



The Future of Ghana's Automotive Workforce

Industrial Growth, Skills Transformation, and Inclusive Mobility (2025–2040)

Policy Report prepared for West Africa Jeep Adventures for Women and Orphans (WAJA).

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This report provides a strategic roadmap for developing Ghana's automotive workforce to support industrial expansion, electric mobility, and regional leadership under AfCFTA.

1. Executive Summary

Ghana's automotive sector is approaching a pivotal juncture in its development trajectory. Over the past decade, the nation has witnessed a rise in vehicle ownership, an expansion of its logistics and transportation infrastructure, and increased interest from global automotive manufacturers seeking a regional manufacturing base in West Africa. These developments present significant opportunities for employment growth, industrial expansion, and technology transfer. The successful realization of this potential—and the goal of establishing Ghana as a regional manufacturing hub under the African Continental Free Trade Area (AfCFTA)—hinges on a critical factor: the transformation and modernization of its automotive workforce.

However, these opportunities simultaneously expose structural deficiencies within the automotive workforce. Ghana's vehicle repair economy remains predominantly characterized by informal apprenticeship models, which primarily emphasize mechanical repair competencies. Modern vehicles are increasingly dependent on sophisticated electronics, software systems, battery technology, and advanced diagnostic capabilities. Absent comprehensive workforce modernization, the technological disparity between contemporary vehicles and technician proficiencies is poised to continue widening.

This report investigates the necessary steps for Ghana to cultivate a modern automotive workforce capable of sustaining both traditional vehicle maintenance and the demands of emerging mobility technologies, such as electric vehicles and connected transport systems. Strategic investment in education, robust industry partnerships, and initiatives promoting workforce inclusion will be indispensable to ensuring that Ghana fully capitalizes on the global mobility transition.

Introduction

Transportation systems are fundamental to economic activity, enabling individuals and enterprises to access markets, services, and employment opportunities. In rapidly developing economies such as Ghana, transportation infrastructure plays a particularly critical role in connecting urban centers with rural communities and facilitating regional trade.

The automotive workforce provides essential support for this system through vehicle maintenance, manufacturing operations, supply chain management, and the provision of engineering expertise. As transportation technologies advance, the requisite skills within this workforce must correspondingly evolve.

Ghana's demographic profile presents both a strategic opportunity and a challenge. A substantial youth population provides a strong potential labor pool; however, a significant number of these young individuals lack access to high-quality technical training. Workforce development initiatives that are aligned with emerging mobility technologies could generate considerable employment opportunities while simultaneously supporting national economic advancement.

The African Continental Free Trade Area (AfCFTA) establishes a unified market capable of supporting large-scale automotive manufacturing within the region. Ghana is strategically positioned to emerge as a regional hub for vehicle assembly and automotive services. A highly skilled workforce will be a critical determinant of the country's ability to capitalize on these opportunities.

Ghana Automotive Industry Overview

Historically, the Ghanaian automotive market has been characterized by a significant reliance on imported vehicles and associated spare parts. The requisite repair and maintenance activities for these vehicles have predominantly been executed by informal mechanics operating within concentrated urban repair hubs.

However, recent governmental policy initiatives have been introduced with the objective of stimulating domestic vehicle assembly and manufacturing. These initiatives are strategically designed to mitigate dependency on foreign imports while simultaneously generating opportunities for skilled employment.

Consequently, international manufacturers, including Toyota, Volkswagen, Nissan, Hyundai, and Kia, have commenced establishing assembly operations within Ghana. The expansion of these sophisticated facilities necessitates a workforce comprising skilled technicians, engineers, and supply chain professionals proficient in supporting contemporary manufacturing processes.

Structure of the Automotive Workforce

The automotive workforce in Ghana can be broadly categorized into three distinct segments. The most substantial segment comprises informal repair technicians who operate small workshops situated across urban and peri-urban regions. These mechanics typically acquire their technical skills through apprenticeships, which often span a duration of three to five years.

The second segment encompasses technicians employed within formal dealership networks and corporate fleet maintenance operations. These professionals frequently benefit from manufacturer-specific training and possess access to advanced diagnostic equipment.

The third segment includes workers engaged in vehicle assembly and manufacturing. While this segment is currently nascent in size, it is projected to experience considerable growth as Ghana's domestic automotive industry continues its development.

The current challenge lies in a workforce largely structured around informal apprenticeship systems, which lack the formal training required for advanced vehicle technologies, electric mobility (EVs), and digital diagnostics. Strategic, coordinated investment in workforce development is the single most critical intervention to ensure Ghana's competitiveness and reduce reliance on imported technical expertise between 2025 and 2040.

Key Findings and Policy Considerations.

I. Industry Development and Policy Environment

- **Manufacturing Momentum:** The Ghana Automotive Development Policy has successfully attracted major global manufacturers (e.g., Toyota, Volkswagen, Nissan, Hyundai) to establish local assembly operations, validating the nation's industrial strategy.
- **Regional Leadership:** Leveraging the AfCFTA, Ghana is strategically positioned to become a regional automotive manufacturing and service hub, necessitating a labor force capable of supporting scaled, cross-border operations.

Electric vehicles are rapidly gaining global momentum as governments and industries seek to reduce greenhouse gas emissions and transition toward sustainable transportation systems.

The maintenance and repair of EVs differ significantly from those of internal combustion engine vehicles. Technicians must possess a comprehensive understanding of battery

chemistry, high-voltage electrical systems, and specialized diagnostic procedures.

The development of structured training programs for EV technicians will be essential to ensure that Ghana can effectively support the anticipated adoption of electric mobility technologies. Electric vehicles (EVs) are rapidly gaining global momentum as a cornerstone of the transition toward sustainable transportation. This surge is primarily driven by concerted efforts from governments and industries worldwide to drastically reduce greenhouse gas emissions and combat climate change. The adoption of electric mobility is no longer a niche market but a fundamental shift in the future of personal and commercial transport.

However, this transition presents significant challenges for the existing automotive workforce, particularly in regions like Ghana. The maintenance and repair of EVs differ fundamentally and significantly from the established practices for internal combustion engine (ICE) vehicles. A standard ICE technician's skill set is insufficient for the complexities inherent in EV technology.

To effectively service and maintain these advanced vehicles, technicians must possess a highly specialized and comprehensive understanding of several key areas:

- II. **Battery Technology and Chemistry:** This includes knowledge of lithium-ion and other emerging battery chemistries, thermal management systems, state-of-charge monitoring, and safe handling procedures for damaged or degraded battery packs.
- III. **High-Voltage Electrical Systems:** EVs operate on high-voltage direct current (DC) systems (often exceeding 400V), which poses substantial safety risks. Technicians require rigorous training in safe isolation, testing, and repair of high-voltage components, including inverters, converters, and wiring harnesses.
- IV. **Specialized Diagnostic Procedures:** EV diagnostics rely heavily on software interfaces and sophisticated data analysis to identify faults within the powertrain, battery management system (BMS), and regenerative braking systems. This necessitates proficiency with new diagnostic tools and software protocols specific to various EV manufacturers.
- V. **Power Electronics and Thermal Management:** Understanding the functioning and maintenance of the electric motor, power electronics (such as the inverter), and the sophisticated thermal management systems that regulate the temperature of the battery and power electronics are crucial for optimal vehicle performance and longevity.

The capability of Ghana to effectively support the anticipated adoption rate of electric mobility technologies hinges critically on its ability to develop a proficient, safety-conscious, and well-trained workforce. Therefore, the immediate development and implementation of structured, certified, and practical training programs for EV technicians will be essential. These programs must be established in collaboration with educational institutions, industry

stakeholders, and government regulatory bodies to ensure they meet international standards and address the specific needs of the Ghanaian market. Investing in this human capital is paramount to securing the long-term success and sustainability of the electric vehicle transition within the country.

Government policies exert a significant influence on industrial development. Ghana's Automotive Development Policy aims to promote domestic manufacturing while establishing incentives for international companies to invest in local assembly facilities. The alignment of workforce development initiatives with industrial policy is essential to ensure that training programs produce graduates whose competencies correspond to industry demand.

Workforce Structure and Skills Gap

- **Current Structure:** The workforce is fragmented across informal repair clusters, formal dealership networks, and nascent manufacturing assembly plants.
- **Technological Imperative:** The adoption of modern vehicles, which rely heavily on sensors, software, and electronic diagnostics, is creating a critical skills gap. This is compounded by the emerging need for expertise in high-voltage battery systems and charging infrastructure necessary for the **Electric Mobility Transition**.
- **Education Reform:** Current technical education institutions must urgently integrate curricula on EV systems and digital diagnostics to align formal training with future industry demand.

Contemporary vehicles exhibit an increasing reliance on electronic systems that monitor performance, govern engine functions, and augment safety. Modern diagnostic procedures necessitate digital interfaces that link vehicles to sophisticated computer systems capable of analyzing extensive technical data.

Consequently, technicians must acquire a skill set that integrates mechanical proficiency with knowledge of electronics, computing, and data interpretation. The forthcoming integration of telematics systems and remote diagnostics is anticipated to further transform the execution of vehicle maintenance. The automotive industry is undergoing a profound technological transformation, driven by the increasing complexity of contemporary vehicles. These modern automobiles exhibit a significant and growing reliance on sophisticated electronic control systems, which are integral to monitoring performance metrics, governing critical engine functions, and augmenting passenger safety through advanced driver-assistance systems (ADAS) and other integrated technologies.

This fundamental shift necessitates a corresponding evolution in diagnostic and repair

procedures. Modern vehicle diagnostics can no longer be performed solely through mechanical intuition. Instead, they mandatorily require digital interfaces that establish a communication link between the vehicle's onboard computer systems (ECUs) and sophisticated external computer diagnostic tools. These systems are essential for retrieving, analyzing, and interpreting the extensive technical data logs, fault codes, and real-time operational parameters generated by the vehicle's network.

Consequently, the professional profile of the vehicle technician must be redefined. Technicians are now required to acquire a hybrid skill set that seamlessly integrates traditional mechanical proficiency with a deep, practical knowledge of electronics, computer networking, and data interpretation. This interdisciplinary expertise is critical not only for accurately pinpointing complex electronic failures but also for correctly performing software updates, module programming, and sensor calibration.

Looking ahead, this technological trajectory is set to accelerate. The widespread integration of telematics systems—which involve the long-distance transmission of computer information—and the subsequent expansion of remote diagnostics capabilities are anticipated to further and fundamentally transform the execution of vehicle maintenance and repair. These technologies will enable predictive maintenance, over-the-air software updates, and expert remote troubleshooting, requiring the automotive workforce to adapt to a new paradigm of connectivity and data-driven service delivery..

Strategic Workforce Development Framework

- **Coordinated Strategy:** A comprehensive, multi-stakeholder framework is essential, focusing on the development of modern training centers, formalized apprenticeships, and deep industry-education partnerships.
- **Gender Inclusion as Growth Strategy:** Women are significantly underrepresented in technical automotive careers. Focused programs, supported by organizations like West Africa Jeep Adventures (WAJA), present a major opportunity for workforce expansion and economic inclusion.
- **Economic Impact:** A highly skilled workforce will directly enhance industrial productivity, improve vehicle safety and reliability, and strengthen overall national competitiveness.

Education and Training Systems

The participation of women in the technical trades, particularly within the dynamic and growing automotive sector, remains notably low across a multitude of African economies. This significant underrepresentation is not accidental but is rooted in a complex interplay of historical and societal factors. Traditionally, careers within the automotive field—spanning mechanics, electrical diagnostics, and heavy equipment maintenance—have been culturally coded as male domains. These deep-seated cultural perceptions often discourage young women from even considering such paths, leading to a self-fulfilling cycle of exclusion.

A critical barrier to entry is the restricted and often discriminatory access to pertinent vocational training and educational programs. In many instances, training facilities may lack the necessary infrastructure to accommodate female trainees, or institutions may implicitly (or explicitly) favor male applicants. Furthermore, even when training is accessible, a substantial challenge lies in the absence of established mentorship networks. Successful male mechanics and technicians rarely have female protégés, and the scarcity of visible female role models—women who have successfully navigated these trades—deprives aspiring female entrants of invaluable guidance, practical career advice, and critical industry connections. This lack of a supportive ecosystem makes the journey into and advancement within the sector far more daunting for women.

However, expanding the participation of women in the automotive sector offers transformative advantages that extend beyond mere social equity. For African economies experiencing rapid motorization and industrial development, integrating women fundamentally enhances the workforce's overall capacity, addressing chronic skills gaps and labor shortages. Economically, empowering women through high-value technical careers is a powerful engine for poverty reduction and wealth creation, providing them with reliable, often higher-paying, and in-demand skills that foster financial independence. On a societal level, increasing the number of female technicians is a crucial step in advancing broader gender parity within technical professions. It challenges ingrained stereotypes, normalizes the presence of women in non-traditional roles, and ultimately contributes to a more diversified, resilient, and economically vibrant workforce ready to meet the challenges of the 21st-century African market.

Technical universities, vocational institutes, and apprenticeship programs constitute the bedrock of Ghana's workforce training ecosystem. Nevertheless, numerous programs retain a primary focus on conventional mechanical systems. Curriculum modernization is thus essential to effectively incorporate emerging technologies, including Electric Vehicle (EV) systems, digital diagnostics, and advanced manufacturing techniques.

A successful workforce development strategy should encompass several key components. These include the establishment of specialized automotive training institutes, the modernization of apprenticeship systems, and the fostering of partnerships between educational institutions and the automotive industry. Furthermore, strategic investment in training infrastructure is essential to ensure that technicians acquire the requisite skills for emerging vehicle technologies.

Workforce Projections and Implementation

- **Growth Forecast:** With targeted investments in training and manufacturing capacity, Ghana's automotive workforce has the potential to double its size by 2040.
- **Implementation Roadmap:** The transformation must be phased, prioritizing the establishment of core training infrastructure and curriculum modernization in the immediate term, followed by scaled implementation across the sector.

Role of Nonprofit Organizations

Nonprofit organizations are uniquely positioned to serve as catalysts for expanding access to crucial workforce training opportunities within the automotive sector and related technical trades. Their flexibility and community-focused missions allow them to bridge gaps often overlooked by purely commercial or governmental programs.

A key strategy for these organizations is the development and implementation of targeted programs aimed at increasing participation among historically marginalized groups. Specifically, programs designed for women, youth, and residents of underserved communities are vital for broadening the pipeline of skilled technical professionals. By addressing systemic barriers—such as lack of resources, cultural biases, or geographical isolation—these initiatives ensure that technical careers become accessible and viable paths for a more diverse segment of the population. This not only promotes social equity but also strengthens the overall workforce by harnessing untapped potential.

The mission of organizations like WAJA (West Africa Jeep Adventures for Women and Orphans) aligns seamlessly with these objectives. WAJA is dedicated to supporting initiatives that actively empower women and orphans through the provision of comprehensive technical training and subsequent economic opportunities. By focusing on these vulnerable populations, WAJA contributes directly to the development of a resilient, skilled, and equitable workforce, ensuring that the benefits of economic growth are shared across all segments of

society. A highly-skilled automotive workforce is instrumental in fostering economic advancement through various channels. Such a workforce enhances productivity within manufacturing operations, elevates the standard of vehicle maintenance and repair, and diminishes dependence on international technical specialists. Furthermore, cultivating a robust automotive workforce can catalyze expansion in ancillary sectors, including component production, supply chain management, and engineering consulting.

Implementation Roadmap

Workforce modernization for the automotive sector should be implemented through a strategic, phased approach to ensure sustainable growth and a high-skilled labor pool.

Phase I: Foundational Strengthening (Training Infrastructure and Curricula)

The initial phase must concentrate on reinforcing the fundamental educational and training structures that underpin the industry's workforce. This involves a dual focus:

- **Strengthening Training Infrastructure:** Significant investment is required to upgrade existing technical and vocational education and training (TVET) centers. This includes modernizing workshops with state-of-the-art diagnostic equipment, electric vehicle (EV) maintenance bays, and specialized tools relevant to modern automotive technology (e.g., advanced driver-assistance systems - ADAS). Furthermore, establishing regional centers of excellence dedicated to automotive engineering and repair will ensure equitable access to high-quality training across the country.
- **Updating Educational Curricula:** The current curriculum must be rigorously reviewed and updated to align with global automotive trends, particularly in areas of vehicle electrification, digitalization, smart manufacturing, and sustainable practices. Collaborating with leading international automotive education bodies and local industry experts is crucial for developing modules that cover practical skills in areas such as battery technology, telematics, computer-aided design (CAD), and robotic maintenance. This ensures graduates possess skills immediately applicable to a modern, competitive industry.

Phase II: Practical Skill Development and Industry Integration

Once the foundational infrastructure and curriculum are in place, the second phase will focus on embedding practical, real-world experience and fostering deep collaboration between academia and the private sector.

- **Expansion of Apprenticeship Programs:** Current apprenticeship models must be significantly scaled up and formalized to provide structured, long-term on-the-job training. These programs should be co-designed and co-managed by educational

institutions and automotive businesses. Apprenticeships must offer competitive stipends, clearly defined learning outcomes, and certification pathways recognized by the industry, making them an attractive career option.

- **Deepening Industry Partnerships:** Formal, sustainable partnerships between educational institutions (universities, polytechnics, and TVET centers) and local and multinational automotive companies are essential. These partnerships should facilitate regular knowledge transfer, guest lectures by industry leaders, faculty sabbaticals within companies, and joint research projects. This not only provides students with exposure to industry best practices but also ensures the curriculum remains relevant to evolving employer needs.

Phase III: Innovation and Future-Proofing

The final phase aims to position the automotive sector at the forefront of regional innovation, ensuring long-term competitiveness and resilience.

- **Focus on Advanced Research and Innovation:** Establishing dedicated research and development (R&D) centers focused on sector-specific challenges is paramount. Key areas of focus should include developing local solutions for component manufacturing, exploring sustainable biofuels or battery recycling technologies suitable for the local market, and researching specialized vehicle modifications for local terrain and climate conditions. This phase requires collaboration with international research bodies and significant government and private sector funding.
- **Cultivating an Entrepreneurial Ecosystem:** Efforts should be made to foster a culture of innovation and entrepreneurship within the sector. This includes providing incubation support, seed funding, and mentorship for startups focused on automotive technology, software development for vehicle systems, or advanced repair techniques. The ultimate goal is to move beyond simply maintenance and assembly to becoming a hub for automotive intellectual property and high-value design.

Conclusion

Based on projected growth in vehicle ownership, domestic manufacturing expansion, and the accelerating adoption of electric vehicles (EVs), Ghana's automotive workforce is expected to grow significantly, potentially doubling or tripling, over the next two decades. This monumental expansion will necessitate the development of a highly skilled and adaptable labor pool to meet the evolving technical demands of the industry.

To ensure that workforce supply not only meets but anticipates the rapidly increasing industry demand, strategic, large-scale investments in targeted training programs and robust technical and vocational education and training (TVET) will be absolutely critical. These investments must focus on establishing modern curricula, providing cutting-edge equipment, and training instructors in areas such as advanced diagnostics, automotive software, battery technology, and EV maintenance and repair.

Furthermore, collaboration between the government, educational institutions, and private sector automotive firms—including local assemblers and international manufacturers—will be essential to align training outputs directly with industry needs and secure employment pathways for graduates. Without this proactive and strategic intervention in workforce development, Ghana risks creating a skills gap that could impede the industry's growth, stifle innovation, and undermine its potential as a regional manufacturing hub. The time for significant investment in the human capital of the automotive sector is now.

Ghana's automotive industry stands on the precipice of a significant transformation, driven by a confluence of technological innovation and burgeoning regional trade opportunities. This dynamic shift is fundamentally reshaping the nation's transportation landscape, moving beyond traditional models toward a more advanced and integrated ecosystem. The acceleration of electric vehicle adoption, the rise of autonomous driving technologies, and the implementation of smart logistics solutions all present both challenges and immense prospects for growth.

To fully capitalize on these impending changes and secure a position as a regional leader in the sector, Ghana must undertake a concerted effort to develop a modern, inclusive, and highly-skilled automotive workforce. This development is not merely an optional measure but an absolute necessity for ensuring that the country can strategically leverage new technologies, attract foreign direct investment, and establish robust, high-value manufacturing and service industries.

A modern automotive workforce must be trained in the maintenance and repair of complex electric and hybrid vehicles, familiar with advanced diagnostics, and capable of working with the software and data analytics that underpin future mobility. Furthermore, an *inclusive*

workforce strategy is critical, focusing on breaking down gender barriers and providing accessible training pathways for youth across all regions.

By successfully nurturing this talent pipeline, Ghana can ensure that the economic benefits of this industrial transformation are widely distributed, supporting sustainable economic growth, fostering local entrepreneurship, and securing the country's long-term prosperity within the increasingly competitive West African and global automotive market. This commitment to workforce development will be the foundation upon which Ghana builds a resilient, technologically adept, and globally competitive automotive future.

This foundational investment in human capital is the key to unlocking industrial growth and securing Ghana's long-term economic prosperity.