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Challenges in Manpower Management: Discuss The Challenges Faced by the Automotive Industry in Managing Manpower Due to Rigid Labor Laws and Complex Legal Systems, Especially Concerning Temporary Increases in Workforce to Meet Demand Fluctuations.

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Abstract

The automotive industry is at the forefront of technological innovation and economic growth. However, it faces significant challenges in manpower management, particularly due to rigid labor laws and complex legal systems. These challenges are exacerbated when addressing temporary workforce increases to meet demand fluctuations. This paper aims to discuss the multifaceted issues that arise in the context of labor flexibility, talent acquisition, and retention strategies within the automotive sector. Firstly, the industry contends with the difficulty of attracting and retaining talent in a competitive landscape where technology companies and startups often offer more appealing opportunities. The rapid pace of technological advancements demands a workforce that is adaptable and skilled in new and evolving competencies. However, traditional labor laws often do not accommodate the flexible arrangements required to attract such talent. Secondly, the high turnover rate within the automotive industry further complicates manpower management. The need to cultivate leaders from within is hindered by generational differences and a redundant skill set that is increasingly becoming automated. This situation is compounded by the industry's struggle to maintain employee health and safety, which is paramount given the physical nature of manufacturing jobs. Lastly, the legal complexities associated with temporary staffing to manage demand peaks present a significant hurdle. The industry must navigate a labyrinth of employment regulations that vary by region and often restrict the ability to swiftly adjust workforce levels in response to market needs. The automotive industry must develop robust strategies to overcome these challenges. This includes fostering organizational resilience, reimagining talent management, and advocating for labor law reforms that reflect the dynamic nature of the industry and its workforce requirements. The ability to adapt to these challenges will be a determining factor in the industry's capacity to sustain innovation and growth in the coming years.

Keywords: Internal Labor Flexibility, Organizational Performance, Flexibility, Automotive Industry, Human Resources**.**

Introduction

The Indian automotive sector has been a bellwether for the country's economic health. In the past, it faced significant challenges, including a dip in commercial vehicle (CV) sales due to regulatory changes in axle-load norms. This decline was akin to a small fire in 2018 but escalated into a larger crisis—the most severe in two decades. Factors such as credit availability reduction, slowed demand (especially in infrastructure and mining), and discretionary spending drops contributed to the decline in auto sales. Just as the industry was poised for recovery in early 2020, the COVID-19 pandemic struck, disrupting demand and affecting the intricately connected automotive supply chains. Labor Laws and Manpower Management - Rigid labor laws have posed challenges for the automotive industry. These laws often limit flexibility in workforce management, making it difficult to respond swiftly to demand fluctuations. Temporary increases in workforce to meet surges in demand require navigating complex legal systems. Balancing contractual employment, temporary hires, and permanent staff becomes critical. The industry's 37 million direct and indirect jobs are at stake when vehicle sales decline. Recent Developments and Growth Potential in despite the ongoing challenges posed by COVID-19, the Indian automotive industry is showing resilience. Recent tailwinds include: Global supply-chain rebalancing: Opportunities arise as companies seek to diversify their supply chains. Government incentives for exports and these encourage growth and competitiveness. Technology disruptions: These create new spaces for innovation and value creation. The sector is expected to generate 65 million new jobs within India by 2026 as production increases. The Indian automotive industry's journey has been marked by challenges, but it continues to evolve, adapt, and contribute significantly to the nation's economy and employment landscape.

The automotive industry operates across various states and countries, each with its own labor laws, regulations, and standards. This diversity poses a significant challenge for employers. For instance, what is permissible in one state may be prohibited in another. The automotive sector experiences demand fluctuations due to seasonal variations, market dynamics, and product launches. During peak production periods, manufacturers often need to ramp up their workforce temporarily. However, rigid labor laws can hinder the smooth hiring and release of temporary workers. Automotive companies employ a mix of permanent, contract, and temporary workers. Each category has distinct legal implications. Crafting employment contracts that align with labor laws, protect workers' rights, and meet business needs requires careful consideration. Unions play a significant role in the automotive industry. Collective bargaining agreements govern wages, working hours, benefits, and dispute resolution. Navigating negotiations with unions while adhering to legal requirements can be challenging. Automotive manufacturing involves hazardous processes and materials. Employers must comply with stringent health and safety regulations to protect workers. Failure to do so can result in legal penalties, reputational damage, and harm to employees.

Objectives

1. Rigid Labour Laws: This includes examining the impact of unionization, collective bargaining agreements, and labour protection regulations that may hinder rapid workforce adjustments.
2. Complex Legal Systems: Explore the complexities of legal systems that govern employment and how they affect the automotive industry's ability to manage manpower efficiently.
3. Temporary Workforce Management: Assess the strategies used by automotive companies to manage temporary labour, including the sourcing, hiring, and training of such workers.

4. Demand Fluctuations: Examine the causes of demand fluctuations in the automotive industry and how they necessitate changes in workforce levels.
5. Talent Acquisition and Retention: Analyse the challenges in attracting and retaining talent in the automotive industry, especially for high-tech roles that are critical for future growth.

Challenges

The automotive industry operates in a dynamic environment, where workforce management plays a crucial role. However, several challenges hinder efficient manpower management:

Labor Laws and Regulations:

Rigid labor laws can restrict flexibility in hiring, firing, and adjusting workforce levels. These laws often prioritize employee protection, but they can make it challenging for companies to adapt swiftly to changing demand. Complex legal systems across different regions or countries add layers of bureaucracy. Compliance with various regulations becomes cumbersome, affecting workforce planning.

Temporary Workforce Fluctuations:

Automotive manufacturers often face seasonal demand variations. For instance, during new model launches or holiday seasons, demand surges. Managing temporary workforce increases during these peaks requires agility. Contract workers, temporary staff, and seasonal employees are essential for meeting short-term demand spikes. However, legal restrictions and administrative processes can hinder their quick deployment.

Supply Chain Disruptions:

The automotive supply chain is intricate, involving multiple tiers of suppliers. Disruptions (such as raw material shortages, port delays, or transportation bottlenecks) impact production schedules. When supply chain disruptions occur, workforce planning must adapt. However, rigid labor laws may hinder swift adjustments.

Labor Shortages:

Finding skilled workers is a persistent challenge. The automotive industry requires specialized skills, from assembly line workers to engineers. Labor shortages affect production capacity. Companies must explore innovative recruitment strategies and invest in training programs.

Freight and Logistics Challenges:

Shipping costs have surged due to container shortages, port congestion, and increased freight rates. Managing logistics efficiently is critical. Labor shortages in trucking and shipping industries compound the problem. Delays in transporting goods impact production schedules.

Risk Sharing and Flexibility:

Suppliers need to negotiate contracts that allow for risk sharing. This includes flexibility in pricing, inventory management, and freight costs. Traditional operational and contracting practices may need updates to enhance flexibility in an unpredictable world.

Rigid labor laws and complex legal systems. Let's delve into these issues:

Labor Shortages and Demand Fluctuations:

Shortages of Skilled Labor: Finding skilled workers with the necessary expertise in automotive manufacturing can be challenging. The industry requires specialized skills in areas such as assembly, maintenance, and quality control.

Temporary Workforce Increases:
To meet sudden spikes in demand (e.g., during new model launches or seasonal variations), automotive companies often need to hire temporary workers. However, navigating legal requirements for hiring, training, and managing these temporary employees can be complex.

Rigid Labor Laws and Regulations:
Restrictions on Hiring and Firing: Labor laws in various countries impose strict regulations on hiring and firing practices. These laws protect workers' rights but can hinder flexibility in workforce management.
Fixed-Term Contracts: When hiring temporary workers, companies must comply with rules regarding fixed-term contracts. These contracts have limitations on duration and renewal, affecting the ability to adjust the workforce dynamically.
Collective Bargaining Agreements: Automotive companies often deal with unions and collective bargaining agreements. These agreements dictate terms related to wages, working hours, benefits, and job security. Adhering to these agreements while managing workforce fluctuations can be intricate.

Legal Compliance and Documentation:
Record Keeping: Strict documentation requirements exist for employee records, payroll, and compliance with labor laws. Failing to maintain accurate records can lead to legal penalties.
Health and Safety Regulations: Ensuring a safe working environment is essential. Compliance with health and safety regulations involves continuous monitoring, training, and adherence to protocols.
Work Hour Restrictions: Labor laws limit the number of hours an employee can work per day or week. Managing overtime, breaks, and rest periods while meeting production demands can be a balancing act.

Cross-Border Operations:
Global Supply Chains: Automotive manufacturers operate globally, sourcing components and assembling vehicles across borders. Understanding and complying with labor laws in different countries adds complexity.
Visa and Work Permit Issues: When hiring foreign workers or transferring employees across borders, obtaining work permits and visas involves legal procedures. Missteps can disrupt operations.

Adapting to Technological Changes:
Automation and Robotics: As the industry embraces automation, companies need to retrain existing workers or hire new talent with relevant skills. Legal considerations include worker safety, intellectual property, and data privacy.

Balancing Flexibility and Stability:
Flexibility: Automotive companies must balance the need for a flexible workforce (to adapt to market changes) with providing job stability and fair treatment to employees.
Training and Skill Development: Investing in employee training ensures a skilled workforce but requires navigating legal aspects related to training programs and certifications.
In summary, the automotive industry faces multifaceted challenges in managing manpower due to legal complexities, labor shortages, and the need for workforce flexibility.

Here are some strategies they can consider:

Data-Driven Forecasting: Historical Data: Analyze historical sales data, seasonality, and trends. Use statistical models to predict future demand.

Collaborate with Suppliers: Share forecasts with suppliers to align production schedules.

Flexible Production Capacity: Scalability Design production lines that can scale up or down quickly. Modular assembly systems allow adjustments based on demand.

Contract Manufacturing: Partner with contract manufacturers to handle overflow production during peak periods.

Inventory Management: Just-in-Time (JIT): Maintain lean inventory levels. JIT systems reduce storage costs and minimize excess stock.

Safety Stock: Keep safety stock for unexpected spikes in demand.

Agile Workforce Planning:

Cross-Training: Train employees for multiple roles. This flexibility helps during demand surges. **Temporary Staff:** Establish relationships with temporary staffing agencies. Quickly hire additional workers when needed.

Supply Chain Resilience: Diverse Suppliers: Work with multiple suppliers to mitigate risks. Geopolitical events or natural disasters can disrupt supply chains.

Risk Assessment: Identify critical components and assess their vulnerability.

Collaboration with Dealerships:

Communication: Regularly communicate with dealerships. Understand local demand patterns and adjust production accordingly.

Incentives: Offer incentives to dealerships during slow periods to clear excess inventory.

Scenario Planning:

What-If Analysis: Simulate scenarios (e.g., sudden demand surge, supply chain disruption). Develop contingency plans.

Cross-Functional Teams: Involve cross-functional teams in scenario planning.

Market Intelligence:

Consumer Trends: Monitor consumer preferences and emerging technologies.

Competitor Analysis: Understand competitors' strategies and market positioning.

Collaboration with Finance Teams:

Budget Allocation: Allocate resources for capacity expansion or workforce adjustments.

Financial Reserves: Maintain reserves for unexpected events.

Adaptive Pricing Strategies:

Dynamic Pricing: Adjust prices based on demand. Offer discounts during slow periods.

Promotions: Run targeted promotions to stimulate demand.

Literature Review

The article written by AUSTIN-EGOLE, Ifeyinwa Stella1, IHERIOHANMA, E. B. J2, NWOKORIE, Chinedu3 "Flexible Working Arrangements and Organizational Performance: An Overview" 2020. The researchers This essay aims to illustrate the different varieties and fundamental ideas of flexible work arrangements. Flexible workarounds, or FWAs, have grown more and more important in the workplace in the 21st century. Many businesses provide flexible work schedules to their employees because of these benefits. Relates to providing greater flexibility to both employers and employees. One of the most common benefits is improved organizational performance thanks to considerably superior personnel. As a result, work-life balance is made easy. Lower stress levels, enhanced health of employees, decreased absenteeism, and decreased employee turnover It's important to distinguish between flexible work arrangements driven by employers and those driven by employees. It is believed that an employee benefit-focused system will encourage people to work more. Employers want to figure out how to put these kinds of procedures into place since they lead to better organizational outcomes including decreased employee espionage, turnover, and absenteeism. an arrangement that benefits the employer significantly, especially usual arrangements like shift work and weekend work, Money and the effects of non-financial organizations are generally negatively correlated with fixed-term contracts and the number of yearly hours worked. **[1]**

The article written by Daisy Valle Enriquea "Advantages and difficulties of implementing Industry 4.0 technologies for labor flexibility:" 2021. The researchers It is well known that one of the most important components of industrial flexibility for competitive advantage is labor flexibility. in the commercial area. In the context of Industry 4.0, where personnel, products, machinery, information, and communication technology (ICT) systems, and other components work together to create an intelligent network, this becomes even more crucial. Numerous scholarly studies examine the possible advantages that Industry 4.0 technologies may offer to laborers. Concerns remain on the nature of labor in the future. The growing adoption of digital technology and the flexibility it provides in fulfilling the rigorous requirements of work-related responsibilities for companies. The purpose of this study is to ascertain the advantages and difficulties that operators perceive with the application of these technologies for Industry 4.0. This was achieved by reviewing the literature. Collaborative robotics (CR) is a useful tool for flexibility since it relieves the operator of the most labor-intensive activities, allowing them to perform other jobs. This makes the robot more versatile. The goal of this study is to evaluate the advantages and disadvantages of collaborative robotics, augmented reality, and virtual reality through a review of the literature in order to improve labor flexibility.**[2]**

The article written by panelR. Rajesh "Flexible business strategies to enhance resilience in manufacturing supply chains: An empirical study" 2021. The researchers Resilience in supply chains and manufacturing are examined in light of the ongoing Covid-19 pandemic crisis. The contribution of complexity and flexibility to the development of resilience in supply chains and enterprises is a topic of continuous discussion among practitioners. In this paper, we examine flexible supply chain operations, demand, and supply side viewpoints that facilitate flexibility in corporate strategies. Five key adaptable business methods were used in this study, and one building block was recommended for each. In this work, we analyze the relationships between the characteristics using survey-based research from electronic manufacturing businesses, and we reduce the dimensions of the constructs using factor analysis. Using pertinent statistical indicators, a number of preliminary tests were conducted on the gathered data to guarantee its validity, reliability, and sufficiency. Path coefficients were found after the measurement

model was transformed into a structural model. Latent variables that contribute to supply chain flexibility were discovered to be independent predictors of flexibility through route analysis. The findings are helpful for managers in their decision-making about the application of flexibility and the enhancement of supply chain flexibility. Because of crisis-related situations, resilience and flexibility are becoming more important in manufacturing and supply chain activities. This work explores and establishes the suitability of flexible business practices to improve the resilience of supply networks.**[3]**

The article written by Ageel Abdulaziz Alogla "The Impact of Additive Manufacturing on the Flexibility of a Manufacturing Supply Chain" 2021. The researchers Supply chains are under increasing pressure to deliver customized items quickly in response to changes in consumer demand. The supply chain concept needs to be developed. One crucial quality is flexibility. Businesses are considering the use of additive manufacturing to solve problems. A calculated move that makes this possible. Supply chain flexibility has four primary components: distribution, volume, mix, and product innovation introduction. In this case study, inter-process comparison is applied using data from a manufacturing company that makes pipe fittings using injection molding (IM). The chain of supply using instant messaging. This case study demonstrates enhanced delivery flexibility and scale. This initiative will provide relevant information on the effects of implementing AM on the supply chain, enabling decision-makers to make decisions quickly. Flexibility in a variety of sudden disruption situations, such as demand turbulence and uncertainty, Lead time compression and product variety **[4]**

The article written by Hamid Jafari, Hadi Ghaderi, Mohsin Malik & Ednilson Bernardes "The effects of supply chain flexibility on customer responsiveness: the moderating role of innovation orientation" 2022. The researchers We investigate the connection between supply chain (SC) flexibility and responsiveness. contribution to the study In order to understand how SC flexibility affects consumer response and whether a firm's innovation orientation changes this relationship, the literature examines SC flexibility as a multidimensional phenomenon. About the advantages of supply chain adaptability elements for customer reaction. adaptability both internally and in reaction to clients. Experimental validation of the connection between Multi-Dimensional SC Being flexible and customer-focused Inspired by Originality Orientation is a novel addition to theory and practice.**[5]**

Significance

Understanding Labour Laws and Legal Systems:

Investigate the specific labour laws and legal frameworks that impact the automotive industry. Explore how these regulations vary across different regions and countries.

Analyse the challenges posed by rigid labour laws and complex legal systems, especially when it comes to hiring, firing, and managing temporary workers.

Temporary Workforce Management:

Examine strategies employed by automotive companies to handle temporary workforce fluctuations. This includes hiring additional staff during peak demand periods and downsizing during slower times. Explore the effectiveness of flexible employment contracts, temporary agencies, and outsourcing in managing workforce fluctuations.

Impact on Productivity and Efficiency:

Assess how rigid labour laws and legal complexities affect overall productivity and operational efficiency within automotive manufacturing plants. Investigate whether these regulations hinder or enhance workforce performance and production output.

Cost Implications:
Analyse the financial implications of complying with labour laws and legal requirements. Consider costs related to hiring, training, benefits, and compliance. Compare the cost-effectiveness of maintaining a permanent workforce versus utilizing temporary labour.

Case Studies and Best Practices:
Collect case studies from automotive companies that have successfully navigated labour law challenges. Highlight best practices in managing manpower under such conditions. Identify innovative approaches, negotiation strategies, and collaborative efforts between industry stakeholders and regulatory bodies.

Employee Satisfaction and Well-Being:
Investigate how rigid labour laws impact employee satisfaction, job security, and work-life balance. Explore ways to mitigate negative effects on employee well-being while adhering to legal requirements.

Legal Complexities

The automotive industry plays a crucial role in the Indian economy, serving as a bellwether for its overall health. When the commercial-vehicle (CV) sales declined in 2012 and 2019, it signalled economic challenges. Conversely, a surge in passenger-vehicle (PV) and two-wheeler (2W) sales indicated positive economic trends in 2010. The automotive sector contributes 10 to 12 percent of India's gross value added (GVA) in manufacturing, making any decline in this area significantly impact the country's economic outcomes.

However, the automotive industry has faced several challenges. In 2018, a regulatory change in axle-load norms led to a dip in CV sales, which escalated into a significant downturn. Factors such as reduced credit availability, slowed demand (especially in infrastructure and mining), and decreased discretionary spending contributed to the decline in auto sales.

Despite these challenges, there are positive signs. The easing of government travel restrictions, a good harvest, and festive season demand boosted sales in late 2020. Both 2Ws and PVs showed a recovery in month-over-month sales. Additionally, the industry benefits from global supply-chain rebalancing, government incentives for exports, and technology disruptions.

In summary, understanding the dynamics of the automotive industry, especially in terms of managing manpower, is critical for sustained growth and resilience. Labour laws and legal complexities play a pivotal role in shaping workforce strategies, particularly during temporary increases to meet demand fluctuations.

Research GAP

1. Impact of Labour Law Reforms: There is a need for research on the impact of recent or proposed labour law reforms on the automotive industry's ability to manage manpower flexibly. This includes understanding how changes in legislation could potentially ease or complicate the hiring and laying off of temporary workers[1].
2. Global vs. Local Legal Systems: Comparative studies on how different countries' legal systems affect the automotive industry's manpower management strategies could highlight best practices and areas for improvement. This gap addresses the need for a cross-cultural analysis of legal complexities[2].
3. Technology Integration in Workforce Management: Research is needed on how emerging technologies can be integrated into workforce management to mitigate the challenges posed by rigid labour laws.
4. Skill Gap Analysis: There is a gap in research regarding the specific skills that are lacking in the

automotive workforce, which are necessary to adapt to the changing technological landscape and legal requirements. This research could guide targeted training and education programs[3].

5. Temporary Workforce Utilization: Studies on the effectiveness of current strategies for utilizing temporary workers in the automotive industry are lacking. Research could focus on the cost-benefit analysis of temporary vs. permanent workforce in fluctuating market conditions[2].
6. Employee Well-being and Legal Constraints: Research is needed on how the automotive industry can ensure the well-being of its workforce, both temporary and permanent, within the constraints of rigid labour laws.

By addressing these research gaps, the paper could contribute significantly to the body of knowledge on manpower management in the automotive industry and provide insights for policymakers and industry leaders to develop more effective strategies.

Let's delve into some relevant findings:

United States (US) Auto Industry:

A recent report from the University of Oregon's Labor Education and Research Center highlights the critical turning point faced by the US auto industry. As the industry transitions from gasoline-powered to electric vehicles (EVs), the quality of jobs it provides becomes a central concern. Labor law reform plays a pivotal role in shaping the future of auto manufacturing jobs. Specifically, the right of employees to organize labor unions without fear or intimidation significantly impacts job quality. Non-union auto employers have engaged in aggressive tactics, including hiring "union avoidance" consultants who employ both legal and illegal means to prevent collective bargaining. Ensuring that the emerging EV industry guarantees employees' right to organize unions is essential for sustaining family-wage jobs.

Indian Automotive Industry:

The Indian automotive sector serves as a bellwether for the country's economic state. Changes in commercial-vehicle (CV) and passenger-vehicle (PV) sales often foreshadow economic trends.

While this context doesn't directly address labor laws, it underscores the industry's sensitivity to market dynamics and the need for agile workforce management.

Japan's Automobile Industry:

A study analyzing HR practices in Japan's major automobile companies reveals incremental changes in key policies, such as compensation and ranking systems. However, traditional long-term employment practices persist. The Japanese auto industry has adopted global HR policies earlier than comparable sectors, emphasizing the importance of adaptable workforce strategies.

In summary, the interplay between labor laws, workforce flexibility, and industry transformation presents a rich area for research. Investigating how legal frameworks impact workforce management during demand fluctuations can contribute valuable insights to scholarly discourse.

Conclusions

The automotive industry's challenges in manpower management are multifaceted and deeply influenced by rigid labour laws and complex legal systems. These challenges are particularly pronounced when addressing temporary workforce increases to meet demand fluctuations. The research has highlighted several critical areas: Rigid Labour Laws: The inflexibility of labour laws poses significant obstacles for automotive companies, limiting their ability to swiftly adapt to market changes. This rigidity can lead to inefficiencies and increased operational costs. Complex Legal Systems: Navigating the intricate legal

landscape requires substantial resources and expertise, which can detract from the core focus of automotive companies on innovation and competitiveness. Temporary Workforce Management: While temporary workers provide a solution to fluctuating demands, managing this segment of the workforce comes with its own set of challenges, including legal compliance, training, and integration into the company culture. Demand Fluctuations: The unpredictable nature of consumer demand in the automotive sector necessitates a flexible and responsive workforce management strategy, which is often hampered by the legal constraints. The automotive industry must strive for a balance between compliance with labor laws and the agility required to remain competitive in a rapidly evolving market. This involves advocating for more adaptable labor regulations, investing in workforce planning technologies, and fostering a culture that values continuous learning and adaptability. Organizational resilience has emerged as a key theme, with companies that can turn challenges into opportunities positioning themselves for success. Ultimately, the automotive industry's ability to manage manpower effectively will be a significant determinant of its future success. As such, ongoing research and dialogue between industry stakeholders, policymakers, and legal experts are essential to address these challenges and pave the way for a more resilient and dynamic automotive sector.

References

1. AUSTIN-EGOLE,Ifeyinwa Stella1, IHERIOHANMA, E.B.J2, NWOKORIE, Chinedu3 (2020) "Flexible Working Arrangments and Organizational Performance IOSR Journal Of Humanities And Social Science (IOSR-JHSS) e-ISSN: 2279-0837, p-ISSN: 2279-0845. www.iosrjournals.org **[1]**
2. Daisy Valle Enriquea,b, João Carlos M. Druczkoskia, Tânia Miranda Limaa, Fernando Charrua-Santosa,(2020) ''Advantages and difficulties of implementing Industry 4.0 technologies for labor flexibility'' Procedia Computer Science 181 347–352 www.sciencedirect.com**[2]**
3. R. Rajesh (2021) ''Flexible business strategies to enhance resilience in manufacturing supply chains: An empirical study''https://doi.org/10.1016/j.jmsy.2020.10.010Get rights and content Journal of Manufacturing Systems **[3]**
4. Ageel Abdulaziz Alogla 1,2,*, Martin Baumers 1, Christopher Tuck 1 and Waiel Elmadih 1(2021) ''The Impact of Additive Manufacturing on the Flexibility of a Manufacturing Supply Chain''Appl. Sci. 2021, 11, 3707. https://doi.org/10.3390/app11083707**[4]**
5. Hamid Jafari, Hadi Ghaderi, Mohsin Malik & Ednilson Bernardes(2022) ''The effects of supply chain flexibility on customer responsiveness: the moderating role of innovation orientation''the moderating role of innovation orientation, Production Planning & Control, 34:16, 1543-1561, DOI:10.1080/09537287.2022.2028030 **[5]**
6. Russell Hensley, Hans-Werner Kaas, and Moritz (2020) " Winning the race for talent: A road map for the automotive industry''https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/winning-the-race-for-talent-a-road-map-for-the-automotive-industry[6]
7. Mercer. Inside Employees' "Minds in the Technology Industry" 2022. The automotive industry is experiencing a profound shift. Talent is in the driver's seat, and automotive manufacturers and suppliers need new skills for future success Available at https://www.mercer.us/content/dam/mercer/attachments/north-america/us/us2022- Technology-industry-summary.pdf. [7]
8. ERNST AND YOUNG LLP.PUBLISH INDIA (2019)knowledge-products/human-resource-and-skill-requirement automotive-sector-2026https://skillsip.nsdcindia.org [8]

9. European Commission 2. McKinsey 3. PwC (2024) "The Reinvention of the Automobile" https://workforce-resources.manpowergroup.com/white-papers/automotive-outlook [9]