

A Comparative study on Technological transformation between Automation and Manual process

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Abstract- The study of comparison between the manual and automation process primarily focuses on IT employees, the study mainly determines the focus on the perception of the workforce using automation and manual process which evolving in the industry. This study describes that the automation process will rule the future industry to reduce the workforce of humans. The purpose of this comparative study is to examine the technological transformation between automation and manual processes in a business. It aims to determine, the increasing availability and advancements of automation technologies, businesses face the decision and the perception towards adoption of automation or continue with manual processes. A comparative study on the technological transformation between automation and manual process, analysis primarily focuses on the questionnaire which was circulated among IT employees, for analyzing the perception towards the automation and manual process.

Keywords: Manual, Automation, IT Employees, Questionnaire

I. INTRODUCTION

In recent years, technological advancements have revolutionized various industries by introducing automation as an alternative to traditional manual processes. Automation involves the use of technology and machines to perform tasks that were previously done manually by humans. This technological transformation has had a profound impact on businesses, leading to increased productivity, efficiency gains, and improved overall performance. And it is easy for humans to minimize the repetitive task which was done by machines. Both software and hardware automation evolve in the present and future phenomena which increase the workflow which will make a drastic change in the future.

AUTOMATION

Automation technologies encompass a wide range of tools and systems, including robotics, artificial intelligence (AI), machine learning, computer vision, and process automation software. These technologies have enabled organizations to streamline operations, reduce human error, and achieve higher levels of precision and accuracy. From a cost perspective, automation may require an initial investment in technology implementation and integration. However, over time, it can lead to substantial cost savings through reduced labor expenses, decreased error rates, and improved resource allocation. Automation can also enhance scalability, allowing businesses to handle larger volumes of work without proportionally increasing labor requirements.

MANUAL PROCESS

Manual processes rely on human labor and physical effort to complete tasks. While manual processes have been the traditional approach for centuries, they can be time-consuming, prone to errors, and less efficient compared to automation. However, they still play a vital role in industries where human judgment, creativity, and adaptability are crucial.

A comparative study on the technological transformation between automation and manual processes from a business perspective provides valuable insights into the trade-offs, benefits, and challenges associated with each approach. It helps organizations evaluate the impact on productivity, efficiency, cost-effectiveness, scalability, and adaptability. By understanding these factors, businesses can make informed decisions and leverage technology to optimize their processes, enhance competitiveness, and drive sustainable growth in the dynamic business landscape.

II. OBJECTIVES OF THE STUDY

The objectives of a comparative study on technological transformation between automation and manual processes can be determined as follows:

- To examine the impact of automation and manual processes on business performance indicators such as profitability, cost-effectiveness, and competitive advantage.
- To compare the advantages and disadvantages of automation and manual processes in terms of productivity, efficiency, and quality.
- To assess the implications of automation and manual processes on the workforce, including job roles, job satisfaction, and employee well-being.

- To identify the factors that influence decision-making when choosing between automation and manual processes, considering industry-specific requirements, scalability, adaptability, and resource considerations.

III. METHODOLOGY

“A comparative study on technological transformation between automation and manual process”, analysis starts from preparing a standard questionnaire as it is a quantitative methodology.

The data are collected in terms of primary analysis. The questionnaire is prepared using Google form and it is shared through the IT Employees. The questionnaire is mainly focused on automation and manual process toward technological transformation in present and future perspectives. The responses were evaluated using percentage analysis and SPSS software. Around 110 responses were collected and taken for analysis.

Source of Data

Primary data: Data was collected through a survey of IT employees, using a questionnaire.

Secondary data: Information collected from the internet and various journals and articles.

IV. DATA ANALYSIS AND INTERPRETATION

Data analysis is a very important aspect of the project, as it involves the analysis of all the information that we collected. “A Comparative study on the technological transformation between automation and manual process”, the analysis starts by preparing a standard questionnaire as it is a quantitative methodology. The questionnaire is prepared using Google form and it is shared with IT employees. Around 110 responses were collected. This is a Non-Probabilistic sampling method. A survey was conducted to identify the comparison between automation and the manual process in today’s business towards the perception of technological transformation, efficiency, implementation, impacts, and job satisfaction. This analysis was done using SPSS and percentage analysis.

Total Number of respondents = 110

The survey collected were tabulated and interpreted below,

Perception towards software automation compared to manual processes

S.NO	PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
1.	Software automation is more efficient and faster	49	43.8%
2.	Manual processes are more efficient and faster	7	6.3%
3.	Both approaches are equally efficient and fast	52	46.4%
4.	Not sure	4	3.6%
	Total	110	100%

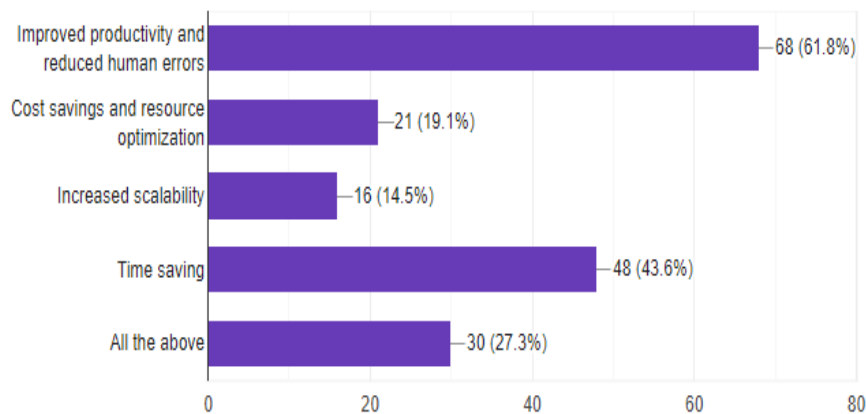
Table 1: Perception towards software automation compared to manual processes

Interpretation:

The survey depicts that, 43.8% of employees determine software automation is more efficient and faster. 6.3% of employees determine that the manual and automation processes are equally important. And 46.4% of the employees determine manual processes are more efficient and faster. Based on the survey perception towards both software automation and manual processes efficiency is determined efficiently and fast.

Benefits are associated more with software automation compared to manual processes

110 responses

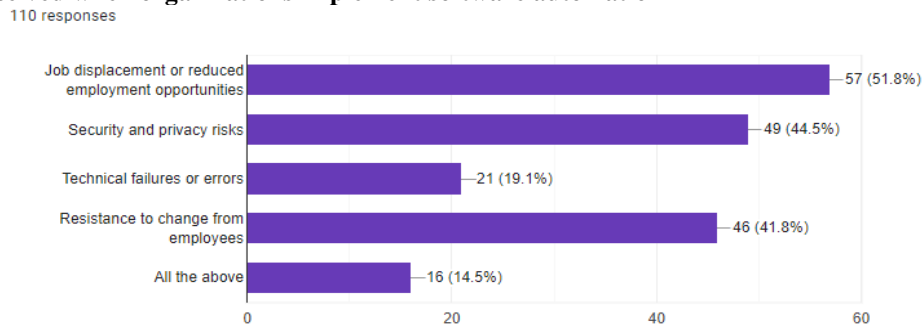


Benefits are associated more with software Automation compared to manual processes

Interpretation:

The survey depicts that, the benefits are associated more with software automation compared to manual processes is an open-ended question it analyzes the perception towards all the given options are analyzed depends upon the employees, it determines that improved productivity and reduced human errors are the major respondent from the employees. Followed by that Time saving, cost savings and resource optimization and increased scalability are all the benefits considered by the employees.

Challenges you perceived when organizations implement software automation



Challenges you perceived when organizations implement software automation

Interpretation:

The survey depicts that, challenges perceived by organizations while implementing software automation is an open-ended question it analyzes the perception towards all the given options is analyzed depends upon the employees, 51.8% of the employees determine that Job displacement will happen due to the advancement of technology. 44.5% of the employees determine the security and privacy risks and followed by that resistance to change from employees and technical failures and errors are determined.

Human decisions towards software automation compared to manual processes

S.NO	PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
1.	A Human decision is more important in software automation	33	30%
2.	A Human decision is more important in manual processes	10	9.1%
3.	Both approaches require human decisions	63	63.4%
4.	Not sure	4	3.6%
	Total	110	100%

Table 2: Human decisions toward software automation compared to manual processes

Interpretations:

The survey depicts that, 30% of human decision is more important in software automation. 9.1% of manual and automation is important in taking decisions. And followed by that, 3.6% of the human decision is more important in the manual process. By analyzing the questionnaire, it is determined that 63.4% of both manual and software decisions are equally important for taking decisions, because human workforce is needed everywhere while automating a machine.

Software automation and manual processes impact overall job opportunities

S.NO	PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
1.	Significantly reduce job opportunities	43	7.3%
2.	Slightly increase job opportunities	8	13.6%
3.	No significant impact on job opportunities	59	53.6%
	Total	110	100%

Table 3: Software automation and manual processes impact overall job opportunities

Interpretation:

The survey depicts that, most of the responses were, if the automation process and manual process the job opportunity will not affect future.

Security and privacy measures of automation tools for software automation

S.NO	PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
1.	Not confident at all	4	3.6%
2.	Slightly confident	16	14.5%
3.	Moderately confident	43	39.1%
4.	Confident	33	30%

5.	Extremely confident	16	14.5%
	Total	110	100%

Table 4: Security and privacy measures of automation tools for software automation

Interpretation:

The survey depicts that, 39.1% of the employees were moderately confident about privacy and security concerns. 14.5% of the employees are slightly and extremely confident followed by confident. Privacy and security concerns are determined as difficult in manual processes when compared to software automation because of threats and vulnerabilities.

SPSS ANALYSIS

Correlation:

Bivariate Pearson Correlation to test whether there is a statistically significant linear relationship between the comparison of manual and automation processes. This analysis was done to determine the perception of automation in the growing technology, through a 5-point scaling analysis.

The 5-point scaling questions in the survey questionnaire are analysed using SPSS to determine the,

1. Software automation will take a major part in the future
2. The Efficiency of software automation is better when compared to the manual process
3. Whether software automation is complex to implement
4. Software automation impacts the job opportunities
5. Automation tools can enhance job satisfaction by eliminating repetitive tasks

Correlations

Correlations

		Software automation will take major part	Efficiency of Software automation is better wh	Complex to implement software auto	Software automation will impact the job opportunity	Automation tools can enhance job satisfaction by eliminating
Software automation will take major part	Pearson Correlation	1	.065	-.329**	-.195*	.138
	Sig. (2-tailed)		.498	.000	.041	.152
	N	110	110	110	110	110
Efficiency of Software automation is better wh	Pearson Correlation	.065	1	.245**	.399**	.175
	Sig. (2-tailed)	.498		.010	.000	.067
	N	110	110	110	110	110
Complex to implement software auto	Pearson Correlation	-.329**	.245**	1	.332**	.317**
	Sig. (2-tailed)	.000	.010		.000	.001
	N	110	110	110	110	110
Software automation will impact the job opportunity	Pearson Correlation	-.195*	.399**	.332**	1	.058
	Sig. (2-tailed)	.041	.000	.000		.544
	N	110	110	110	110	110
Automation tools can enhance job satisfaction by eliminating	Pearson Correlation	.138	.175	.317**	.058	1
	Sig. (2-tailed)	.152	.067	.001	.544	
	N	110	110	110	110	110

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Correlation analysis

Interpretation:

Correlation is done through Non – Probabilistic sampling technique. The data which are collected for the five-point scaling analysis is primitive data. From the analysis of the correlation in the SPSS software, it determines a 0.01 level of significance and the scaling for future perception, efficiency, implementation, opportunity, and repetitive tasks. By analyzing this process software automation is more determinant and effective when compared to manual process.

FINDINGS

- The findings determined that automation significantly reduces the time required to complete tasks and processes. By analyzing the survey, 46.4% of the majority of IT employees determined that both software and manual process software are more efficient and faster. And 43.4%, most of the IT employees determined that software automation is efficient and faster.
- Job displacement, resistance, security, and privacy, most of the employees determined these challenges faced by the organization, the major challenge faced by the employees towards technological transformation between automation and manual process.
- By comparing and analyzing the difference between manual and automation processes, 57.3% of the majority of IT employees perceive both human decision and automation equally important, and 28.9%, most of the employee's perceptions towards both automation and manual process are equally important.
- Majority of IT employees determine that job opportunities will reduce in the future because of technological transformation.
- From a business perspective, if an employee starts a company on his own it is determined that 80.9% of the majority of people, move towards software automation and 19.1%, most of the employees will work on the manual process
- 39.1% of the majority of employees are moderately confident about security and privacy issues, 21.1% of most of the people are confident, 30%, most of the IT employees are very confident and 14.5%, most of the employees are extremely confident.
- The technological transformation from manual to automation process determines the perception of the employees towards future transformation, efficiency, and enhance job satisfaction the responses agreed by most of the employees.
- And implementation and impact towards the job opportunity become the major challenge while analyzing toward future perspective.

LIMITATIONS

- Collecting data from employees become difficult in the workplace due to time constraints, and the workforce in the location.
- The availability of literature specifically comparing automation and manual processes may be limited.
- The study was based on automation and manual process in general, which makes the employees take up the survey.
- Obtaining comprehensive and accurate data for both automation and manual processes might be challenging. Organizations may have limitations on sharing sensitive data, and the data available may not cover all aspects of the processes being studied.

SUGGESTIONS:

By analyzing the technological transformation between manual and automation processes from the employee's perspective,

- Awareness about automation and working with various tools should be created among all the employees in the organization.
- Manual work should be considered, to analyze the automation process in terms of future perspective.
- Security and privacy measures should be evaluated and it is determined as the major concern while automating in terms of business perspective.

V.CONCLUSION

A comprehensive comparative study and analysis conducted for the perception of employees about the manual and automation process, it can be concluded that automation proves to be faster and more efficient than manual processes. And manual process is equally important for automating. This conclusion aligns with the findings obtained from the survey questionnaire administered by the research. The survey questionnaire, which collected data from a representative sample of participants, provided valuable insights into their perceptions and experiences regarding automation and manual processes. The responses consistently indicated a consensus that automation offers superior speed and efficiency compared to manual methods.

RESULTS AND DISCUSSIONS

The automated systems are designed to follow predefined rules and algorithms, ensuring consistency and accuracy in the execution of tasks. This reduces the occurrence of errors, resulting in improved quality outcomes and higher customer satisfaction levels. However, it is important to note that the adoption of automation should be approached strategically, considering factors such as the nature of the tasks and the potential impact on the workforce. Organizations must carefully evaluate their specific requirements and strike a balance between automation and manual processes to achieve optimal results. And by correlating in SPSS using probabilistic sampling technique in terms of five-point scaling, it is determined that the level of significance is accurate and it is correlated with the survey questionnaire.

In conclusion, based on the survey questionnaire and the comparative study conducted, it is evident that automation is indeed faster and more efficient than manual processes. These findings determine the significance of technological transformation and leveraging automation to drive operational excellence, meet customer expectations, and achieve sustainable business growth in today's dynamic and competitive business process.

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SURVEY QUESTIONNAIRE**A COMPARATIVE STUDY ON TECHNOLOGICAL TRANSFORMATION BETWEEN AUTOMATION AND MANUAL PROCESS**

1. **Name**
2. **Age**
 - 18 to 22
 - 23 to 25
 - 26 to 35
 - 35 to 45
 - Above 45
3. **Are you aware of Software automation?**
 - Yes
 - No
4. **Did you have any experience in working with automation tools?**
 - Yes
 - No
5. **Which of the following describes, your perception of software automation compared to manual processes?**
 - a. Software automation is more efficient and faster
 - b. Manual processes are more efficient and faster
 - c. Both approaches are equally efficient and fast
 - d. Not sure
6. **Which of the following benefits do you believe, are associated more with software automation compared to manual processes?**
 - a. Improved productivity and reduced human errors
 - b. Cost savings and resource optimization
 - c. Increased scalability
 - d. Time-saving
 - e. All the above
 - f. None of the above
7. **What are the main challenges you perceive when organizations implement software automation?**
 - a. Job displacement or reduced employment opportunities
 - b. Security and privacy risks
 - c. Technical failures or errors
 - d. Resistance to change from employees
 - e. All the above
 - f. None of the above
8. **What role do human decisions towards software automation compare to manual processes?**
 - a. A Human decision is more important in software automation
 - b. A Human decision is more important in manual processes

- c. Both approaches equally require human decision
 - d. Not sure
- 9. What are all the drawbacks you associate with software automation in business processes?**
- a. Job displacement and reduced employment opportunities
 - b. Dependence on technology and technical failures
 - c. Lack of personal touch or human interaction
 - d. All the above
 - e. None of the above
- 10. What factors do you consider when choosing between software automation and manual processes for a particular task or process in your organization?**
- a. Time constraints
 - b. Resource availability
 - c. Cost considerations
 - d. The Complexity of the task or process
 - e. All the above
- 11. How do you stay informed about the latest developments and trends related to software automation and manual processes in business?**
- a. Industry publications and blogs
 - b. Professional networks and events
 - c. Training and certification programs
 - d. Internal communications within my organization
- 12. How do software automation and manual processes impact overall job opportunities in the long run?**
- a. Significantly reduce job opportunities
 - b. Slightly reduce job opportunities
 - c. No significant impact on job opportunities
 - d. Slightly increase job opportunities
 - e. Significantly increase job opportunities
- 13. Imagine, if you started a company, what process do you prefer?**
- a. Manual process
 - b. Automation
- 14. How confident are you in the security and privacy measures of automation tools for software automation?**
- a. Not confident at all
 - b. Slightly confident
 - c. Moderately confident
 - d. Very confident
 - e. Extremely confident
- 15. Do you think Software automation will take a major part in the future?**
- 16. Weather efficiency of software automation is better when compared to manual processes?**
- 17. Do you think, is it complex to implement software automation when compared to manual processes?**
- 18. Will Software automation will impact job opportunities?**
- 19. "Automation tools can enhance job satisfaction by eliminating repetitive tasks"?**
- a. Strongly agree
 - b. Agree
 - c. Neutral
 - d. Disagree
 - e. Strongly disagree