

mini-Guide
Strategic Workforce Planning



AUTONOMOUS MOBILE ROBOTS & AUTOMATED GUIDED VEHICLES

Impact on Jobs and Tasks





mini-Guide

Many different technologies are developing quickly. They all change how work is done in organizations, from collaborative robotics to computer vision and predictive analytics. Generative AI is not the only technology to keep an eye on.

Executives must consider various technologies for various applications to stay competitive and innovative and enable HR to create the best workforce for future success.

This mini-guide gives Executives a brief overview of everything they need to consider when making decisions about Autonomous Mobile Robots (AMRs) and Automated Guided Vehicles (AGVs).

Autonomous Mobile Robots (AMRs)

AMRs are intelligent robots equipped with advanced sensors and navigation software that allow them to move independently within a facility. They can dynamically navigate around obstacles and adapt to changing environments, making them ideal for tasks such as order picking, inventory management, and internal transport in warehouses and manufacturing plants



Automated Guided Vehicles (AGVs)

AGVs are self-driving vehicles that follow predefined paths using guidance systems like magnetic strips, wires, or lasers. They are typically used for repetitive and predictable tasks such as transporting materials, pallets, and goods within a fixed route in warehouses, manufacturing plants, and distribution centers



Range of Application



Autonomous Mobile Robots (AMRs)

Picking & Packing

AMRs are used to navigate aisles, pick items, and transport them to packing areas, enhancing efficiency and reducing manual labor.



Inventory Management

AMRs can track and manage inventory in real time, providing data for better stock control and reducing human error.

Material Transport

AMRs transport raw materials and finished goods between different stages of the production process, adapting to dynamic environments.



Assembly Line Support

AMRs assist in assembly areas by delivering parts and tools, allowing workers to focus on more complex tasks.

Automated Guided Vehicles (AGVs)

Heavy Load Transport

AGVs are used to move heavy goods and materials, such as pallets and large containers, along predefined routes, often replacing forklifts and manual carts

Conveyor System Integration

AGVs can be integrated with conveyor systems to automate the transfer of goods between different areas of the warehouse

Repetitive Material Handling

AGVs transport raw materials, components, and finished products along fixed routes in manufacturing plants, ensuring consistent and reliable delivery

Assembly Line Operations

AGVs support assembly lines by moving parts and assemblies between different stages, reducing the need for manual handling.

Range of Application



Autonomous Mobile Robots (AMRs)

Automated Guided Vehicles (AGVs)

Logistics

AMRs handle the transportation of medicines, medical supplies, and other materials within hospitals and pharmaceutical facilities, ensuring timely and accurate deliveries.

Sterile Supply Transport

AGVs transport sterile supplies, waste, and other materials in hospitals and pharmaceutical facilities, maintaining hygiene and reducing contamination risks



AMRs are best for dynamic and flexible environments where tasks and layouts frequently change. They excel in warehouse picking, inventory management, and material transport in manufacturing and healthcare settings.

AGVs are ideal for structured environments with repetitive tasks and fixed routes. They are commonly used for heavy load transport, integration with conveyor systems, and supporting assembly line operations in warehouses, manufacturing plants, and healthcare facilities.

Impact on Job Roles

Material Handlers/ Forklift Operators

AMRs and AGVs will automate many material handling and transportation tasks traditionally performed by handlers and forklift operators. Their responsibilities will shift towards monitoring and supervising the robots, performing maintenance, and handling exceptions or tasks that cannot be automated.



Maintenance Technicians

The deployment of AMRs and AGVs will require specialized maintenance technicians to perform regular maintenance, troubleshoot issues, and repair these robots.

Warehouse Operators/ Pickers

While AMRs and AGVs can automate some picking and transportation tasks, human operators are still needed for more complex or delicate tasks. Their roles may involve coordinating with robots, handling exceptions, and performing quality checks.

Logistics Coordinators/ Supervisors

With the introduction of AMRs and AGVs, logistics coordinators and supervisors will need to manage and oversee the integration of these technologies into existing workflows. They will optimize robot utilization, monitor performance, and ensure smooth operations.

Safety Coordinators

With the introduction of mobile robots in the workplace, safety coordinators must ensure compliance with safety regulations, develop protocols for human-robot interaction, and implement safety measures to prevent accidents.

Impact on Job Roles



Inventory Managers

AMRs and AGVs with advanced tracking and scanning capabilities can significantly improve inventory management. Inventory managers must leverage this technology to optimize stock levels, reduce errors, and enhance supply chain visibility.

Robot Programmers/ Integrators

New Role: As AMRs and AGVs become more prevalent, there will be a demand for skilled professionals who can program, configure, and integrate these robots into existing systems and workflows.

Data Analysts

New Role: AMRs and AGVs generate vast operations, performance, and supply chain data. Data analysts will be needed to analyze this data, identify patterns, and provide insights for optimizing processes.



Robotics Engineers

New Role: As the adoption of AMRs and AGVs increases, there will be a growing demand for robotics engineers who can design, develop, and improve these robots and integrate them with other technologies.

Cybersecurity Specialists

New Role: Integrating AMRs and AGVs into existing systems and networks introduces new cybersecurity risks. Cybersecurity specialists will be needed to ensure the secure operation of these robots and protect against potential threats.

Advantages

Autonomous Mobile Robots (AMRs)

Automated Guided Vehicles (AGVs)



Organizations

Enhancing Organizational Efficiency

Advanced sensors and navigation systems allow AMRs to move independently within a facility. They can handle tasks such as picking, packing, and transporting goods, significantly increasing operational efficiency by automating repetitive and labor-intensive tasks. AMRs can operate 24/7, reducing downtime and ensuring continuous workflow, which leads to higher productivity and optimized use of space.

Enhancing Organizational Efficiency

AGVs follow predefined paths using guidance systems like magnetic strips or lasers, making them ideal for transporting heavy loads and materials consistently and reliably. They optimize transport tasks, enhance scheduling capabilities, and reduce errors, increasing overall operational efficiency and productivity. AGVs can also operate continuously without breaks, further boosting productivity.



Employees

Safety

AMRs reduce the risk of workplace accidents by taking over dangerous tasks and navigating safely around obstacles.

Upskilling Opportunities

Employees can focus on more complex and value-added activities, leading to job enrichment and the need for new skills.

Improved Morale

By automating monotonous tasks, AMRs allow employees to engage in more fulfilling work, improving overall job satisfaction.

Safety

AGVs improve workplace safety by handling hazardous materials and operating in extreme conditions, reducing the risk of injuries.

Reduced Physical Strain

AGVs minimize the physical strain on workers by automating the transport of heavy materials, leading to better health.

Focus on Higher-Value Tasks

Employees can focus on more strategic and skilled activities, which can enhance job satisfaction and career growth.

Disadvantages



Autonomous Mobile Robots (AMRs)

Dependence on Wi-Fi

AMRs rely on having a stable wireless connection to operate. Any Wi-Fi outages could bring their autonomous operations to a halt.

Potential safety concerns

While AGVs are programmed for safety, there is always a possibility that unforeseen issues or errors could occur and compromise their operations.

Automated Guided Vehicles (AGVs)

Upfront investment costs

AGVs require high upfront costs for the hardware and infrastructure needed to operate effectively, which can make them less flexible than other automation solutions.

Inflexibility

While AGVs offer efficiency within their preset routes, they lack the flexibility to quickly adapt to changes in their operating environment.

High initial investment costs

Both technologies require a substantial upfront investment in automated guided vehicle systems.

Maintenance costs

AGVs and AMRs will require routine maintenance and occasional repairs, which can add to the overall operational costs.



Steps Towards an Informed Decision



1. Business Goals and Objectives

Alignment with Strategic Goals: Ensure that adopting AMRs or AGVs aligns with the company's long-term strategic goals, such as improving operational efficiency, reducing costs, or enhancing customer satisfaction.

Specific Use Cases: Identify tasks and processes that will benefit from automation, such as material handling, inventory management, or order fulfillment.



2. Workforce Capabilities and Readiness

Skill Levels: Assess the current skill levels of the workforce and determine whether upskilling or hiring new talent is necessary to manage and maintain the robots.

Change Management: Prepare the workforce for the transition by implementing change management strategies, including training programs and clear communication about the new technology's benefits and impact.



3. Initial and Ongoing Costs

Capital Investment: Consider the initial investment required for purchasing and implementing AMRs or AGVs, including hardware, software, and infrastructure.

Maintenance and Operational Costs: Evaluate the ongoing costs associated with maintenance, repairs, and potential upgrades to ensure the technology remains efficient and effective.



4. Return on Investment (ROI)

Cost-Benefit Analysis: Conduct a thorough cost-benefit analysis to estimate the potential ROI, considering labor cost savings, increased productivity, and reduced error rates.

Payback Period: Determine the investment's payback period, i.e., the time it will take for the savings and benefits to offset the initial costs.



Steps Towards an Informed Decision



5. Operational Environment

Facility Layout: Assess the facility's layout and infrastructure to determine whether it suits AMRs or AGVs. AMRs are more flexible and navigate dynamic environments, while AGVs require fixed paths and predefined routes.

Scalability: Consider the technology's scalability to accommodate future growth and changes in operations. AMRs offer greater flexibility and scalability than AGVs.

6. Integration with Existing Systems

Compatibility: Ensure that the chosen technology can integrate seamlessly with existing systems such as Warehouse Management Systems (WMS), Manufacturing Execution Systems (MES), and Enterprise Resource Planning (ERP) systems.

Data Utilization: Evaluate how the data generated by AMRs or AGVs can be utilized to optimize operations, improve decision-making, and enhance overall efficiency.

7. Safety and Compliance

Regulatory Compliance: Ensure the technology complies with relevant safety regulations and industry standards to prevent accidents and ensure a safe working environment.

Safety Features: Verify that the robots have advanced safety features such as collision detection, emergency stop mechanisms, and safe navigation capabilities.

8. Vendor Selection

Reputation and Experience: Choose a reputable vendor with proven experience deploying AMRs or AGVs in similar industries and environments.

Support and Training: Evaluate the level of customer support, training, and maintenance services the vendor provides to ensure smooth implementation and ongoing operation.



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Technology Impact



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2024

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