



NEW TRENDS IN LOCAL AND INTERNATIONAL BUSINESS FOR ELECTRICAL AND ELECTRONICS ENGINEERS IN 2025

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Abstract:

Electrical and electronics engineering (EEE) is a field experiencing rapid transformations in both local and international business environments. The growing demands for sustainable energy solutions, smart technologies, and digital transformation are reshaping the industry. This paper explores emerging trends in EEE that are influencing business strategies for engineers globally in 2025. Key trends include the integration of renewable energy technologies, the rise of smart cities and IoT (Internet of Things), advancements in automation and robotics, and the increasing importance of sustainability and energy efficiency. The paper provides insights into how engineers are adapting to these trends through innovation, technology, and market strategies. Moreover, the role of artificial intelligence (AI), blockchain, and digital twins in EEE business models will be examined. This paper discusses the implications of these trends for the future of electrical and electronics engineers in the competitive global market.

Keywords: Electrical Engineering, Electronics, Business Trends, Renewable Energy, Automation, Sustainability, Smart Cities, Internet of Things (IoT), Artificial Intelligence (AI).



Introduction

Electrical and electronics engineering (EEE) plays a pivotal role in the modernization of industries and economies around the world. As technological advancements continue to accelerate, the landscape of business for electrical engineers is undergoing significant changes. By 2025, electrical engineers will be tasked not only with technical problem-solving but also with addressing global challenges such as sustainability, digitalization, and the integration of new energy systems. These developments are driving new trends in both local and international business sectors. One of the most noticeable trends is the increasing demand for **renewable energy solutions**. The global energy transition, powered by the need to mitigate climate change and promote environmental sustainability, is pushing engineers to innovate in the development and integration of solar, wind, and other green energy solutions (Mitchell & Thomas, 2025). As governments and corporations set ambitious sustainability goals, the role of electrical engineers in developing energy-efficient systems and technologies is becoming even more critical.

Simultaneously, the rise of **smart cities** and the Internet of Things (IoT) is creating new business opportunities for electrical engineers. IoT devices are revolutionizing urban infrastructures, enabling smarter transportation, healthcare, and environmental monitoring systems. This shift is opening doors for engineers to develop solutions that enhance the functionality and efficiency of urban spaces (Patel & Rao, 2024). Similarly, **automation and robotics** are rapidly changing manufacturing industries, and engineers are increasingly involved in designing and maintaining automated systems, making it a crucial area for business growth in the electronics sector (Singh & Jain, 2023).

Another major factor influencing local and international business trends in EEE is the **integration of artificial intelligence (AI) and machine learning**. These technologies are transforming how businesses operate by optimizing processes, improving productivity, and creating intelligent systems. Electrical engineers are leveraging AI to enhance the capabilities of products and systems across various industries (Chen et al., 2025). The convergence of AI, automation, and IoT is ushering in a new era of smart manufacturing, transportation, and even healthcare systems, which presents both challenges and opportunities for EEE professionals.

Lastly, as the business world continues to prioritize **digital transformation**, electrical engineers are expected to support businesses in their transition toward digital



solutions. From designing and implementing advanced control systems to ensuring cybersecurity in connected devices, engineers are at the forefront of ensuring that businesses remain competitive in an increasingly tech-driven economy (Lee & Zhang, 2024).

Literature Review:

Sustainability and Renewable Energy in EEE

Recent research highlights the growing influence of sustainability on the electrical and electronics industries. The demand for renewable energy systems has significantly increased, as both government policies and consumer preferences shift toward greener solutions (Reddy & Kumar, 2024). Electrical engineers are actively contributing to this shift through innovations in energy storage, solar power systems, and grid integration (Ghosh et al., 2025).

Smart Cities and IoT

The concept of smart cities has gained significant traction worldwide, and electrical engineers are crucial in designing and maintaining the necessary infrastructure. The integration of IoT devices, sensors, and data analytics into urban management systems is creating more efficient and connected environments (Patel & Rao, 2024). IoT-enabled devices, such as smart meters and environmental sensors, allow engineers to optimize city systems, reduce energy consumption, and improve quality of life.

Automation and Robotics

The rise of automation and robotics is transforming industries such as manufacturing, logistics, and healthcare. Engineers are now expected to design and implement robotic systems that streamline operations, increase productivity, and improve safety (Singh & Jain, 2023). Automation has also been integrated into industries such as agriculture and construction, presenting new avenues for EEE professionals (Zhao et al., 2025).

Artificial Intelligence and Digital Transformation

AI technologies have become essential in optimizing business operations. Electrical engineers are applying AI to various sectors, including automotive, healthcare, and manufacturing, to automate processes, enhance predictive maintenance, and drive innovation (Chen et al., 2025). AI is playing a key role in the development of smart



systems that analyze large datasets to make informed decisions in real time (Sharma & Gupta, 2024).

Main Part:

Emerging Business Trends for Electrical and Electronics Engineers in 2025

1. **Renewable Energy Systems:** Engineers are increasingly involved in designing and deploying solar and wind power systems, as well as energy storage solutions (Ghosh et al., 2025). Data from the International Renewable Energy Agency (IRENA) shows that renewable energy accounted for 28% of global electricity generation in 2024, with continued growth expected (IRENA, 2025). Engineers are integrating innovative battery technologies to enhance the efficiency and reliability of these systems.
2. **Smart Cities and IoT:** According to a report by McKinsey (2024), the global smart cities market is expected to reach \$2.5 trillion by 2025. EEE professionals are focusing on creating IoT systems that help monitor and control everything from energy usage to traffic flow in urban environments. For example, smart grids, powered by IoT technologies, allow for real-time monitoring and optimization of energy use (Patel & Rao, 2024).
3. **Automation and Robotics:** A surge in demand for autonomous systems in manufacturing and logistics is creating new opportunities for electrical engineers. The global market for industrial robotics is expected to grow at a rate of 15% annually from 2024 to 2027 (MarketsandMarkets, 2025). Engineers are designing robots that can learn from data and make decisions without human intervention, significantly improving efficiency and reducing costs (Singh & Jain, 2023).
4. **Artificial Intelligence and Machine Learning:** AI-powered solutions are transforming industries by enabling smarter decision-making and automation. Electrical engineers are developing intelligent systems in sectors such as automotive (e.g., self-driving cars), healthcare (e.g., predictive diagnostics), and manufacturing (e.g., automated quality control) (Sharma & Gupta, 2024). Data from Statista (2025) suggests that the AI market is expected to exceed \$100 billion by 2025, with significant contributions from electrical engineering innovations.
5. **Digital Transformation in Manufacturing:** The digitalization of manufacturing processes, including the adoption of digital twins, is a growing trend. Electrical engineers are instrumental in developing systems that provide real-time insights



into manufacturing processes, which help businesses optimize production lines and reduce downtime (Lee & Zhang, 2024). The global digital manufacturing market is projected to grow by 17% annually, reaching \$10 billion by 2025 (Market Research Future, 2024).

Table 1: Projected Growth of Key EEE Business Sectors (2023-2025)

Business Sector	2023 Market Value (Billion USD)	2025 Market Value (Billion USD)	Annual Growth Rate (%)
Renewable Energy Solutions	275	320	8%
Smart Cities & IoT	1,800	2,500	15%
Industrial Robotics	45	75	15%
Artificial Intelligence (AI)	80	120	18%
Digital Manufacturing	7	10	17%

Source: McKinsey, 2024; MarketsandMarkets, 2025

Results and Discussion:

The results show a clear trend of growth in the electrical and electronics engineering industry driven by technological advancements and global market demands. The data from Table 1 reveals that the renewable energy sector is expected to grow steadily, driven by increased government and private investments. The rise in smart cities and IoT adoption is creating significant opportunities for electrical engineers, especially in urban infrastructure development.

Automation and robotics continue to be a major area of innovation, with industries investing heavily in robotic systems to enhance productivity. The AI and machine learning sector shows the most rapid growth, with engineers leveraging these technologies to create smarter, more efficient systems across multiple sectors.

The data also suggests that digital manufacturing will play an essential role in shaping the future of production and supply chains, providing more sustainable and optimized operations. Electrical engineers will need to adapt to these new business realities by staying abreast of technological developments and acquiring expertise in these emerging fields.



Conclusion:

The business landscape for electrical and electronics engineers in 2025 will be shaped by advances in renewable energy, automation, IoT, and AI. Engineers will play a pivotal role in driving technological innovation and business growth across industries. With the increasing emphasis on sustainability and digital transformation, the demand for highly skilled engineers will continue to rise. As these trends evolve, engineers must stay ahead of technological developments to remain competitive and contribute to the ongoing advancements in the global business environment.

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