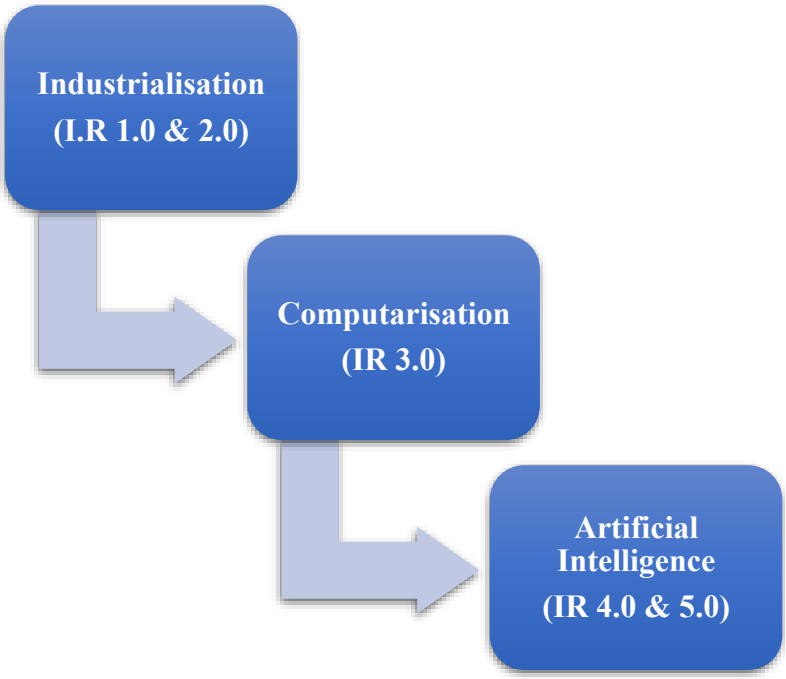

Figure No. 3.1: Evolution of Automation.

i) Industrialisation (I.R 1.0 & 2.0): Automation originated from the first Industrial Revolution, which started in 1760 in Great Britain and later reached in United States of America. The Industrial Revolution, which took place, was divided into two phases known as Industry 1.0 and Industry 2.0. Industry 1.0 replaces the manual production of agricultural products, chemicals, and iron, water power, steam power, etc.

ii) Computarisation (IR 3.0): It is part of Industry 3.0, where computers were invented and became very popular in the mid-20th century. It is also known as the digital era of the Industrial Revolution. Computer-Aided Manufacturing, Computer-Aided Design were introduced in order to facilitate production more smoothly.

iii) Artificial Intelligence (IR 4.0 & 5.0): Artificial intelligence, or AI, is a fully automated technology that can give more effective results by applying a few prompts to the system. Generative AI is replacing the traditional mechanism, computerised operations, as it was still a time-consuming option and required a huge cost to operate. Computers and manual mechanics needed employees to operate, but Artificial Intelligence operates on fully automated principles, which requires less human capital.

- **Types of Automation:**

a) Robotic Process Automation: Robotic process automation, or RPA, is known for its automated solution using software robots or bots to reduce the manual or repetitive tasks. RPA is used to reduce the manual tasks like data entry, invoice processing, and handling customer grievances, which were previously handled by human resources. RPA is a fully automated system that helps the organisation to reduce errors and manage the workforce effectively.

b) Industrial Automation: Industrial automation refers to a production system that facilitates the entire production process by using automated machines, robots in its operations. It ensures a faster production process, brings operational efficiency, is less time-consuming, and maximises the utilisation of the resources.

c) Cognitive Automation: A word cognitive represents the term logical, cognitive automation has the highest demand in the field of the service sector, where the logical mindset is mostly needed. Cognitive

automation analyses the patterns, unstructured data, which helps the management and human capital to make a decision. It integrates Artificial Intelligence and Machine Learning to perform these types of complex tasks

d) Business Process Automation: Business process automation generally facilitates the day-to-day business operations and processes. Various BPO & BPM-based companies like Wipro, Infosys, Tata Consultancy Services, Mahindra, HCL, etc, use BPA in order to facilitate business transactions smoothly and error-free.

II) Human Capital: Concept & Introduction

- **Meaning & Components of Human Capital:**

  i) Human capital is primarily known as a human resource, which is one of the prominent factors of production. Human capital is variable in nature; an organisation can adjust it according to the organisation's requirements.

  ii) Human capital refers to a capital which helpful from the production process till the successful pitch of the product to the end-user.

  iii) Organisation incurred its cost in the form of wages, salary and other perquisites subject to the nature of the job and requirements of the organisation.

- **Components of the human capital:**

i) Human capital components represent the essential and required elements that play a vital role in the growth and development of human capital. It includes selection, recruitment, training, remuneration, promotion, and recognition. Each component plays a vital role as it represents the job development and stages of an employee.

Figure No. 3.2: Components of the Human Capital.

- **Proposed Model for Continuous Human Capital Development in the Era of Automation & changing management needs.**

Figure No. 3.3: "5 I Model for Implementing the Automation, which integrates the Human capital training needs and managerial goals".

4. Research Methodology:

4.1 Research Method: We are using the Empirical research method for this research paper. Under this study, we are analysing both qualitative as well as quantitative data.

4.2 Data Collection Method: We have used both primary data as well as secondary data collection methods for this research purpose.

4.3 Sampling Method Used: We have used the Stratified sampling method for this research purpose. We divided the respondents working in the organisation into three strata as per their working hierarchy in the organisation.

4.4 Variables Study:

- **Independent Variable:** Automation.
- **Dependent Variables:** Operational Efficiency, Human Capital Development, Managerial Decision, Employee adaptability, Overall impact, Reskilling & Upskilling.
- **Controlled Variables:** Age, Education, Job experience, industry type.

5. Data Analysis & Interpretation.

5.1 Framework for Data Analysis:

This section will interpret the data analysis for the primary data collected by the questionnaire. We have received the responses from the 118 respondents working in different organisations across the different sectors and levels of the organisational hierarchy.

5.2 Demographic Analysis of the respondents.

Table No. 5.1: Demographic Analysis.

Demographic Classification.	Total Respondents.	Demographic Profile.	Frequency.	Percentage.
Gender.	118.	Male.	80.	67.8%
		Female.	38.	32.2 %
Age Group.	118.	Below-25 Yrs.	25.	21.2%
		25-35 Yrs.	61.	51.7%
		36-45 Yrs.	27.	22.9%
		46-55 Yrs.	4.	3.4%
		Above-55 Yrs.	1.	0.8%
Work Experience.	118.	Less than 5 Yrs.	53.	44.9 %
		5-10 Yrs.	30.	25.4 %
		10-20 Yrs.	29.	24.6 %
		Above-20 Yrs.	6.	5.1 %
Job Level.	118.	Operational Level.	53.	44.9%
		Mid-Level.		
		Top-Level.	58.	49.2%
			7.	5.9%
Sector.	118.	Manufacturing.	3.	2.5%
		IT.	28.	23.7%
		Banking & Finance.	25.	21.2%
		Education.	40.	33.9%
		Health Care.	12.	10.2%
		Others.	10.	8.5%

5.3 Objective – Questionnaire – Hypothesis Mapping.

Table No.5.2: Objective-Questionnaire-Hypothesis Mapping.

Sr. No	Research Objective.	Questions	Variable Measure.	Hypothesis.	Statistical Test.
1.	To analyse the impact of automation on operational efficiency.	Section-B	Operational Efficiency.	H1/H0	Descriptive Statistics Test & T-Test
2.	To analyse the impact of automation on human capital.	Section-C	Human Capital Development.	H2/H0	Descriptive Statistics Test & T-Test
3.	To analyse the impact of automation on managerial decisions.	Section-D	Managerial Decision Making.	H3/H0	Descriptive Statistics Test & T-Test

4.	To analyse the employee adaptability with respect to automation.	Section-E	Employee Adaptability.	H4/H0	Descriptive Statistics Test & T-Test
5.	To analyse the overall impact of the automation.	Section-F	Overall impact.	H5/H0	Descriptive Statistics Test & T-Test
6.	To analyse the need for reskilling & upskilling requirements for automation.	Section-G	Reskilling & Upskilling.	H6/H0	Descriptive Statistics Test & T-Test

5.4 Hypothesis Testing & Interpretation.

H1: Automation increases operational efficiency.
H0: Automation does not increase the operational efficiency.

- **Table No: 5.4.1 Results of Descriptive Statistical Test for H1.**

Sr.no	Statistical Method Tested	Variable 1- Operational Efficiency
1.	Mean.	4.01059322
2.	Standard Error.	0.046943565
3.	Median.	4
4.	Mode.	4
5.	Standard Deviation.	0.509937641
6.	Standard Variance.	0.260036397
7.	Kurtosis.	-0.19666743
8.	Skewness.	0.513382499
9.	Range.	2
10.	Minimum.	3
11.	Maximum.	5
12.	Sum.	473.25
13.	Count.	118
14.	Confidence Level (95%)	0.09296927

- **Decision Rule:**

Mean score > Test Value, reject the H0.

- **Hypothesis Testing Result:**

Mean score (4.01) > Test Value (3.00).

- **Hypothesis Decision (Descriptive Statistical Test):** H1 is accepted & H0 is rejected.

- **Table No: 5.4.2 Result of T-test Single Paired for H1.**

Sr.no	Statistical Method Tested	Variable 1- Operational Efficiency
1.	Mean.	4.01059322
2.	Variance	0.260036397
3.	Observations	118
4.	Hypothesised Mean	3
5.	Degree of Freedom (df)	117
6.	t Stat	21.52783291
7.	P(T<=t) one-tail	8.3674E-43
8.	t Critical one-tailed	1.657981659
9.	P(T<=t) two-tail	1.67348E-42

- **Decision Rule:**
- If T-stat > T-critical, reject H0.
- If P-value < 0.05, reject H0.

- **Hypothesis Testing Results:**
- T-stat (21.52) > T-critical (1.65).
- P-value (8.3674E-43) < 0.05.

- **Hypothesis Decision (T-Test single paired):** H1 is accepted & H0 is rejected.

- H2: There is a positive impact of automation on human capital.
- H0: There is no impact of automation on human capital.

- **Table No: 5.4.3 Results of Descriptive Statistical Test for H2.**

Sr.no.	Statistical Method Tested.	Variable 2- Human capital Development.
1.	Mean.	4.042372881
2.	Standard Error.	0.043917382
3.	Median.	4
4.	Mode.	4
5.	Standard Deviation.	0.477064883
6.	Standard Variance.	0.227590903
7.	Kurtosis.	0.042607261
8.	Skewness.	0.336168933
9.	Range.	2
10.	Minimum.	3
11.	Maximum.	5
12.	Sum.	477
13.	Count.	118
14.	Confidence Level (95%)	0.086976074

- **Decision Rule:**

Mean score > Test Value, reject the H0.

- **Hypothesis Testing Result:**

Mean score (4.04) > Test Value (3.00).

- **Hypothesis Decision:** H2 is accepted & H0 is rejected.

- **Table No: 5.4.4 Result of T-test Single Paired for H2.**

Sr.no	Statistical Method Tested	Variable 2- Human Capital Development.
1.	Mean.	4.042373
2.	Variance	0.227591
3.	Observations	118
4.	Hypothesised Mean	3
5.	Degree of Freedom (df)	117
6.	t Stat	23.73486
7.	P(T<=t) one-tail	7.59E-47
8.	t Critical one-tailed	1.657982
9.	P(T<=t) two-tail	1.52E-46

- **Decision Rule:**
- If T-stat > T-critical, reject H0.
- If P-value < 0.05, reject H0.

- **Hypothesis Testing Results:**
- T-stat (23.73) > T-critical (1.65).
- P-value (7.59E-47) < 0.05.

- **Hypothesis Decision (T-Test single paired):** H2 is accepted & H0 is rejected.
- H3: Managerial decisions are impacted by automation.
- H0: Managerial decisions are not impacted by the automation.

- **Table No: 5.4.5 Results of Descriptive Statistical Test for H3.**

Sr.no.	Statistical Method Tested.	Variable 3- Managerial Decision Making.
1.	Mean.	4.016949
2.	Standard Error.	0.041455
3.	Median.	4
4.	Mode.	4
5.	Standard Deviation.	0.450319
6.	Standard Variance.	0.202787
7.	Kurtosis.	0.338038
8.	Skewness.	0.431964
9.	Range.	2
10.	Minimum.	3
11.	Maximum.	5
12.	Sum.	474
13.	Count.	118
14.	Confidence Level (95%)	0.0821

- **Decision Rule:**

Mean score > Test Value, reject the H0.

- **Hypothesis Testing Result:**

Mean score (4.01) > Test Value (3.00).

Hypothesis Decision: H3 is accepted & H0 is rejected.

- **Table No: 5.4.6 Result of T-test Single Paired for H3.**

Sr.no	Statistical Method Tested	Variable 3- Managerial Decision Making.
1.	Mean.	4.016949153
2.	Variance	0.202787194
3.	Observations	118
4.	Hypothesised Mean	3
5.	Degree of Freedom (df)	117
6.	t Stat	24.53126701
7.	P(T<=t) one-tail	3.03152E-48
8.	t Critical one-tailed	1.657981659
9.	P(T<=t) two-tail	6.06305E-48

- **Decision Rule:**
- If T-stat > T-critical, reject H0.
- If P-value < 0.05, reject H0.

- **Hypothesis Testing Results:**
- T-stat (24.53) > T-critical (1.65).
- P-value (6.06305E-48) < 0.05.

- **Hypothesis Decision (T-Test single paired):** H3 is accepted & H0 is rejected.

- H4: Automation was accepted by the employees.
- H0: Automation wasn't adopted by the employees.

- **Table No: 5.4.7 Results of Descriptive Statistical Test for H4.**

Sr.no.	Statistical Method Tested.	Variable 4 – Employee Adaptability.
1.	Mean.	3.983051
2.	Standard Error.	0.046632
3.	Median.	4
4.	Mode.	4
5.	Standard Deviation.	0.506552
6.	Standard Variance.	0.256595
7.	Kurtosis.	-0.19029
8.	Skewness.	0.431027
9.	Range.	2

10.	Minimum.	3
11.	Maximum.	5
12.	Sum.	470
13.	Count.	118
14.	Confidence Level (95%)	0.092352

- **Decision Rule:**

Mean score > Test Value, reject the H0.

- **Hypothesis Testing Result:**

Mean score (3.98) > Test Value (3.00).

Hypothesis Decision: H4 is accepted & H0 is rejected.

- **Table No: 5.4.8 Result of T-test Single Paired for H4.**

Sr.no	Statistical Method Tested	Variable 4- Managerial Decision Making.
1.	Mean.	3.983050847
2.	Variance	0.256595361
3.	Observations	118
4.	Hypothesised Mean	3
5.	Degree of Freedom (df)	117
6.	t Stat	21.08106684
7.	P(T<=t) one-tail	5.91022E-42
8.	t Critical one-tailed	1.657981659
9.	P(T<=t) two-tail	1.18204E-41

Decision Rule:

- If T-stat > T-critical, reject H0.
- If P-value < 0.05, reject H0.

- **Hypothesis Testing Results:**
- T-stat (21.08) > T-critical (1.65).
- P-value (5.91022E-42) < 0.05.

- **Hypothesis Decision (T-Test single paired):** H4 is accepted & H0 is rejected.

- H5: Automation Impacts the organisation.
- H0: Automation has no impact on the Organisation.

- **Table No: 5.4.9 Results of Descriptive Statistical Test for H5.**

Sr.no.	Statistical Method Tested.	Variable 5 – Overall Impact.
1.	Mean.	4.011864
2.	Standard Error.	0.044144
3.	Median.	4
4.	Mode.	4
5.	Standard Deviation.	0.479524

6.	Standard Variance.	0.229944
7.	Kurtosis.	0.059729
8.	Skewness.	0.424708
9.	Range.	2
10.	Minimum.	3
11.	Maximum.	5
12.	Sum.	473.4
13.	Count.	118
14.	Confidence Level (95%)	0.087424

- **Decision Rule:**

Mean score > Test Value, reject the H0.

- **Hypothesis Testing Result:**

Mean score (4.01) > Test Value (3.00).

Hypothesis Decision: H5 is accepted & H0 is rejected.

- **Table No: 5.4.10 Result of T-test Single Paired for H5.**

Sr.no	Statistical Method Tested	Variable 5 - Overall Impact.
1.	Mean.	4.011864
2.	Variance	0.229944
3.	Observations	118
4.	Hypothesised Mean	3
5.	Degree of Freedom (df)	117
6.	t Stat	22.92201
7.	P(T<=t) one-tail	2.19E-45
8.	t Critical one-tailed	1.657982
9.	P(T<=t) two-tail	4.38E-45

- **Decision Rule:**
- If T-stat > T-critical, reject H0.
- If P-value < 0.05, reject H0.

- **Hypothesis Testing Results:**
- T-stat (22.92) > T-critical (1.65).
- P-value (2.19E-45) < 0.05.

- **Hypothesis Decision (T-Test single paired):** H5 is accepted & H0 is rejected.

- H6: Automation has required re-skilling & up-skilling of the employees.
- H0: Automation has not required re-skilling & up-skilling of the employees.

- **Table No: 5.4.11 Results of Descriptive Statistical Test for H6.**

Sr.no.	Statistical Method Tested.	Variable 6 – Reskilling & Upskilling.
1.	Mean.	4.15254237
2.	Standard Error.	0.04568106
3.	Median.	4
4.	Mode.	4
5.	Standard Deviation.	0.49622328
6.	Standard Variance.	0.24623755
7.	Kurtosis.	-0.08085451
8.	Skewness.	0.01243723
9.	Range.	2
10.	Minimum.	3
11.	Maximum.	5
12.	Sum.	490
13.	Count.	118
14.	Confidence Level (95%)	0.09046894

- **Decision Rule:**

Mean score > Test Value, reject the H0.

- **Hypothesis Testing Result:**

Mean score (4.15) > Test Value (3.00).

Hypothesis Decision: H6 is accepted & H0 is rejected.

- **Table No: 5.4.12 Result of T-test Single Paired for H6.**

Sr.no	Statistical Method Tested	Variable 6 – Reskilling & Upskilling.
1.	Mean.	4.152542373
2.	Variance	0.246237546
3.	Observations	118
4.	Hypothesised Mean	3
5.	Degree of Freedom (df)	117
6.	t Stat	25.23020434
7.	P(T<=t) one-tail	1.90209E-49
8.	t Critical one-tailed	1.657981659
9.	P(T<=t) two-tail	3.80418E-49

- **Decision Rule:**
- If T-stat > T-critical, reject H0.
- If P-value < 0.05, reject H0.

- **Hypothesis Testing Results:**
- T-stat (25.23) > T-critical (1.65).
- P-value (1.90209E-49) < 0.05.

- **Hypothesis Decision (T-Test single paired):** H6 is accepted & H0 is rejected.

6. Findings, Observations & Suggestions:

1. We have found that Automation has a positive impact towards the operational efficiency of the organisation.
2. Automation has a positive impact on Human capital development.
3. Automation has a serious impact on managerial decisions.
4. Automation has been adopted positively by the employees.
5. Automation has a positive overall impact on the organisation.
6. After passing all the requisite statistical tests, we have found that there is a need for Upskilling & Reskilling for implementing the automation effectively.
7. Organisations should sponsor and initiate the training, reskilling and upskilling activities for the successful implementation of the automation.
8. Automation should be for the convenience of the human capital as well to increase their working capacity, not for replacing them.
9. Various senior-level employees are still not comfortable with the automation; organisations should carefully handle their grievances regarding this.

7. Conclusion

1. After analysing the inputs of the questionnaire, we have concluded that the automation has a positive impact on human capital development. And also increases the operational efficiency.
2. Managerial decisions positively impact the organisation, while employees need various reskilling & upskilling activities to align themselves with the automated technology.
3. While employees are adapting the new technology to increase the efficiency of their work while the automation has an overall positive impact on all the variables studied in this research
4. Finally, we are concluding this research with the remark that Automation is reshaping organisations, human capital, refining managerial decisions to a great extent, and it is required in today's global competitive environment.

8. Appendix A.

The Questionnaire is structured for academic research to understand the impact of automation on human capital & management. A five-point Likert scale questionnaire has been prepared as follows.

Scale:

1- Strongly Disagree.
2- Disagree.
3- Neutral.
4- Agree.
5- Strongly Agree.

Section A: Demographic Profile.

1. **Gender:** Male, Female, Other.
2. **Age Group:** Below 25, 25-35, 36-45, 46-55, Above-55.
3. **Work Experience:** > 5 yrs, 5-10 yrs, 10-20 yrs, < 20 yrs.

4. **Job level:** Operational staff, Mid-Level, Top-Level.
5. **Sector:** Manufacturing, IT, Banking & Finance, Education, Health Care, Others.

Section B: Automation in operations.

6. My organisation has implemented automation in business operations.
7. The level of automation is increased in my department.
8. Operational efficiency has increased due to automation.
9. Manual tasks are reduced because of automation.

Section C: Impact of Automation on Human Capital.

10. The skill requirements of my job have changed because of automation.
11. A continuous learning process is possible because of automation.
12. My organisation is arranging a training session on adopting automation.
13. My productivity has increased because of automation.
14. Automation facilitates my career growth of mine.

Section D: Impact of automation on Managerial Decision.

15. The managerial decision-making process has been influenced by automation.
16. Management relies more on data-driven inputs because of automation.
17. Automation enhances coordination & communication.
18. Managerial roles are becoming more strategy-driven.
19. Automation reduces managerial workload.

Section E: Employee Adaptability & Implementation.

20. I can comfortably work on an automated system.
21. Employee accepts the automation.
22. My organisation smoothly implemented the automation without harming the human capital.
23. My job satisfaction improved because of automation.
24. Some employees are still not interested in accepting automation.
25. The organisation environment is supportive of technological changes.

Section F: Overall Impact & Perception.

26. Automation has a direct impact on human capital.
27. Automation improves organisational efficiency.
28. Pros of automation are more than its cons.
29. Technology-driven change is important for business & management.
30. Automated organisation will be performed well as compared to traditional ones in future.

Section G: Reskilling & Upskilling requirement.

31. I need upskilling courses to become familiar with automation.
32. Reskilling & Upskilling initiatives increased my confidence.
33. Management supports the employees in learning new automated technology.

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