

The way to go (in spite of a few roadblocks)

by Peter Szelei, *Senior Director of Business Development, FERNRIDE*

Over the past decade, technology innovations have fueled widespread digital transformation across global industries such as healthcare, telecommunication, and manufacturing. Maritime transportation, however, despite handling over 80% of international trade, has been slow to adopt new solutions. Yet, disruptive global events and persistent challenges, such as skilled labor shortages, among others, have exposed the increasing fragility of the worldwide supply chain. These pressures are driving industry professionals to evaluate and introduce new technologies to increase efficiency, worker safety, and environmental sustainability.

In its recent survey, FERNRIDE asked container terminal professionals from across Europe, the Middle East, Africa, Asia-Pacific, and the Americas about the present levels of automation in their terminals and the technology trends they plan

to follow. The majority (67%) ranked the level of automation in their terminals as 'low to moderate.' Still, the overall sentiment was clearly toward increasing implementation.

This article summarizes the findings from the survey to paint a clear picture

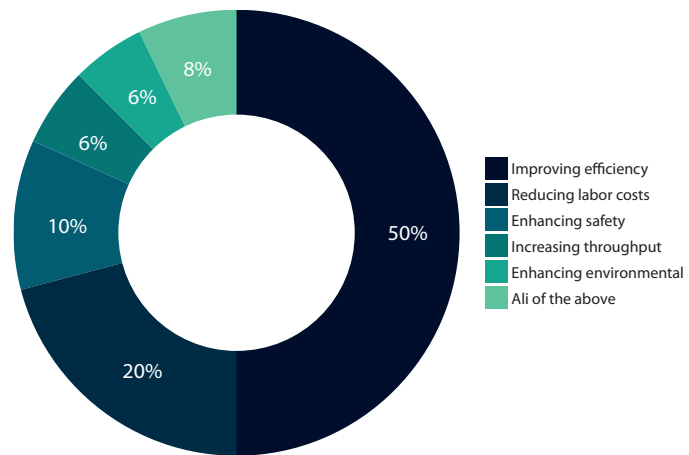
of the current state of automation in container terminals and examines the barriers to implementation. Finally, it explores the emerging trends most likely to influence decision-making and technology implementation in container terminals in the future.

Primary goals: What do container terminal professionals expect to gain from automation?

It is not surprising that efficiency improvements ranked the highest (Fig. 1), as small profit margins and the lack of skilled labor are global phenomena. While improving efficiency is the number one driver for automation across the board, for survey respondents on the executive level, this is followed by their ambition to improve safety.

Labor cost reduction is ranked second highest (20%). This desire is likely a by-product of ongoing pressure to increase efficiency. Our survey showed that it is felt most strongly by those in operational roles, who must navigate external pressures, rising costs, and labor shortages on a daily basis.

Fig. 1. Container terminal professionals' primary goals for implementing automation

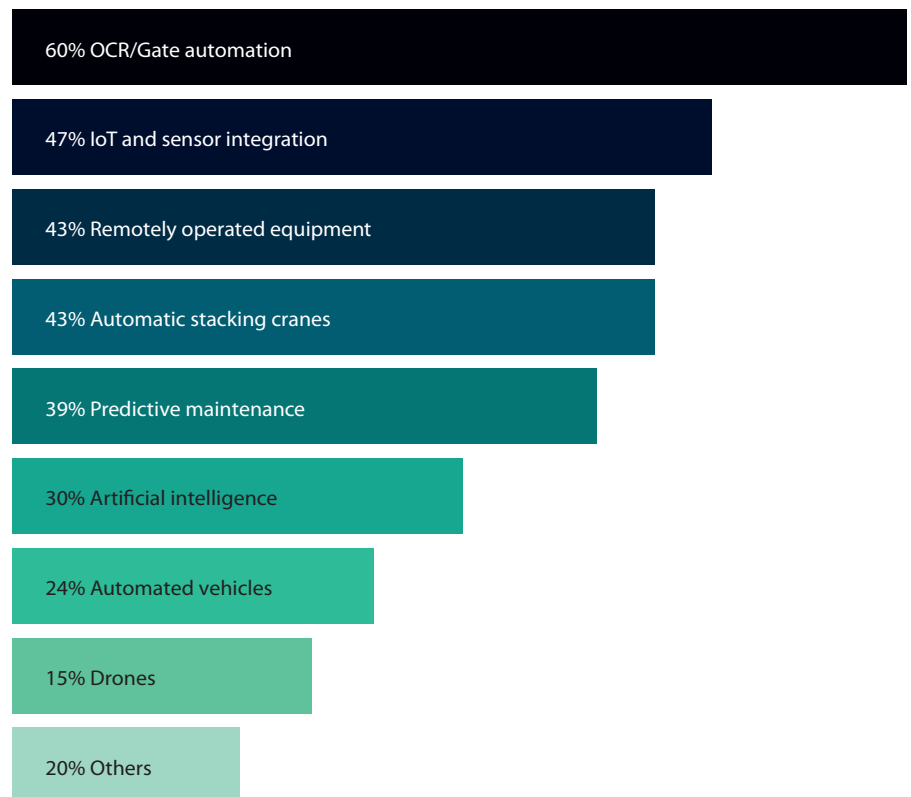


Status quo: What automation solutions have container terminals already implemented – or are they planning to implement?

Optical character recognition (OCR) for gate automation ranks highest (Fig. 2) among the solutions that container terminal professionals are already using or have planned to implement. **This is unsurprising as OCR is a mature technology that has already been proven across industries.** The prevalence of OCR is an excellent example of a proven automation technology accelerating the primary goal of increasing efficiency while delivering a return on investment (ROI) relatively quickly by reducing congestion and turnaround times in terminals. “[Going from] a manual environment in the port where almost everything was paperwork, [gate automation] has significantly improved our efficiency and truck turnaround time. It’s the way to go in terms of efficiency, safety, and effective terminal operation,” shared one of the respondents.

Survey responses also showed that the implementation of newer technologies – such as the Internet of Things (IoT), remote-controlled & automated equipment, and predictive maintenance – is increasing in maritime terminals. Advancements in these technologies are driving the introduction of robust and reliable solutions (such as **remotely operated and autonomous terminal tractors** and cranes).

Fig. 2. Automation solutions that maritime terminal professionals have implemented or planned to implement



Challenges and barriers: What slows the implementation of automation solutions?

Some 62% of respondents cited the high initial cost of technologies as the main barrier to implementing automation solutions (Fig. 3). Executive-level respondents ranked resistance from the workforce as their second highest

concern, along with a lack of skilled workers versed in new technologies. “In as much as people are willing to embrace automation in terminals, they are also concerned about the job security of workers,” one respondent said.

Those pushing for more automation also point to a lack of awareness about the right solutions and say that they have difficulty engaging stakeholders due to uncertainty about the reliability of new technology and its expected impact. Survey

respondents report that decision-makers prefer to prioritize small gains achievable with familiar solutions over the higher risk-reward ratio of new and transformative technologies. “Although managers say they believe that automation is necessary, they don’t really realize what they can achieve,” one of the surveyees told us.

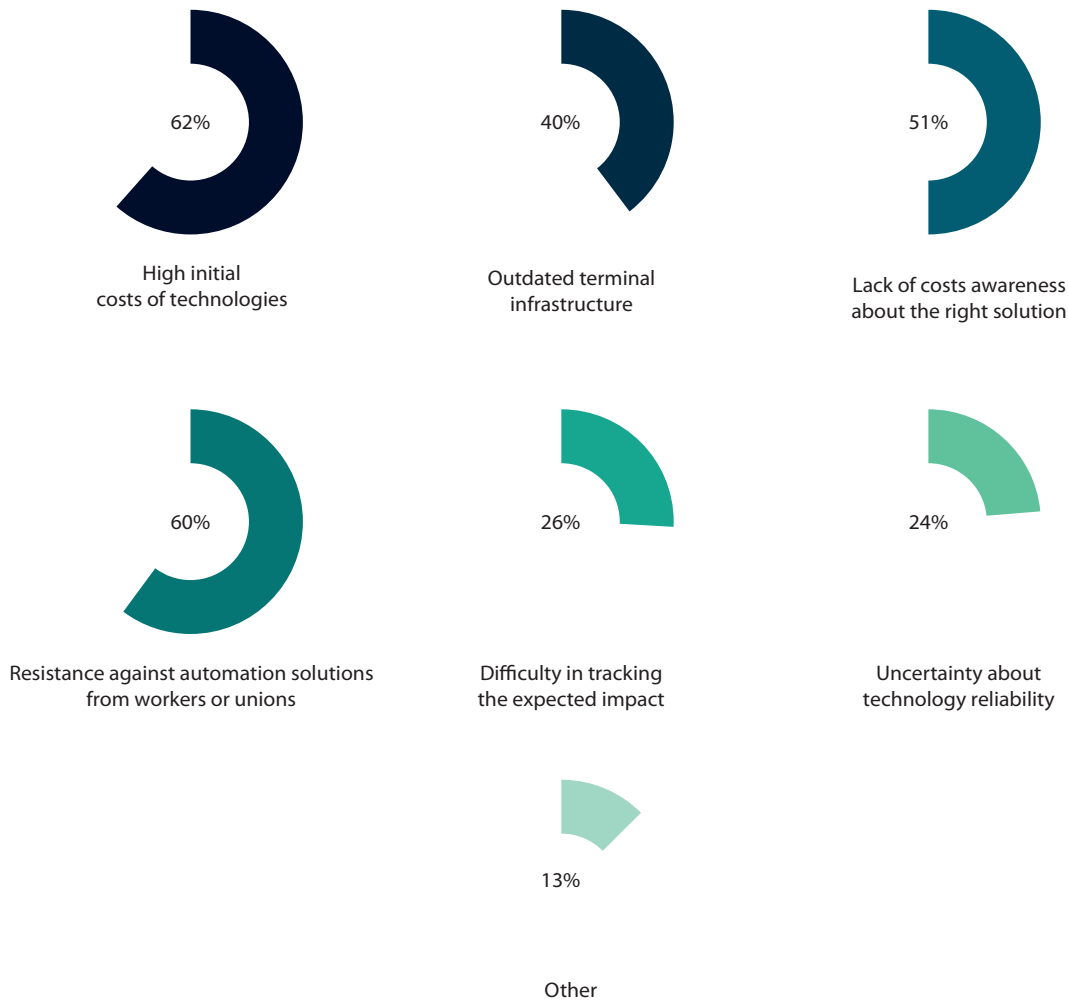
Operations managers are the most concerned with how automation integrates

with existing systems (60%) and any potential negative impact it might have on efficiency. Autonomous terminal tractors, for instance, must be able to navigate novel scenarios (like external truck drivers who don’t necessarily adhere to speed limits or follow designated routes, resulting in unpredictable behavior). “The complexities of mixing our manual operations with automation is one of our

key hurdles. For example, we will have autonomous trucks utilizing the same roadways as our manual vehicles,” commented one respondent.

Respondents in automation-related roles emphasized a need to increase awareness of existing automation solutions, fearing that terminals that fail to adopt these innovations will struggle to compete with more technologically advanced facilities.

Fig. 3. Barriers and challenges to the adoption of automation



Environmental sustainability: How can automation help container terminals to become greener?

The efficiency gains possible with autonomous technology also help terminals to become more sustainable by reducing fuel consumption and increasing productivity.

Autonomous terminal tractors, among other things, can run more efficiently than manually driven tug masters, leading to reduced emissions. Vehicles equipped with human-assisted autonomy can increase the productivity of the existing workforce by handling the majority of

driving tasks autonomously. This allows remote human operators to oversee multiple vehicles and only support autonomy remotely when needed.

Pressure is increasing across the logistics industry, including container terminals, to adopt more sustainable practices. In line with the implementation barriers for automated solutions, industry professionals rank the high initial costs of technologies as even more prohibitive when it comes to adopting sustainable practices (Fig. 4).

Survey respondents said that container terminals lack the budget to replace outdated technology and infrastructure. Those pushing for more environmentally friendly measures also described the difficulties they face in convincing stakeholders without a demonstrable ROI: “I strongly believe in improving the sustainability of port operations and that terminal automation helps in advancing sustainable practices. But I always get the same response [from stakeholders]: What’s the ROI?” Another said: “ROI is a big challenge

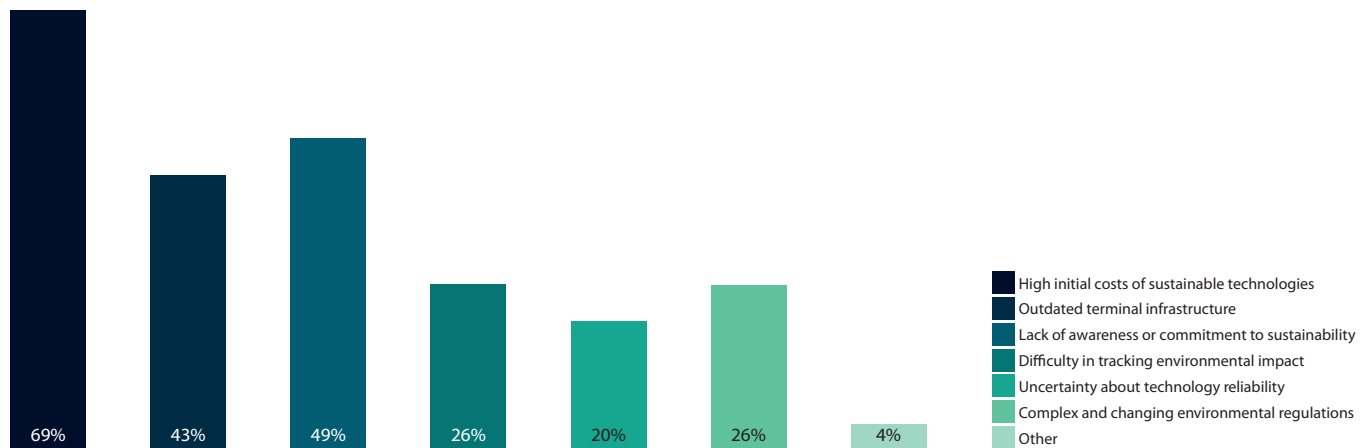
for any new technology implementation; it is difficult to capture the impact with numbers.”

Less than 6% of respondents said that enhancing environmental sustainability

was their primary goal for implementing automation, and all of these worked in operations or automation-related roles. However, most of the workforce agrees

that an increased awareness of and commitment to sustainability is needed to drive the adoption of environmentally friendly practices.

Fig. 4. Barriers and challenges to the adoption of sustainable practices



Key takeaways & outlook

Beyond assessing the current state of automation in container terminals, the survey results also indicate which trends we can expect to shape the future of automation in the industry.

Efficiency improvement and labor cost reduction are the main drivers for automation overall, but decision-makers will push to enhance safety, too. The general ambition for efficiency improvement and cost reduction reflects the persistent budgetary and labor challenges faced by container terminal professionals, particularly those in operations and IT. In contrast, executive-level respondents rated ‘enhancing safety’ as their second most important goal. Skilled labor shortages and cost restrictions will increase pressures to reduce risk in the workplace as executives push to attract new talent as well as retain existing workers.

Mature technologies with proven efficiency benefits are fast becoming the norm:

98% of survey respondents have already implemented (or planned to do so) technologies such as OCR for gate automation (60%), IoT and sensor integration (47%), and remotely operated equipment & automated stacking cranes (both 43%). We can expect these proven solutions to become the norm due to their predictable efficiency improvements. At the same time, advancements in newer technologies will also drive the implementation of more robust and reliable solutions (like remotely operated and autonomous terminal tractors).

Workforce acceptance and adoption will depend on the investment in training alongside new technologies. After the cost of tech, executive-level respondents are most concerned about the workforce resisting automation and lacking the skills to work with innovative technologies. Providing quality training will be instrumental to overcoming these challenges by upskilling the current

workforce and attracting new talent to the maritime transportation industry.

Container terminals will prioritize automation solutions that can be integrated into live operations. With efficiency improvements and cost savings set to remain the primary goals for implementing automation (particularly amongst operations, IT, and terminal development personnel), we can expect solutions that can be integrated into live operations without disruption and deliver near-term ROI to be most successful.

Autonomous solutions will also pave the way to greener practices. The efficiency gains will support the adoption of more environmentally sustainable practices. Pressure on providers to offer more data visibility will increase as stakeholders scrutinize the reliability and environmental impact of new technologies. The rate of change will also depend on how well policymakers communicate new requirements.

Can you afford *not* to automate?

Forward-thinking container terminal professionals are already seeing the efficiency, safety, and sustainability benefits of early automation and remotely operated solutions. Now seeking to increase their awareness about the right solutions

in an industry that can ill afford even the smallest setbacks, decision-makers must strike a balance between achieving efficiency gains and reducing labor costs while ensuring a smooth transition for workers and operations. Investment in training will

be central not only to filling skill gaps and ensuring acceptance of new ways of working but also to attracting the next generation of talent who bring along an increased awareness and knowledge of the best solutions for the future. ■



FERNRIDE is pioneering the use of autonomous, electric trucking within logistics centers, production facilities, and intermodal & maritime terminals, enabling its customers to immediately and significantly improve productivity, sustainability, and worker safety. Employing a human-assisted autonomy approach that allows teleoperators to control trucks remotely, FERNRIDE's technology has been seamlessly integrated into logistics operations in ports and terminals run by industry titans such as Volkswagen, HHLA, and DB Schenker. Go to fernride.com to discover more.