



LOG!VILLE

WHITEPAPER

HOW TO ENSURE A SUCCESSFUL IMPLEMENTATION OF AMRS: KEY LEARNINGS AND OPPORTUNITIES

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INTRO

For many European companies, intralogistics and warehousing are important drivers of revenue. That's why they are always looking for ways to improve the capacity and efficiency of their warehouses. More recently, constraints in the labour market and lead time reduction have become even bigger concerns, as they could lead to growth limitations, gaps in customer service and a failure to respond to market needs. In their search for solutions, it has become clear that human labour will have to be supplemented with robotized labour.

Early Automated Guided Vehicles showed how humans and robots can work together to improve warehouse efficiency. However, their lack of spatial awareness and relative inflexibility are important limitations in real world settings.

To fix these hurdles, Automatic Mobile Robots or AMRs are now making their entrance in the warehouse. These robots better understand the environment they are placed in and can move through it freely, without a fixed path or direct supervision of an operator. Front-running companies are now extensively testing these technologies to learn how they can successfully be implemented in real-world scenarios.

Log!Ville, the innovation center for logistics, and Flanders Make, the strategic research centre for the manufacturing industry, hosted a round table with market leading AMR users, suppliers and software developers to learn from each other and pave the way for widespread adoption.

In this paper, we share opportunities, trends, and key learnings that were discussed during the round table.





AUTOMATION READINESS

While testing and implementing AMR solutions in the real world, companies quickly learned about the importance of preparing their warehouse environment and processes for AMRs. Rather than viewing AMRs as a one-size-fits-all solution, businesses should identify which processes could benefit from AMR support and seek suitable solutions accordingly.

Additionally, companies need to ensure that their processes are 'automation ready'. E.g. Processes that are fully optimized for human labour may be difficult to efficiently and safely carry out by AMRs. Stefan Roelans from Colruyt Group emphasizes the need for companies

to strike a balance between exploring technological possibilities within their context and being flexible in adjusting their processes to accommodate AMRs.

With e-commerce driving the demand for shorter lead times, wider ranges of SKUs, and more sustainable packaging solutions, companies must assess their automation readiness sooner rather than later if they want to stay ahead.

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When automation is not working, the first question you should ask is whether the environment is set up for success.

- Tom Mertens, Nike

TECHNOLOGICAL CONTEXT

While Automatic Mobile Robots are constantly evolving, it is important to keep in mind that they do not exist in a vacuum: AMRs are always deployed in an environment that includes legacy Warehouse Management Systems, older Automated Guided Vehicles, and/or other AMRs.

Market leaders are emphasizing the importance of being able to coordinate and integrate these different systems. As specific AMRs are implemented to address specific challenges, interoperability between AMRs of different suppliers will be essential to successfully automate intralogistic processes. The addition of AI solutions to AMRs, similar to what is already being done with picking robots, could simplify this coordination. With different industries requiring different solutions, this interoperability seems to be a more interesting strategy than trying to find a one-size-fits-all solution.

As the technology matures, companies are also seeking plug-and-play solutions for proven implementations. This allows for flexibility in rapidly scaling up and down the autonomous workforce to meet warehouse demands. On the other hand, specialized implementations that can be co-developed with and customized for a given company are also necessary. By bringing together suppliers and users in this manner, the industry can accelerate innovation as a whole.



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HUMAN AMR ADOPTION

The labour market is becoming tighter, especially in warehousing and intralogistics. AMRs can complement human workers by taking over repetitive, dangerous, or non-value-added tasks. This allows employees to focus on more interesting, value-added work. Compared to Automated Guided Vehicles, AMRs are more flexible and aware of their surroundings, making them better suited to work alongside human employees. Increasing their capability to deal with unforeseen situations could further reduce the need for human intervention.



AMRs can complement human workers by taking over repetitive, dangerous, or non-value-added tasks.

However, real-world testing has taught us that not all human workers welcome these autonomous helpers. Like any innovation or automation, the introduction of AMRs follows five stages of acceptance: fear, apprehension, curiosity, tolerance, and eventually acceptance. Proper education and change management are necessary to promote the adoption of AMRs and accelerate acceptance. This in turn will be an important requirement for new, closer ways of collaboration between mobile platforms and warehouse operators.



These tips have proven to improve adoption:

- Clearly communicate to workers why AMRs are being introduced and how they will improve their work.
- Emphasize how AMRs will improve workers' safety in the warehouse.
- Ensure that people understand that their jobs and livelihoods are not at risk.
- Educate workers on how AMRs function and what they can expect from them in different situations.
- Recognize that working with AMRs requires different skills than working in a fully human-operated warehouse.
- Involve workers in the implementation phase, allowing them to take ownership by participating in testing and piloting.
- Personalize and humanize the AMRs by allowing workers to give them names, add personal tags, and consider them as personal assistants.
- Understand that larger AMRs may require more time and effort for workforce acceptance. Smaller AMRs are generally more easily accepted.



CYBERSECURITY

On the one hand, operators working in the same environment as the AMR could be harmed by actions of compromised robots. On the other hand AMRs are equipped with sensors that capture data to ensure their proper functioning. By using these data, AMRs and their software can learn and determine how companies and their processes can gain a competitive advantage in the market.

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Finally, the cybersecurity of autonomous labour will soon become a prominent topic.

This means that it will become increasingly important for suppliers to guarantee the confidentiality of the data these AMRs capture and safeguard business intelligence.

THE FUTURE OF AMRS

As technology improves, both suppliers and users are optimistic about the future of AMRs. Currently, they are primarily being used for A-to-B transport within the warehouse. Leading companies are continuously decreasing the lead times in the warehouse. This way, buffers would not be needed anymore. AMR solutions should be mindful of this trend, and be able to support warehouses in making their processes ever more efficient to meet customer demand.

To further automate processes end-to-end, manipulation functions are also required. Another logical next step would be to expand the use of AMRs outside of distribution centers.

Furthermore, it will be interesting to see how suppliers integrate sustainability into their AMR solutions. Designing AMRs for longevity, repairability, and refurbishment can help increase their lifespan and reduce e-waste. However, market leaders also want the flexibility to continuously improve and innovate their processes with state-of-the-art technology. An 'AMR-as-a-service' model can help find a balance that benefits suppliers, users, and the environment



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**In the future, AMRs will
become as ubiquitous
and commonplace as
pallet trucks.**

- Stefan Roelans, Colruyt Group

CONCLUSION

In order to successfully implement AMRs in real-world environments, companies need to prepare their warehouses and processes to accommodate AMRs. On the supplier side, interoperability between AMRs, but also with customer software solutions and a wide range of WMS/TMS will be key to enable wide-scale adoption.

The acceptance of AMRs by the human workforce is another critical factor for a successful implementation. Education, change management, and involving workers in the process are proven strategies to improve acceptance.

Looking towards the future, companies are optimistic about the widespread adoption of AMRs in warehouse logistics. Logical next steps include incorporating manipulation capabilities as well as extending the operation of AMRs outside the warehouse.

To help businesses implement AMRs successfully and pave the way for widespread adoption, Flanders Make is preparing for action on all of these domains.



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