**ABB Documentation**

***Submitted by***

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**INDEX**

|  |  |  |
| --- | --- | --- |
| **SL.NO** | **Table of Contents** | **PG.NO** |
| **1** | **Introduction** | **3** |
| **2** | **Global Presence And Footprint** | **4-5** |
| **3** | **Organizational Structure** | **5** |
| **4** | **Business Divisions** | **6-7** |
| **5** | **Emphasis on ABB Robotics** | **7-9** |
| **6** | **Current Trends and Future** | **9-10** |
| **7** | **Career Opportunities** | **10-11** |
| **8** | **Challenges** | **11-12** |
| **9** | **Conclusion** | **12** |
| **10** | **References** | **13** |

**1.Introduction**

**1.1 Company Background**

ABB (Asea Brown Boveri) is a world-leading technology company that is shaping electrification, automation, robotics, and digitalization. ABB is headquartered in Zurich, Switzerland, and has operations in more than 100 countries with a global workforce of over 105,000 people. ABB caters to numerous industries such as manufacturing, energy, transport, and utilities, with an objective to enable a more productive and sustainable future.

**1.2 Historical Background**

ABB came into being in 1988 via the legendary merger of ASEA (established in 1883, Sweden) and BBC – Brown, Boveri & Cie (established in 1891, Switzerland), two engineering giants renowned for their visionary contributions to the electrical world. The union merged ASEA's dominance in power systems with BBC's knowledge in automation and heavy electrical engineering, and a world leader in industrial technology emerged.

ABB has evolved significantly over the last three decades through investment in digitalization, robotics, AI, and clean technologies. ABB sold its power grid business to Hitachi in 2020 to concentrate more intensely on automation and smart electrification.

**1.3 Vision, Mission, and Values**

ABB's vision is to make a more productive and sustainable future a reality by applying breakthrough technologies. Its mission is to make industries and societies evolve with safe, smart, and sustainable solutions. Key values that shape ABB's operations are:

* Innovation: Leading through cutting-edge R&D and technology.
* Integrity: Following ethical principles and being transparent.
* Customer Focus: Creating value through customized solutions.
* Safety and Sustainability: Putting people and the planet first.
* Collaboration: Encouraging teamwork across cultures and industries.

**1.4 ABB in Modern Industry**

In a world where industries are increasingly trending towards automation, sustainable energy, and information intelligence, ABB is still leading the way. From robotic arms on production lines to EV charging points along highways and control systems for smart factories, ABB's innovations touch virtually every part of the modern industry and infrastructure.

This report delves into ABB's organizational setup, major business segments, innovation strategy, global reach, and career prospects, presenting an overarching picture of one of the world's leading-edge engineering firms.

**2.Global Presence and Footprint**

**2.1 Headquarters and Regional Hubs**

ABB is headquartered in Zurich, Switzerland, and has a robust network of regional headquarters and offices covering more than 100 countries. This global setup enables ABB to engage a wide and varied customer base while being nimble in local markets.

| **Region** | **Head quarters** |
| --- | --- |
| **Europe** | Sweden (Västerås – Robotics R&D), Germany |
| **Asia-Pacific** | China (Shanghai – Robotics Mega Factory), India (Bangalore) |
| **North America** | USA (Cary, NC – Motion, Robotics), Auburn Hills, MI |
| **South America** | Brazil (Sao Paulo) |
| **Middle East & Africa** | UAE, South Africa, Saudi Arabia |

**2.2 Global Offices and Facilities**

ABB has operations in:

* Manufacturing Facilities in 40+ nations
* R&D Facilities in 7+ nations (including India, China, Germany, Sweden, USA)
* Customer Experience & Training Centers all around the world
* Distribution & Logistics Hubs to enable product delivery and services

Some of the main centers for production and research are:

* ABB Robotics Mega Factory – Shanghai, China
* ABB India Campus – Nelamangala, Bangalore
* ABB Motion Factory – Helsinki, Finland
* RobotStudio Innovation Center – Västerås, Sweden

**2.3 Industry Segments Served**

ABB solutions cover a broad range of industries and infrastructure networks:

|  |  |  |
| --- | --- | --- |
| **Industry** | **Key ABB Applications**   |  | | --- | |  | |
| **Manufacturing** | Robotics, Motion Control, Factory Automation |
| **Power & Energy** | Smart Grids, Substations, Electrification Systems |
| **Transportation** | EV Charging Infrastructure, Rail Electrification |
| **Utilities** | Energy Management, Control Systems |
| **Oil, Gas & Chemicals** | Process Automation, Industrial IoT |
| **Buildings & Cities** | Home Automation, Smart Building Systems |
| **Marine & Ports** | Electrification, Digital Navigation |

**3.Organizational Structure**

**3.1 Divisional Breakdown (Business Areas)**

As of 2025, ABB's activities are divided into four strategic business areas, each functioning as a strategic business unit with its own resources, R&D direction, and president**:**

| **Business Area** | **Focus** |
| --- | --- |
| Electrification | Smart buildings, energy distribution, EV charging, switchgear |
| Motion | Motors, drives, generators, digital powertrain solutions |
| Process Automation | Solutions for oil & gas, marine, chemicals, power generation |
| Robotics & Discrete Automation | Industrial robots, collaborative robots, AMRs, and factory automation |

**3.2 Executive Leadership**

ABB is led by an Executive Committee that is headed by the Chief Executive Officer (CEO). As of 2025:  
CEO: Björn Rosengren  
CFO: Timo Ihamuotila  
Other members include Presidents of all Business Areas, Heads of Operations, HR, Legal, and Strategy**.**

**3.3 Cross-Functional and Digital Units**

ABB also maintains cross-cutting teams that support all divisions, including:

* ABB Ability™ Platform Team – Digitalization, cloud platforms, IoT
* Sustainability and ESG Team – Environmental compliance and green innovation
* Corporate Research Centers – Strategic tech R&D across multiple fields
* Human Resources, Legal, and Marketing – Centralized support functions

**4. Business Divisions**

ABB's businesses are divided into four large business divisions (also referred to as business areas), each dealing with particular technologies, markets, and customer solutions. The divisions are autonomous but interconnected through ABB's common digital ecosystem and corporate strategy.

**4.1 Electrification**

Focus: Providing safe, smart, and sustainable electrification solutions across industries.

Key Offerings:

* Smart circuit breakers and switchgear
* EV charging infrastructure (Terra series)
* Home and building automation systems
* Grid-edge technologies and energy management

Industries Served:

* Commercial and residential buildings
* Utilities and smart cities
* Data centers, transport hubs

ABB's Terra 360 EV charger is among the world's fastest and part of global clean mobility growth.

**4.2 Motion**

Theme: Motors, drives, and services increasing energy efficiency and industrial performance.

Key Offerings: Low- and medium-voltage electric motors, Variable speed drives ,Generators, Digital powertrain systems

Markets Served: Manufacturing ,Water and wastewater ,HVAC and renewables ,Mining and marine.

ABB Motion assists industries in achieving up to 30% energy savings through efficient motor-control systems.

**4.3 Process Automation**

Industry Focus: Automating sophisticated industrial processes for energy, process, and hybrid industries.

Main Offerings: Distributed Control Systems (DCS) ,Instrumentation and analyzers ,Marine propulsion and control systems ,Mining automation solutions

Geographic Segments Served: Oil & gas, chemicals, mining ,Power generation and water utilities ,Marine and pulp & paper

ABB's Ability™ System 800xA DCS is extensively used in mission-critical infrastructure worldwide.

**4.4 Robotics & Discrete Automation**

Industry Focus: Robotics, machine automation, and digital solutions for smart manufacturing.

Main Offerings: Industrial robots (welding, painting, assembly) ,Collaborative robots (YuMi, GoFa, SWIFTI) ,Autonomous Mobile Robots (AMRs) , Robot Studio™ digital simulation platform

Industries Served: Automotive and electronics ,Food & beverage, logistics ,Pharma and metal fabrication.

With ASTI Mobile Robotics acquisition and collaboration with Seven sense, ABB is pushing the frontiers in mobile robotics and visual AI for autonomous navigation.

**4.5 ABB Ability™ – Digital Platform**

Not a separate division but universal across all business segments, ABB Ability™ offers:

* Cloud-based condition monitoring
* AI-based predictive maintenance
* Digital twins and analysis
* Asset optimization and remote services

**5.Emphasis on ABB Robotics**

ABB is a world-leading provider of industrial automation and robotics, with a broad portfolio of robotic systems for production, logistics, healthcare, and service industries. The company has deployed more than 500,000 robots worldwide and continues to advance through digitalization tools, artificial intelligence, and cutting-edge automation platforms.

**5.1 Industrial Robots**

ABB provides a comprehensive range of industrial robots suited for precision, speed, and reliability in sophisticated manufacturing environments.

Main Features:

* Payload capacity: 3 kg to 800 kg
* Delta robots with high-speed six-axis robots
* IP67 rated for use in harsh environments
* Smooth integration with factory automation

Models:

* IRB 6700 – Welding, material handling robot with high payload
* IRB 1200/1600 – Small parts, electronics, compact
* Flex Picker IRB 360 – High-speed pick-and-place delta robot for packaging

**5.2 Collaborative Robots (Cobots)**

ABB's cobots are safe to work with humans without safety cages. Cobots are simple to program and are perfect for flexible manufacturing.

Top Cobots:

* YuMi (IRB 14000) – Double-arm, extremely accurate; perfect for electronics
* GoFa – Payload of up to 5 kg; used for assembly, inspection
* SWIFTI – High-speed cobot with safety-rated performance

Uses:

* Assembly of electronics
* Pharmaceutical packaging
* R&D and educational training

ABB's cobots are force-limited with vision systems and drag-to-teach programming, making them easy to use and safe.

**5.3 Mobile Robotics (AMRs)**

Recently, ABB diversified into Autonomous Mobile Robots (AMRs) with the purchase of ASTI Mobile Robotics and a collaboration with Sevensense (visual AI navigation).

Key Capabilities:

* Autonomous navigation with LiDAR and AI vision
* Fleet management and path optimization
* Safe human interaction and obstacle avoidance

Use Cases:

* Intralogistics in warehouses
* Material transport in factories
* Smart mobility in campuses and hospitals

Mobile robotics is a natural fit with ABB's vision of end-to-end automation, allowing for full workflow automation from final assembly to material handling.

**5.4 Key Applications and Industries**

ABB robots are deployed across a range of industries for precision-based, repetitive, and hazardous operations.

* Automotive : Welding, painting, assembly, material handling
* Electronics : PCB assembly, inspection, packaging
* Pharmaceuticals : Lab automation, sterile packaging, pick-and-place
* Food & Beverage : Packaging, palletizing, hygiene-sensitive processing
* Logistics & Retail : Order picking, sorting, AMR-based warehouse management
* Metal & Fabrication : Welding, cutting, machine tending

ABB robots enhance productivity, consistency, and workplace safety while facilitating Industry 4.0 adoption.

**5.5 ABB Robot Studio and Digital Twin Technology**

ABB Robot Studio is ABB's cutting-edge simulation and offline programming software, which allows customers to design, test, and optimize robotic processes digitally prior to deployment.

Key Features:

* Real-time 3D simulation and collision detection
* Offline programming without interrupting production
* Integration with digital twin environments
* Augmented reality (AR) support for visual planning

ABB's digital twin technology enables manufacturers to:

* Minimize commissioning time by as much as 25%
* Foresee equipment performance and maintenance requirements
* Enhance OEE (Overall Equipment Effectiveness)

Robot Studio streamlines deployment with decreased errors, costs, and downtime.

**6. Current Trends and Future**

ABB is continuously defining the future of industrial automation by being at the cutting edge of new technologies, sustainability requirements, and employee change.

**6.1 Current Trends in ABB's Robotics and Automation**

AI-Powered Automation

* Use of AI in robots for adaptive learning, visual perception, and decision-making.
* Sensor fusion and computer vision application for .autonomous quality inspection.

Human–Robot Collaboration

* Intelligent, safe collaborative robots (e.g., GoFa and SWIFTI)
* Increasing need for user-centric cobots in SMEs

Autonomous Intralogistics

* Increase in mobile robot deployment for intelligent warehouses and hospitals
* Visual SLAM-based navigation through ABB's collaboration with Sevensense Robotics

Sustainability Integration

* Industrial process electrification
* Robotics applied in solar panel production, battery pack assembly, and recycling facilities

Edge & Cloud Robotics

* ABB Ability™ linking robots to cloud analytics for real-time performance monitoring
* Hybrid deployment with edge processing for enabling low-latency decision-making.

**6.2 Future**

ABB's vision of the future of robotics is:

* Flexible & Modular: Plug-and-play systems for quickly changing production lines
* Hyperconnected: Complete integration with AI, IoT, cloud, and digital twin systems
* Sustainable & Circular: Robots designed for recyclability and energy efficiency
* Decentralized Manufacturing: Allowing micro-factories and local production through scalable automation
* Workforce-Integrated: Enhancing human capabilities with easy-to-use, intelligent machines

As per ABB's Global Robotics Survey (2024), 8 in 10 companies will implement more robots in the next 5 years to cope with labor shortages, quality, and sustainability pressures.

**7. Career Opportunities at ABB**

ABB is not just an automation leader but also a leading employer in engineering, digital, and sustainability areas, providing numerous career opportunities worldwide.

**7.1 Key Job Roles**

|  |  |
| --- | --- |
| **Job Title** | **Relevant Fields** |
| Robotics Engineer | Mechatronics, Embedded Systems, AI/ML |
| Controls & Automation Engineer | Industrial Automation, PLC/SCADA |
| Software Developer (RobotStudio) | Simulation, C++, Python, ROS |
| R&D Scientist | AI, Vision Systems, Edge Computing |
| Field Service Engineer | On-site support, troubleshooting, robotics |
| Sustainability Analyst | ESG, green tech, energy audits |

**7.2 Student & Graduate Programs**

ABB provides:

* Global Trainee Programs in engineering, IT, and business
* Final-year projects and summer internships
* ABB Robotics Challenge Competitions (university teams)

These initiatives focus on experiential exposure to robotics, smart automation, and digital transformation projects.

**7.3 Diversity and Inclusion**

ABB supports:

* Equal opportunities for gender, nationality, or background
* STEM education among underrepresented groups
* Flexible work arrangements and career upskilling paths

**8.Challenges in ABB Robotics and Automation**

Even with its leadership and innovation, ABB has several challenges ahead in the changing world of robotics and industrial automation:

**8.1 Global Competition**

* Cutthroat competition from the likes of FANUC, KUKA, Yaskawa, and Universal Robots
* Pressure to innovate quickly without compromising on product quality and support

**8.2 Supply Chain Disruptions**

* Robot manufacturing and delivery schedules are impacted by semiconductor shortages and supply chain problems
* Prices of raw materials (such as copper, steel, lithium) are reflected in manufacturing costs

**8.3 Regulatory and Safety Compliance**

* Different global regulations regarding robot safety, data privacy, and AI usage
* Sophisticated compliance needs delay rollout in new regions

**8.4 Integration with Legacy Systems**

* Most manufacturing units are still based on legacy infrastructure
* Interoperability and retrofitting requirements in brownfield factories can be expensive and time-consuming

**8.5 Customer Readiness**

* SMEs and developing markets are still not ready to embrace robotics owing to perceived expenditure and awareness
* Affordability and education continue to be stumbling blocks

**9.Conclusion**

ABB stands at the forefront of the global automation revolution, pioneering innovations in robotics, electrification, and digitalization that are reshaping industries worldwide. From high-speed industrial robots to intelligent collaborative and mobile systems, ABB is enabling smart factories, green energy transitions, and human-machine collaboration like never before.

Its digital environment — ABB Ability™, coupled with state-of-the-art solutions such as RobotStudio and digital twin simulation, provides customers with the capability to deploy more quickly, operate more intelligently, and grow more efficiently.

Against the adversity of talent shortages, competitive pressures, and integration challenges, ABB is strong and visionary. By investing in strategic AI, sustainability, and next-generation robotics, it is poised to shape the future of Industry 5.0 — humans and smart machines collaborating to create more efficient, safe, and sustainable working environments.

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