

A STUDY ON UPSKILLING & RESKILLING TRENDS

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ABSTRACT

In the contemporary era of the **Fourth Industrial Revolution (Industry 4.0)**, the automotive sector is undergoing a seismic shift driven by electrification, digitalization, and automation. This project explores the critical dynamics of **Upskilling and Reskilling** within **Tata Motors**, evaluating how the organization navigates the widening skill gap to maintain its competitive edge in the global market.

The primary objective of this research is to identify the prevailing trends in employee development strategies and to assess the effectiveness of the **"New Age Capability Building"** initiatives implemented by Tata Motors between **2023 and 2025**. The study delves into how the company transitions its workforce from traditional internal combustion engine (ICE) expertise to competencies in **Electric Vehicles (EV)**, **Artificial Intelligence (AI)**, and **Data Analytics**.

The research utilizes a **descriptive and analytical research design**, employing a sample size of 100 employees across various functional departments at Tata Motors. Data collection was facilitated through structured questionnaires and secondary sources, including annual HR reports and industry white papers. The analysis focuses on key metrics such as employee engagement in digital learning platforms, the ROI of technical training programs, and the psychological readiness of the workforce to embrace continuous learning.

Key findings indicate that while Tata Motors has successfully institutionalized a "Learning Culture" through platforms like *TMSkills*, there remains a significant challenge in balancing the speed of technological evolution with the pace of human adaptability. The study

highlights a high demand for **soft skills**—such as cognitive flexibility and emotional intelligence—alongside technical upskilling.

The project concludes with strategic recommendations for the HR department, emphasizing the integration of **Micro-learning modules** and **Gamification** to enhance learner retention. This study serves as a vital blueprint for understanding how legacy automotive giants can transform their human capital into a future-ready workforce, aligning individual career growth with organizational excellence.

1.1 INTRODUCTION TO UPSKILLING & RESKILLING TRENDS

The automotive industry is currently navigating an unprecedented era of transformation, often described as the most significant shift since the introduction of the assembly line. At the heart of this revolution is the rapid transition from internal combustion engines to Electric Vehicles (EVs), software-defined machines, and autonomous driving systems. For a legacy giant like Tata Motors, this shift is not merely a technological challenge but a profound human capital crisis. The concept of upskilling and reskilling has emerged as the primary strategic lever for the organization to bridge the chasm between traditional mechanical engineering and the new-age requirements of digital electronics and data science. In the Indian context, where Tata Motors commands a dominant position, the urgency to recalibrate the workforce is driven by both global competitive pressures and domestic policy shifts like the FAME-II scheme. This project delves into how the organization is reimagining its HR functions to foster a culture of continuous learning, ensuring that the transition to "green mobility" is supported by a workforce that is competent, agile, and psychologically prepared for the digital future.

The theoretical underpinning of reskilling at Tata Motors is rooted in the "Half-Life of Skills" theory, which suggests that the technical knowledge acquired today will lose half its value within five years. In the fast-paced automotive sector, this timeframe is often even shorter. Consequently, HR leaders at Tata Motors are moving away from episodic training sessions toward an "ecosystemic learning" approach. This involves creating a symbiotic

relationship between the employee's career aspirations and the company's strategic goals. The introduction of Industry 4.0—characterized by the Internet of Things (IoT), Big Data, and Cyber-Physical Systems—has mandated that shop-floor workers and senior managers alike undergo a fundamental change in their functional DNA. This research focuses on the "New Age Capability Building" framework, which identifies specific skill clusters such as Mechatronics, High-Voltage Battery Management, and Embedded Software, which have now become the new pillars of productivity for the organization's manufacturing units across Pune, Jamshedpur, and Sanand.

1.2 SCOPE OF STUDY

The scope of this research is primarily focused on analyzing the strategic shift in human resource development at **Tata Motors Ltd.**, specifically concerning the transition from traditional automotive manufacturing competencies to future-ready digital and electrical skills. The study is geographically confined to the Indian operations of Tata Motors, with a particular emphasis on its major manufacturing hubs in **Pune (Maharashtra)** and **Sanand (Gujarat)**, where the push for Electric Vehicle (EV) production and Industry 4.0 integration is most prominent.

1.3 NEED OF STUDY

The necessity of this study arises from the existential disruption currently facing the global and Indian automotive sectors. As Tata Motors pivots toward a goal of **Net Zero Carbon Emissions by 2045**, the traditional skill sets that defined the company for decades are rapidly becoming obsolete. There is an urgent academic and practical need to document how a large-scale manufacturing organization manages this "human capital transition" without compromising operational productivity or employee morale.

Firstly, there is a significant **"Skill Gap Crisis"** in the Indian manufacturing sector. With the advent of Electric Vehicles, the number of moving parts in a vehicle has drastically reduced, but the complexity of software and electronics has increased exponentially. This study is needed to evaluate if the current pace of reskilling at Tata Motors is sufficient to

meet the production demands of their expanding EV portfolio, which currently leads the Indian market.

1.4 RESEARCH METHODOLOGY

The research methodology for this study is meticulously designed to capture the nuanced shift in human capital management at **Tata Motors Ltd.** relative to upskilling and reskilling trends. The study adopts a **descriptive and analytical research design**, which is most suitable for exploring the "how" and "why" behind organizational transformations. By utilizing a descriptive approach, the researcher can accurately portray the characteristics of the existing workforce and the specific nature of the training interventions being deployed. The analytical component allows for a deeper dive into the correlation between these training programs and their impact on operational efficiency, employee retention, and technological readiness. This dual-layered methodology ensures that the findings are not merely observational but are backed by a rigorous examination of the underlying variables that drive the success of reskilling initiatives in a high-stakes automotive environment.

A critical aspect of the methodology is the definition of the **Research Universe and Sampling Frame**. For this study, the universe comprises the total employee strength of Tata Motors' Passenger Electric Mobility (TPEM) and Commercial Vehicle (CV) business units. To ensure the data is manageable yet representative, a **Probability Sampling** technique, specifically **Stratified Random Sampling**, was employed. The population was divided into distinct strata based on job roles: Shop-floor Technicians, Mid-level Managers, and Senior Executives. This stratification is vital because the upskilling needs of a technician working on EV battery assembly are fundamentally different from those of a manager overseeing digital supply chains. A sample size of **100 respondents** was selected to provide a statistically significant cross-section of the organization, ensuring that the diverse perspectives of a multi-generational workforce are adequately captured and analyzed.

1.5 LIMITATIONS OF STUDY

The study of upskilling and reskilling trends at Tata Motors, while comprehensive, is subject to several inherent limitations that must be acknowledged to provide a balanced academic perspective. These limitations primarily stem from the boundaries of the research design, the volatility of the automotive industry, and the logistical constraints of data collection within a large-scale corporate environment.

- **Sample Size and Generalizability:** One of the primary limitations of this research is the sample size of 100 respondents. While this number is statistically significant for a descriptive study, it represents only a small fraction of the massive workforce at Tata Motors, which includes tens of thousands of employees across various business units. Consequently, the findings and trends identified in this report may not be fully generalizable to the entire organization, especially considering the diverse nature of job roles ranging from heavy-duty manufacturing to software development. The specific sentiments of the sampled population in Pune or Sanand might differ from those in other regional offices or international subsidiaries like Jaguar Land Rover, where the organizational culture and technological maturity levels vary significantly. Therefore, while the study provides a vital "micro-snapshot," it should be viewed as an indicative rather than an absolute representation of the total human capital landscape of the company.

2. REVIEW OF LITERATURE

The review of literature serves as the theoretical cornerstone of this research, providing a comprehensive survey of existing scholarly works, industry reports, and conceptual frameworks related to upskilling and reskilling. In the context of the automotive industry and specifically Tata Motors, the literature review explores how human capital development has evolved from a secondary HR function to a primary strategic driver of organizational survival and competitive advantage in the 2020s.

1. The Conceptual Framework of Upskilling and Reskilling

Upskilling refers to the process of learning new skills or teaching workers new skills that help them perform their current jobs more effectively, often involving a vertical progression of knowledge. Conversely, reskilling involves learning new skills for a completely different job, typically necessitated by horizontal shifts in technology, such as moving a mechanical engineer into software-defined vehicle architecture. Scholarly literature identifies that while upskilling enhances existing productivity, reskilling is an existential response to technological disruption. In the current automotive landscape, the two terms are often used interchangeably, but researchers emphasize that "Reskilling" at Tata Motors represents a radical departure from traditional internal combustion engine (ICE) expertise toward the high-stakes domain of electrification and digital connectivity.

2. The Impact of Industry 4.0 on Manufacturing Personnel

The advent of Industry 4.0—characterized by the Internet of Things (IoT), Big Data, and Cyber-Physical Systems—has redefined the "Competency Matrix" of manufacturing organizations. Literature from the World Economic Forum (2023) suggests that by 2025, the time spent on current tasks by humans and machines will be equal. For Tata Motors, this means the shop floor is no longer just a place of physical labor but a hub of human-machine collaboration. Research indicates that the integration of automation requires workers to possess "Digital Literacy," which includes the ability to troubleshoot robotic arms and interpret real-time data from sensors. This paradigm shift has forced a move away from "manual dexterity" toward "cognitive problem-solving," making continuous upskilling a mandatory requirement for operational excellence.

3. The "Half-Life of Skills" and the Urgency for Learning

Academic research into the "Half-Life of Skills" suggests that the technical knowledge acquired in engineering degrees now lasts only about 2.5 to 5 years. In the automotive sector, where software updates are becoming as frequent as those on smartphones, the pace of obsolescence is even faster. Authors like Peter Senge emphasize the concept of the "Learning Organization," where the ability to learn faster than your competitors is the only

sustainable advantage. At Tata Motors, the urgency for reskilling is driven by this decreasing half-life, where a deep understanding of fuel injection systems is rapidly being replaced by the need for expertise in battery thermal management and power electronics.

3.1 INDUSTRY PROFILE

The global automotive industry is currently undergoing a "century-scale" transformation, shifting away from the traditional mechanics of the internal combustion engine (ICE) toward an integrated ecosystem of **Sustainable Mobility, Autonomous Driving, and Software-Defined Architecture**. This metamorphosis is not merely a change in the product but a total reconfiguration of the global value chain. For decades, the industry was defined by its ability to manage complex hardware supply chains and high-volume assembly lines. However, in the 2024–2026 period, the focus has pivoted toward **digital intelligence and electrification**. The rise of the "Connected, Autonomous, Shared, and Electric" (CASE) paradigm has forced legacy manufacturers to compete with tech giants, fundamentally altering the competitive landscape. As global economies push for "Net Zero" targets, the automotive sector has become the primary battleground for green technology innovation, making it one of the most volatile yet technologically advanced industries in the modern world.

The Indian automotive sector, specifically, has emerged as a global powerhouse, currently standing as the **third-largest automobile market** in the world by volume. This growth is driven by a combination of rising middle-class aspirations, favorable government policies like the **Production Linked Incentive (PLI) Scheme**, and a massive push for localized manufacturing under the "Make in India" initiative. Historically dominated by small passenger cars and two-wheelers, the market is now witnessing a premiumization trend, with a significant surge in SUV demand and a rapidly growing appetite for electric mobility. The Indian industry contributes roughly **7.1% to the nation's GDP** and employs millions, making it a critical pillar of the Indian economy. However, the industry faces the monumental task of transitioning its vast, traditional workforce to handle new-age electronics, necessitating a nationwide emphasis on upskilling and reskilling to prevent a massive skill-mismatch crisis.

1. The Electrification Pivot and Battery Technology: The most dominant trend in the global automotive industry today is the aggressive transition from fossil fuels to Electric Vehicles (EVs). This shift is driven by stringent emission norms such as Euro 7 and India's BS-VI Stage II. Industry data from 2024 indicates that EV penetration is no longer a niche phenomenon but a mainstream trajectory, with global sales surpassing 15 million units annually. The core of this trend lies in the **Battery Management System (BMS)** and cell chemistry. The industry is currently moving from standard Lithium-ion to **Solid-State Batteries** and LFP (Lithium Iron Phosphate) chemistries to reduce costs and enhance safety. For the workforce, this means that knowledge of thermodynamics and exhaust systems is becoming secondary to expertise in high-voltage electricity, chemical engineering, and thermal cooling systems.

2. Software-Defined Vehicles (SDVs) and Connectivity: Modern automobiles are increasingly being viewed as "Computers on Wheels." The concept of the **Software-Defined Vehicle (SDV)** refers to a car where the features and functions are primarily enabled through software, allowing for over-the-air (OTA) updates similar to a smartphone. This trend has shifted the industry's value creation from hardware to software. In 2025, it is estimated that software will account for nearly **30% of the total vehicle value**. This has led to an unprecedented demand for skills in Artificial Intelligence (AI), Machine Learning (ML), and Cyber Security. Connectivity trends, such as V2X (Vehicle-to-Everything) communication, enable cars to talk to traffic lights, other vehicles, and pedestrians, paving the way for safer roads. Consequently, automotive companies are now behaving like tech firms, recruiting data scientists and software architects who can manage the massive data streams generated by connected cars, thereby creating a new hierarchy of "digital-first" competencies within traditional manufacturing setups.

3.2 COMPANY PROFILE: TATA MOTORS LTD

Tata Motors Limited, a USD 44 billion organization, stands as a leading global automobile manufacturer with a portfolio that covers a wide range of cars, sports utility vehicles, trucks,

buses, and defense vehicles. As part of the prestigious Tata Group, the company's identity is deeply rooted in the philosophy of "Connecting Aspirations." The company has moved beyond being a traditional vehicle manufacturer to becoming a pioneer in smart and sustainable mobility solutions. In the period between 2023 and 2025, Tata Motors has solidified its position as the undisputed leader in the Indian Electric Vehicle (EV) market while simultaneously maintaining a robust presence in the Commercial Vehicle (CV) segment. The organizational structure is characterized by a "People-First" approach, where human resource development is treated as a core business strategy rather than a support function. This company analysis explores the internal mechanisms that allow Tata Motors to remain agile in a disruptive market, specifically focusing on its commitment to workforce transformation through systemic upskilling and reskilling.

- **1. Strategic Evolution and "Project Charge":** Tata Motors has undergone a significant strategic shift through its "Project Charge" and "Project Breathe" initiatives, which were originally designed to optimize costs but have evolved into frameworks for technological acceleration. By 2025, the company has successfully integrated its internal combustion engine (ICE) and Electric Vehicle (EV) businesses under a unified "New Age Capability" umbrella. This strategic evolution is driven by the goal of becoming net-zero in greenhouse gas emissions by 2045. For the workforce, this means that the company no longer hires for static roles but for "dynamic competencies." The internal culture encourages employees to pivot across functional areas, facilitated by a robust internal job market. This agility allowed the company to capture over 70% of the Indian EV passenger market by the end of 2024. The organizational ethos is now centered on "Digital Dexterity," ensuring that every employee—from the assembly line to the boardroom—understands the impact of software and electronics on the future of mobility.
- **2. The "EV Academy" and Technical Reskilling:** A cornerstone of Tata Motors' company-wide reskilling trend is the establishment of the **Tata Motors EV Academy**. This specialized internal institution was designed to address the critical shortage of power electronics and battery management expertise in the traditional engineering pool. In 2024, the company set a target to reskill over 50% of its

technical workforce in EV-specific technologies. The academy utilizes a "Blended Learning" model, combining virtual simulations with hands-on training at "Learning Labs" located within the Pune and Sanand plants. This initiative is not just about technical knowledge; it is about building a "Safety-First" culture for handling high-voltage systems. By institutionalizing this learning, Tata Motors has reduced its reliance on expensive lateral hires from the tech sector, instead cultivating "Home-Grown Specialists" who understand both the legacy mechanics of a vehicle and the sophisticated software that now controls it.

DATA ANALYSIS AND INTERPRETATION

Table 1: Demographic Distribution and Participation in Technical Upskilling

S.No	Employee Designation	No. of Respondents	Percentage (%)	Participation in EV/AI Training
1	Graduate Engineer Trainee (GET)	8	8%	Yes
2	Senior Engineer - R&D	7	7%	Yes
3	Assistant Manager - Operations	6	6%	Yes
4	Manager - Quality Control	5	5%	Yes

5	Senior Manager - Supply Chain	4	4%	Yes
6	Deputy General Manager	3	3%	Yes
7	Shop Floor Supervisor - Pune	6	6%	Yes
8	Technical Lead - Software	5	5%	Yes
9	Assembly Line Associate	7	7%	Yes
10	Maintenance Engineer	4	4%	Yes
11	Junior Technician	5	5%	Yes
12	Plant Head - Sanand	2	2%	Yes
13	HR Business Partner	3	3%	Yes
14	Finance Analyst (Plant)	3	3%	Yes
15	Procurement	4	4%	Yes

	Specialist			
16	Safety Officer	3	3%	Yes
17	Logistics Coordinator	4	4%	Yes
18	Product Designer	5	5%	Yes
19	Testing Engineer	4	4%	Yes
20	Customer Service Manager	4	4%	Yes
21	Marketing Executive	2	2%	Yes
22	IT Support Specialist	2	2%	Yes
23	Legal Compliance Officer	1	1%	Yes
24	Inventory Manager	3	3%	Yes
TOTAL		100	100%	

INTERPRETATION:

The above table illustrates the diverse demographic and professional spread of the respondents within Tata Motors. A significant observation is the inclusion of employees

from every functional level, ranging from Graduate Engineer Trainees (8%) to Plant Heads (2%). This diversity is crucial because the "Upskilling Trend" at Tata Motors is not localized to a single department but is an organization-wide mandate. The data shows that technical roles, such as Senior Engineers and Assembly Line Associates, comprise a large portion of the sample, reflecting the company's focus on manufacturing excellence. The high participation rate in EV and AI training across these 24 distinct designations indicates that Tata Motors has successfully permeated its "Learning Culture" into non-technical roles as well, such as Finance and Legal. This ensures that the transition to electric mobility is supported by a "digitally fluent" support staff.

5.1 SUMMARY OF FINDINGS

1. **Existential Awareness of Skill Obsolescence:** A significant 95% of employees in traditional Internal Combustion Engine (ICE) departments (Exhaust, Transmission, and Powertrain) acknowledge that their current skills will be redundant by 2026. This indicates a high level of "Change Readiness" within the organization.
2. **Strategic Shift in Core Competencies:** The study identifies a massive pivot in demand for specific technical skills. Competencies like **Autonomous Driving Algorithms** and **High-Voltage Safety** have seen a projected demand increase of over 200%, while traditional mechanical design skills are declining by approximately 55%.
3. **Efficiency of Digital Platforms:** The "TMSkills" platform has proven highly effective for Graduate Engineer Trainees (GETs) and junior staff, with completion rates exceeding 90%. however, there is a visible **"Digital Fatigue"** among senior management (15+ years experience), where completion rates drop to 55%.

5.2 SUGGESTIONS AND RECOMMENDATIONS

To optimize the workforce transformation, the following strategic measures are recommended:

- **Implementation of "Learning-in-Flow-of-Work" (LIFW):** Instead of treating training as an "extra-curricular" activity, Tata Motors should integrate micro-learning modules directly into the daily shift. Allocating 30 minutes of "Protected Learning Time" during the 8-hour shift can mitigate the time-squeeze barrier.
- **Establishment of a "Reverse Mentoring" Program:** To bridge the digital divide, GETs and young "Digital Natives" should be paired with Senior Managers. This will help senior leadership become more comfortable with AI tools and digital dashboards while the younger staff gains organizational wisdom.
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5.3 CONCLUSION

The study concludes that **Upskilling and Reskilling** are no longer merely HR functions at Tata Motors; they are the primary drivers of the company's "Strategic Survival." The transition from a traditional automobile manufacturer to a sustainable mobility tech giant is being successfully navigated through a robust "Learning Culture."

While the financial and operational gains (as seen in the ₹197.4 Crore ROI) are impressive, the true success lies in the **future-proofing** of the workforce. Tata Motors has demonstrated that by aligning individual career growth with organizational goals, a company can turn the "threat" of technological disruption into a "competitive advantage." If the company continues to address the time-constraints of its employees and leverages immersive technologies like VR/AR, it is well-positioned to lead the global EV revolution.

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