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A STUDY ON THE IMPACT OF ROBOTICS AND AUTOMATION ON EMPLOYMENT WITH SPECIAL REFFERENCE TO MARUTI SUZUKI INDIA LIMITED

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Abstract:

This research paper focuses at the profound implications of the swift adoption of robots and automation across India's multiple industries. Understanding the distinctive opportunities and issues encountered by the Indian workforce is crucial, particularly since the world economy keeps shifting due to revolutionary advances in technology. This paper examines multiple facets of this technological progression, including its social, economic, and policy implications, as it explores into the historical background, the present situation, as well as potential future scenarios of robotics adoption in India. Through a comprehensive analysis of the intricate relationship between employment dynamics and technology, the study seeks to provide significant fresh perspectives on the current revolution and its effects on India's labour force. This research paper specifically focuses on the operations of Maruti Suzuki in India, the motive of this paper is to explore the impact of robotics adoption on India's labour force, with a specific focus on Maruti Suzuki's operations, aiming to provide fresh perspectives on the current revolution in technology and its implications for employment dynamics in India.

Keywords: *Robotics, Automation, India, Workforce, Consequences.*

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Introduction:

The last years have seen stunning and unpredictable transformation in the automotive industry, which has been largely fuelled by developments in robotics and automation. Robotics and automation have changed automobile production through assembly lines, vehicle design and manufacturing processes, improving efficiency, accuracy as well as safety at all stages of the production chain. By using these technologies car makers have been able to streamline their operations while optimizing resource use such that they can meet customers 'increasing demand for high quality customized vehicles. Moreover, development of robotics and automation has helped automotive manufacturers to easily incorporate recent technological advances like artificial intelligence (AI) as well as machine learning within their systems paving way for autonomous vehicles and smart factories. As the sector continues to develop further on into the future, robotics and automation are expected to be more influential in shaping mobility's destiny; thus, contributing towards innovation of the world market for cars, environmental friendliness as well as global competitiveness.

The research paper explores the impact of robots and automation on employment sector in India, this research paper focus on Maruti Suzuki a leading automobile industry around the globe. the emerging technology has impacted the working of people. observing the historical trend and the advancement in technology this research paper aims to find the impact of robotics and automation on the employment sector, revenue of Maruti Suzuki specifically in India.

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Maruti Suzuki India Limited (MSIL) was established by an act of Parliament in February 1981 to meet the increasing demand for personal transportation resulting from lack of public transport. Suzuki Motor Corporation was selected from seven potential partners worldwide. This is due not only to their undisputed leadership in small cars, but also to their dedication to frequently promoting the technology and management of Japan's MSIL (which has overtaken Japan as the world's largest automaker). leading automobile manufacturer) largest automobile producing country in the world).

source:https://en.wikipedia.org/wiki/Maruti_Suzuki#:~:text=The%20Government%20of%20India%20established,Suzuki%20Motor%20Corporation%20in%202007.

Maruti became the first Indian company to produce more than 1 million vehicles. Maruti is one of the most successful automotive joint ventures, turning a profit every year since its inception in January 2000. Although in 2000-01 Maruti's operating profit was Rs. 92.5 billion.

https://www.reportjunction.com/Preview/MARUT I-SUZUKI-INDIA-LTD-2002-58038.htm

Since the launch of the new model, low advertising costs have led to the loss of the book. Maruti revolutionized the way Indians look at cars. Suzuki motor corporation (Maruti Suzuki) has two manufacturing units in India, mainly these factories are located at Manesar and Gurgaon in Haryana and a state-of-the-art R&D centre in Rohtak, Haryana. we specifically study the manufacturing stages of producing a vehicle, the stages are Design and Conceptualization, Engineering and Prototyping, Tooling and Component Manufacturing, Metal Stamping, Welding and Assembly, Painting, Assembly Line, Quality Control, Testing, Final Inspection, Packaging and Shipping, Distribution and Sales. The research paper aims to understand who the advancement in automation and robotics impact the manufacturing process and the people working in the automobile industry and its overall impact on the Indian economy.

To keep up with its competitors, Maruti Suzuki India Constrained has chosen a computerized domain to showcase its substance more effectively and attract customers more prominently. The utilization of advanced stages has become a crucial element in the commercial vehicles of Maruti Suzuki India Limited. The fragile nature of cutting- edge media accounted for about a quarter of the company's total advertising spend. Demand for compact vehicles is most justified because per capita income is generally low and activity is high in metropolitan areas. Hatchbacks are the most popular vehicle type in the compact and smaller- than-expected sub-segments due to their uniqueness, incredible fuel economy, and ease of development. In India, Maruti Suzuki India Restricted is the dominant brand in tourist vehicle advertising. Maruti Suzuki India Constrained manufactures various models and variants. The figure below shows a classification of models based on people's needs and financial situation. Maruti Suzuki India Restricted follows a specific approach that considers the differences between marketing online and meeting customers at dealerships. In India, the company brought nearly 900 dealerships online in the company's largest retail digitalization program. Maruti Suzuki India Constrained promotes cutting-edge innovations to secure important deals and achieve incredible customer benefits. Maruti's sales techniques focus on customer satisfaction. Customer satisfaction is very important in stores where businesses compete for customers. Customers who are optimistic about your commitment are more likely to return for prepayment and maintenance and will become repeat customers in the consequences of robotics on manufacturing processes and labour.

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India is a fastest developing country I the world, as well advancements in Information Technology (IT), Healthcare, Automotive, energy, finance, manufacturing etc are the rapidly growing sectors in technology, with the upgradation technological factors the working is also impacted and which results are biased according to everyone. The results are beneficial and detrimental, this shift in how things are made and done is changing the game for industries and workers alike. As the world around us gets more and more tech-savvy, it is not just a matter of convenience – it is also changing jobs. Jobs that used to be done by people are now being taken over by machines. This paper focuses on how this shift, especially in Maruti Suzuki's operations, is affecting the way cars are made and the people who make them. This research paper is in-depth exploration of impacts of technological advancements.

Objectives:

- Assess the impact of robotics and automation on Maruti Suzuki's manufacturing processes.
- Analyze the changes in expenditure patterns before and after robotics implementation at Maruti Suzuki.
- Evaluate the effects of robotics and automation on human employment within Maruti Suzuki.
- Recommend policy interventions to mitigate adverse effects on employment and promote inclusive growth.

Hypothesis:

- Null Hypothesis (H0): Automation and robotics does not impact the employment levels in terms of craftsmanship and traditional manufacturing skill
- Alternative Hypothesis (H1 or Ha): Automation and robotics does impact the employment levels in terms of craftsmanship and traditional manufacturing skill

Methodology:

- **Research Approach:**
  The research aims to capture diverse perspectives on the advancements in robotics and technology through qualitative methods, primarily employing questionnaires to gather insights.
- **Research Design:**
  This study is designed to solicit input from a wide range of stakeholders, including industry professionals, consumers, students, and other relevant parties. Both qualitative and quantitative approaches are utilized to ensure a comprehensive understanding of the subject matter.
- **Data Collection:**
  Quantitative data collection methods, predominantly in the form of online questionnaires, are utilized to gather primary data from professionals across various industries, consumers, students studying relevant fields, and other individuals interested in the topic.
- **Sampling Method:**
  The research follows quantitative principles, utilizing a predetermined sample size of 30 participants. However, the study received an impressive response, with over 50 participants contributing through the questionnaire, indicating significant interest and engagement in the subject matter.
- **Data Analysis:**
  The collected data will undergo qualitative analysis to identify prominent themes and patterns within the responses. Additionally, certain aspects of the analysis may incorporate quantitative presentations to enhance clarity and comprehension of the findings.

Limitations:

Data Availability and Reliability: Getting our hands on all the nitty-gritty details might be a bit tough. Maruti Suzuki might keep some of their data under lock and key, and that could make our analysis a tad less comprehensive.

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Time Constraints: We're on a bit of a deadline here, aren't we? That means we might miss out on some of the longer-term trends or effects because of the scope of our research.

Scope of Analysis: We can't cover every little thing, unfortunately. There might be some factors that slip through the cracks simply because we can't do it all.

Review of Literature:

1. (Panchajanyeswari & K. T. Veeramanju) This research paper provides insights into the adoption of digital technologies in the Indian automobile industry post-pandemic. It emphasizes the significance of information-centric technology and business automation, with Maruti Suzuki India Limited serving as a prime example. Key points covered include the industry's rapid digital transformation, the benefits of automation, and Maruti Suzuki's innovative practices. The review draws on secondary data from various sources to analyse Maruti Suzuki's success in delivering customer satisfaction through digital initiatives.
2. The research by (Pisková et al)(2024) explores the impact of robot installations on employment and labour productivity in the automotive industry. Contrary to some expectations, the study finds that robot installations have a positive effect on labour demand but may decrease labour productivity. The literature review within the paper discusses divergent views on the effects of automation on employment and productivity, highlighting the complexities of the Fourth Industrial Revolution. It also addresses broader challenges such as globalization, environmental concerns, and potential social implications, emphasizing the need for evidence-based policy responses.
3. **The research paper "Robots worldwide:** The impact of automation on employment and trade" by Francesco Carbonero, Ekkehard Ernst, and Enzo Weber, published by the International Labour Office in October 2018, highlights the significant negative impact of robots on employment, especially in emerging economies, with a 14% decrease between 2005 and 2014. It also notes a reduction in off-shoring due to robots in developed countries, leading to a 5% decline in employment in emerging economies during the same period. The paper emphasizes the need for tailored policy responses to address the adverse effects of automation on global labour markets.
4. **Michal Bartoša, Vladimír Bulej, Martin Bohušík, Ján Stančeka , Vitalii Ivanovb , Peter Macek:** (2021) This research paper talks about how robots are used in making cars and what might happen in the future. Robots help with things like putting parts together and checking how things are made, making car factories faster and more efficient. Some new ideas include robots that work alongside people and robots that can move really fast. In the future, car factories might even run themselves! There's a story about how robots help tighten screws on car seats, showing how smart robots can be. Overall, robots are super important in making cars, and people are always working to make them even better.
5. **A positioning paper by the International Federation of Robotics:** (2017) The International Federation of Robotics' paper outlines the positive impact of robots on productivity and employment. It dispels the notion that automation leads to job losses, highlighting studies showing automation creates jobs, especially higher-skilled ones. The paper stresses the importance of providing the right skills for workers and calls for collaboration between public and private sectors to harness the benefits of automation effectively. Overall, it offers valuable insights for policymakers and businesses navigating the automation landscape.
6. **Maruti Suzuki to increase dependence on robots:**

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(2012) MINT article, the article states that, Maruti Suzuki's adoption of industrial robots reflects a broader trend in the automotive industry towards automation, driven by the company's pursuit of enhanced efficiency and competitiveness through reduced reliance on manual labour and improved quality control. Rising labour costs and concerns over labour unrest further propel this transition. While automation raises concerns about job displacement, it also creates opportunities for technical roles in robotics and automation maintenance. Maruti Suzuki's shift prompts discussions about workforce restructuring and sets a precedent for the industry in India, highlighting the need to adapt to technological advancements while addressing local challenges. This strategic move underscores the convergence of global manufacturing practices with socio-economic dynamics, signalling a transformative shift in manufacturing practices that necessitates further research to understand its long-term implications for the automotive sector.

7. **MARUTI SUZUKI IMPLEMENTING RPA, AI and IOT initiatives:** (2019) The article discusses Maruti Suzuki's strategic adoption of RPA, AI, and IoT technologies to drive digital transformation. Through RPA, the company aims to automate mundane tasks, improve efficiency, and enable employees to focus on higher-value work. AI-driven chatbots are being deployed for HR support, enhancing employee engagement. Maruti Suzuki's utilization of IoT focuses on integrating equipment, optimizing production processes, and enabling predictive maintenance. Overall, these initiatives demonstrate the company's commitment to innovation, efficiency, and leveraging data for competitive advantage in the automotive industry.
8. **Maruti Suzuki's Automation Drive: (**2012) THE ECONOMIC TIME article stated that Enhancing Efficiency and Quality, Maruti Suzuki to increase automation, bring Manesar operations on par with Japan plants Maruti Suzuki, India's top carmaker, is rapidly automating critical production processes in its manufacturing plants to achieve 99% automation levels. This shift is driven by the company's commitment to consistent product quality and competitiveness. By deploying more robots and transitioning to permanent labour, Maruti Suzuki aims to improve efficiency, product quality, and resilience against disruptions. Notably, popular models like the Swift and DZire have already benefited from this automation push, reinforcing the company's leadership in the automotive market.
9. **Ahlam Rais, the rise of robots in the Indian automobile industry Automation:** (2019) maschinen market article stated that the Indian automotive industry, the adoption of robotics has witnessed a remarkable upsurge, revolutionizing production processes and elevating standards of efficiency and quality. Key players such as Tata Motors and Maruti Suzuki have embraced automation, deploying robots for tasks ranging from welding to painting. These robots not only streamline production but also ensure consistent quality, contributing to enhanced safety by handling hazardous tasks.

However, this shift towards automation is not without its challenges. Concerns regarding potential job displacement, initial investment costs, and compatibility issues with existing infrastructure loom large. Despite these obstacles, the outlook for robotics in the Indian automotive sector remains promising. With India's commitment to exploring the realms of Industry 4.0, demand for industrial robots is expected to soar. Events like the India Machine Tools Show serve as crucial platforms for industry stakeholders to exchange knowledge, showcase innovations, and chart the path forward.

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In conclusion, while challenges persist, the continued integration of robotics is essential for driving sustained growth, efficiency, and competitiveness in the Indian automotive industry.

10. **THE ECONOMIC TMES AUTO:** (2017) The article states that Maruti Suzuki India's (MSI) evolution in automotive manufacturing showcases a shift towards advanced technologies, with over 2,400 robots aiding 20,000 workers across its Gurugram and Manesar factories. Integrating modern tools alongside traditional methods ensures smooth operations, with over 5,100 fool-proofing tools enhancing quality control. MSI prioritizes flexibility, training workers for multi-skilled roles to facilitate rapid model launches and technology adaptation. Employee engagement drives cost savings and efficiency gains, while technology streamlines raw material handling, exemplified by 10 kilometers of conveyor belts. This commitment to innovation cements MSI's position as a leader in automotive manufacturing, setting benchmarks for efficiency and quality in the industry.
11. Menon Balkrishnan and Jagathy Raj Vice President (May 2012) A purchasing model is used to study consumer preferences. from car owners. According to their research, customer focus is one of the key differentiators in the passenger car industry. Consumers in this sector need after-sales support from manufacturers. Research also shows that peer groups have the biggest influence on teens' car-buying decisions
12. Dr. R. Menaka, K. Ashath (2014) [9] in their research paper concluded that the blame for the change in consumers' lifestyle should be attributed to the change in business leading to world trade and economic integration. Segmenting new customers using traditional demographic tools is difficult without a good understanding of their purchasing behaviour. If customer preferences can be accurately predicted and determined, product design, product differentiation, product placement and distribution decisions can be made accordingly. These decisions are implemented to meet customer needs.
13. Kanagaraj, M.P, et al. (2018) [10] concluded in their research paper that discounts and other incentives from businesses can attract more customers and encourage them to purchase. This leads researchers to conclude that consumers are interested in Maruti's automotive business and are quite aware of the cars the company offers. Data shows that most customers use the same brand for a long time, so customers do not switch brands frequently.
14. Dhruv, Mathur et al. (2018) [11] In their research paper, they concluded that the reputation of the car and the manufacturer affects the consumer's decision. The most important thing that impresses potential customers is the type of engine and the quality of the work performed, as well as the quality of the support. Therefore, manufacturers need to follow good standards and use advertising and marketing, which are important in establishing products in the minds of consumers.
15. C. S. Gowtham Chakravarthy et al. (2018) [12] in their research paper, when investigating consumer behaviour based on purchasing behaviour, they found that consumers play three different roles: user, payer, and buyer. Social anthropology combines ideas from psychology, sociology, and economics. He is passionate about understanding how consumers make decisions individually and in groups. It analyses individual customers, including demographic and behavioural characteristics, to understand people's needs. It also attempts to assess the client's influence from groups such as family, friends, and the wider community. Social marketing is very useful for studying consumer behaviour. Additionally, customer relationship management,

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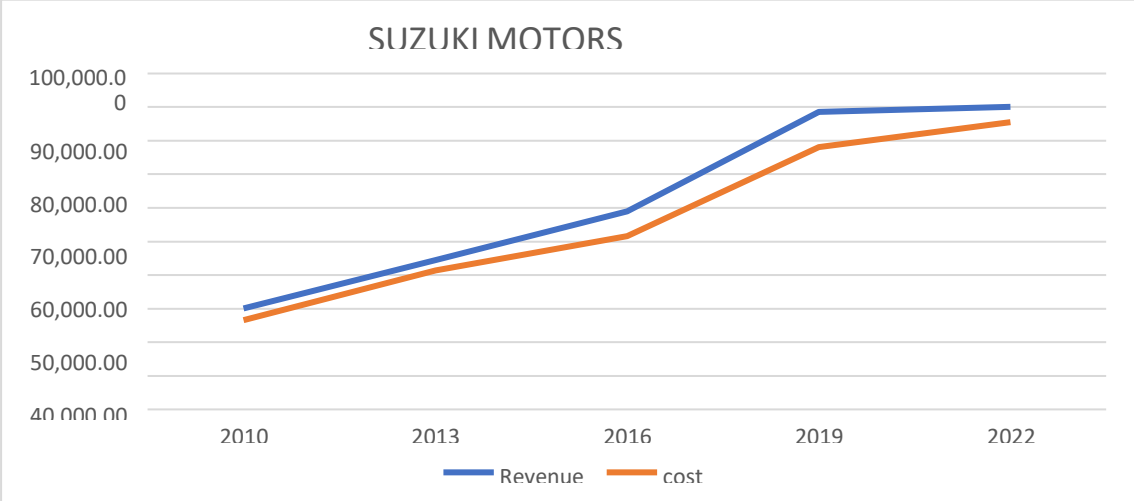
identity, personalization, and marketing are also gaining more attention on their own.

16. N. Kamala et al. (2020) [13] in their study concluded that "Maruti Suzuki India Limited" plays an important role among automobile manufacturers in the automobile industry. Hyundai, Honda, Ford etc. Big competitors like. However, Maruti has identified different factors that make people choose Maruti Suzuki cars. The company has launched new models with advanced technology to attract customers. After-sales service can be considered as an important factor before purchasing a car. Therefore, they focus on offering after-sales service at a lower price than their competitors.

Problem Statement:

1. How has the implementation of robotics and automation affected the manufacturing operations at Maruti Suzuki?
2. What are the expenditure patterns before and after the implementation of robotics at Maruti Suzuki?
3. How have policies regarding human employment been impacted by the integration of robotics at Maruti Suzuki?



Source: https://www.moneycontrol.com/financials/marutisuzukiindia/profit-lossVI/MS24

The graph reveals a sharp rise in revenue from 2016 to 2019, following the introduction of technological advancements and robotics after 2013. This increase reflects the optimization and improved productivity brought about by these technologies. The data clearly illustrates how the implementation of advanced technology, particularly robotics, has significantly boosted revenue during this period, highlighting its effectiveness in enhancing overall performance.

The incorporation of advanced technology into the workplace brings forth a range of considerations that cannot be ignored. Among these are the initial investment required, potential job displacement, technical hurdles, the existing skills gap, and a growing reliance on technology. These factors have a significant impacton human resources. On a positive note, this technological shift has resulted in increased efficiency, enhancedquality, improved safety measures, innovation, and the creation of specialized job roles, thereby boosting overall workforce productivity. However, alongside these benefits, human resources must navigate through various challenges. These include social disruptions, environmental impacts, the need for workforce restructuring, and the increase in stress and anxiety among employees. Striking a balance between the advantages of technological progress and the human element of its implementation remains crucial, necessitating strategic planning and empathetic leadership for a seamless integration of technology

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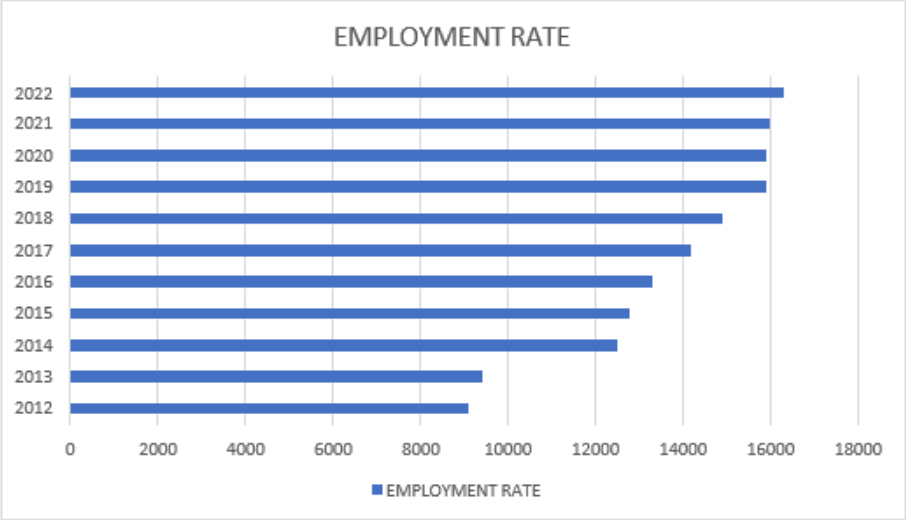
into the workforce.

Employment Rate These Years:

Source: https://tradingeconomics.com/msil:in:employees



The rising employment rate in tandem with the growth of robotics and automation suggests that while technology is transforming the nature of work, it is also creating new job opportunities. This indicates a dynamic shift in the labour market where human skills remain crucial alongside technological advancements.Adaptability and skill development are key for individuals to thrive in this evolving landscape, while policymakers and businesses must prioritize measures to ensure that the benefits of automation are equitablydistributed across society.

Problem Statement Findings:

- The introduction of robotics and automation within Maruti Suzuki's manufacturing operations has yielded significant enhancements in efficiency, precision, and safety across the production chain. These technological advancements have revolutionized various facets of vehicle production, spanningfrom design and engineering to assembly, painting, quality control, and final inspection. As a result, Maruti Suzuki has experienced notable improvements in productivity, reduced production lead times,and elevated overall quality standards.
- The strategic integration of over 2,400 robots alongside a workforce of 20,000 employees has redefined expenditure patterns within the company. Initial investments in advanced robotics technologies, characterized by lean and efficient automation systems, have been pivotal in augmentingoperational efficiency, elevating product quality, and fortifying the company's market position. Despite initial apprehensions regarding investment costs, the long-term benefits, including cost-effectiveness and heightened productivity, have amply justified the expenditure. This strategic shift has empowered Maruti Suzuki to achieve global benchmarks in quality while concurrently bolstering production capacities, thereby fostering revenue growth and reinforcing competitive positioning.
- Importantly, the adoption of robotics and automation has not precipitated adverse effects on employment policies at Maruti Suzuki. Rather, the company perceives robotics process automation (RPA) as a catalyst for amplifying employee productivity and job satisfaction. A concerted emphasis on workforce re-skilling and upskilling

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initiatives has been undertaken, engendering new opportunities and roles for employees in domains such as maintenance, programming, and oversight of automated systems. This proactive approach towards human capital development underscores Maruti Suzuki's commitment to mitigating potential employment impacts arising from automation. In essence, the assimilation of robotics and automation within Maruti Suzuki's operations has engendered a paradigm shift in employment policies, characterized by a steadfast focus on workforce development and alignment with technological advancements.

Suggestion:

- Investment in Reskilling and Upskilling: We need to make sure our workers are equipped with the right skills for the future. That means offering training programs to help them adjust to new technologies. We want them to feel confident in operating and maintaining automated systems.
- Promotion of Technological Literacy: Not everyone has had the same access to education, especially in rural areas. We should focus on teaching people about technology, so they're not left behind. This could involve partnerships with schools and vocational training programs.
- Incentives for Adoption of Automation: We want companies like Maruti Suzuki to embrace automation without leaving workers in the lurch. Offering tax breaks or subsidies could encourage them to investin automation while keeping people employed.
- Support for Small and Medium Enterprises (SMEs): Small businesses might need a bit of extra help to get on board with automation. We could provide financial assistance or technical support to make it easier for them to adopt new technologies.
- Labour Market Policies: If people do lose their jobs due to automation, we need safety nets in place. That could mean helping them find new jobs, providing unemployment benefits, or offering retrainingprograms.
- Regulation and Oversight: We cannot let companies exploit workers or cut corners on safety. There should be rules in place to make sure automation is implemented ethically and responsibly.
- Collaboration between Industry and Government: Everyone needs to work together on this. That means bringing together businesses, government agencies, and educators to figure out the best way forward. Task forces and research projects could help us stay on track.
- By focusing on these areas, we can make sure that automation benefits everyone, not just a select few. We want to create a future where technology helps us all thrive.

Conclusion:

From the above discussions have shed light on diverse perspectives and intricate analyses, fostering a deeper understanding of complex issues. We've emphasized critical thinking and open-mindedness, recognizing the significance of ongoing discourse and learning. Let's carry forward the knowledge gained, embracing growth and transformation. As we navigate our world, let's remain committed to curiosity, empathy, and collaboration. Thank you for joining this journey of exploration. Together, let's seek understanding and strive for a brighter tomorrow.

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