SMART SHIPPING

The future is knocking on the industry's door

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Global economy is witnessing a barrage of technological changes that aspire to usher in a new era in every industry, including, of course, shipping. However, every change involves numerous challenges, and shipping is no different in this respect. On the other hand, technological progress offers many advantages. In this context, Naftika Chronika conducted a survey on smart shipping, looking into the benefits it has brought to the industry, and examining the challenges that remain unsolved or lie ahead.

We then asked experienced members of the shipping industry to answer questions based on our research findings related to current and future technological developments driving the digitalization of shipping.

A research conducted by Manos Charitos

ZOOMING IN ON FUTURE TECHNOLOGICAL CHALLENGES

MARTECMA* MEMBERS PUT THEIR CARDS ON THE TABLE

*Marine Technical Managers Association in Greece

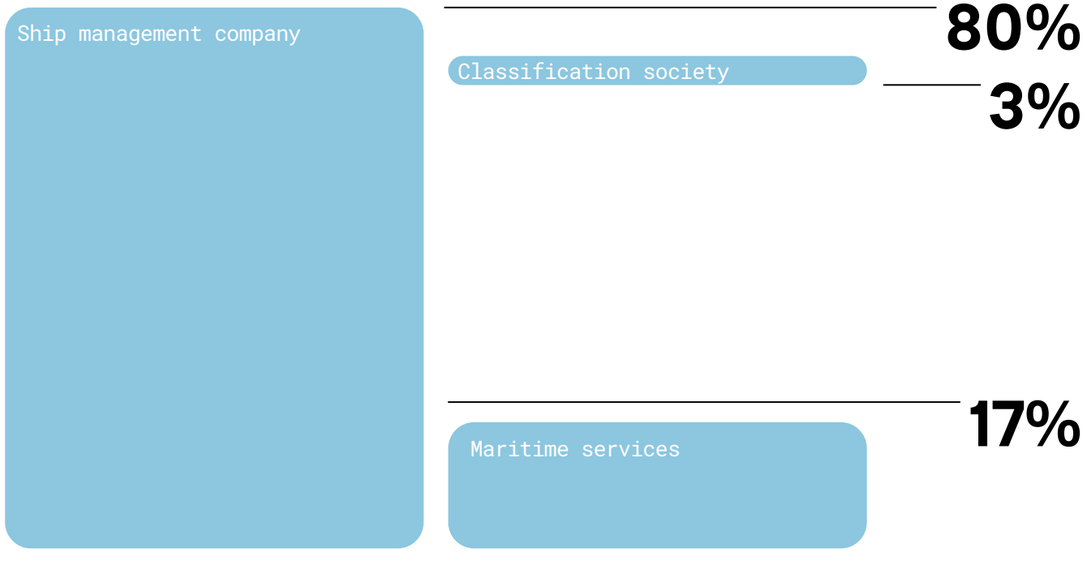
Environmental concerns and technological developments in the highly competitive and ever-evolving global shipping industry necessitate changes in the structure, management, and general operation of shipping companies.

Today's race to develop technologies aimed at reducing the environmental footprint of ships and the ever-increasing rate at which digitalisation and the potential dangers it entails are entering the shipping industry make it clear that the future of shipping will remain intertwined with technological progress and the implementation of innovative ideas.

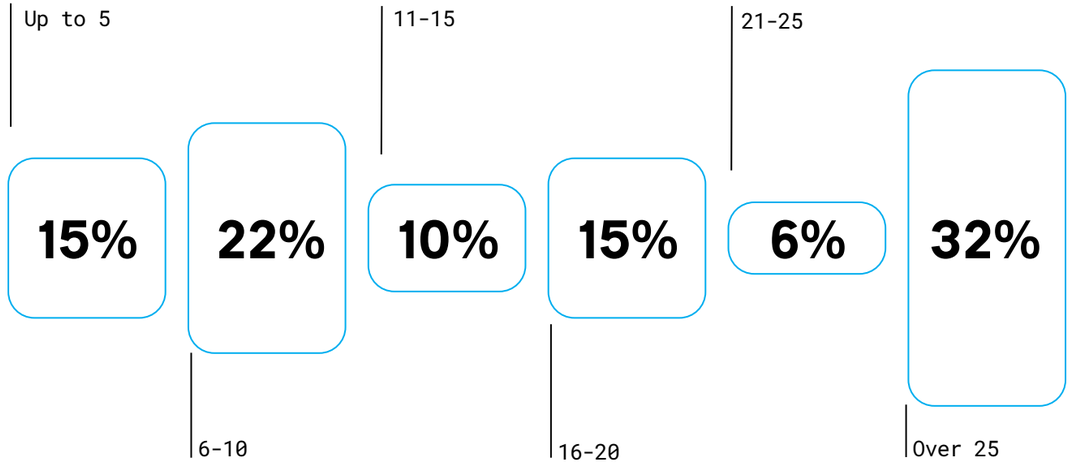
In this context, Naftika Chronika has conducted a survey on the subject of "Smart Shipping" based on the responses of MARTECMA members to a related questionnaire. A total of 75 people participated in the survey, of who 60 are representatives of shipping companies, 13 work for classification societies, and two in companies that provide services to the wider shipping industry.

This research aimed at recording the opinions of experts on the emerging trends driven by the digitalisation of the shipping industry and drawing conclusions about its most important effects.

Graph 1 Distribution of the survey participants based on the type of company they work for



Graph 2 Distribution of the survey participants based on the number of ships managed by the company they represent



DISTRIBUTION OF THE SURVEY PARTICIPANTS BASED ON THE NUMBER AND TYPE OF SHIPS MANAGED BY THE COMPANY THEY REPRESENT

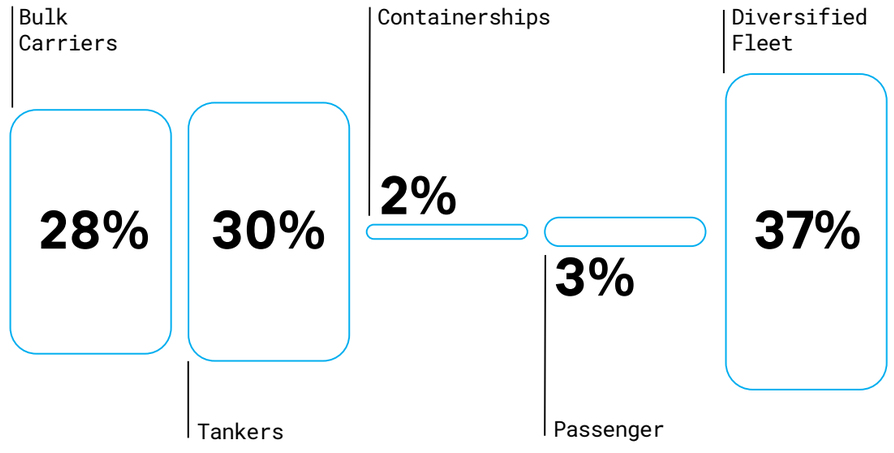
As indicated in Graph 1, 80% of the survey participants represent ship management companies of various sizes, categorised according to the number of vessels they manage. The company size category with the highest representation is companies managing more than 25 vessels. There are 19 such companies in the sample, representing 32% of the total.

To facilitate comparisons based on the size of the ship management companies represented in the survey, we have divided the sample into two further categories: representatives of companies with a fleet of up to 15 ships and representatives of companies with a fleet of more than 15 ships. 28 company representatives belong to the first category of ship management companies, while 32 belong to the second.

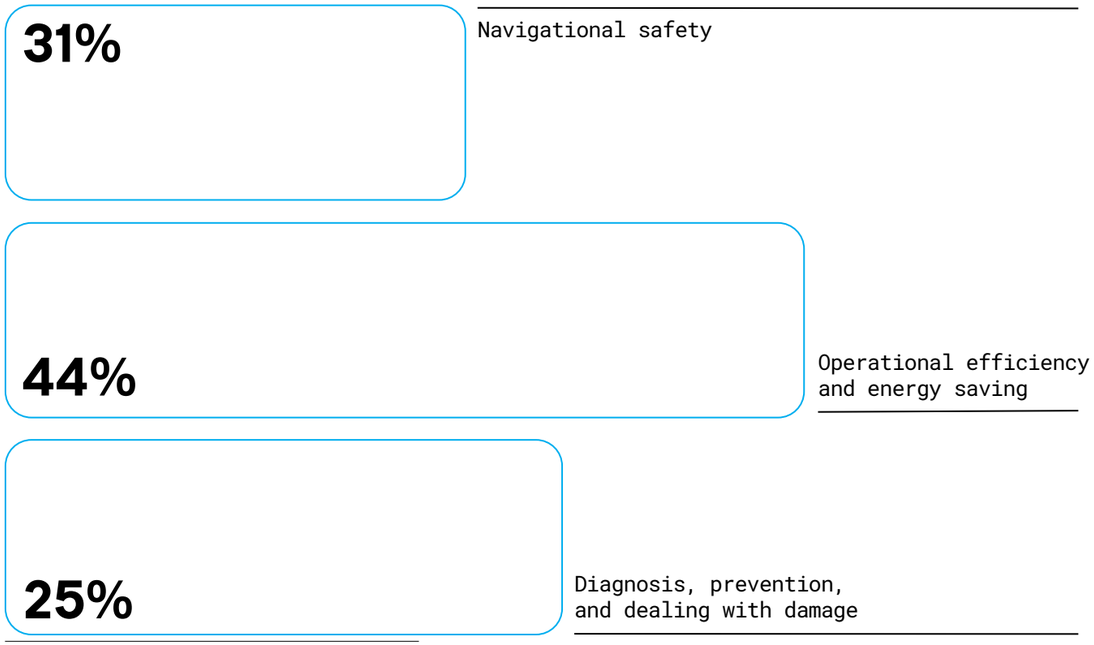
An additional axis of categorisation of survey participants is the type of vessels managed by their company. The critical role of bulk carriers and tankers in the Piraeus/Athens fleet is again evident. Of the survey's 60 shipping company representatives, 17 work in companies that exclusively manage bulk carriers and 18 in companies that exclusively manage tankers. Thus, 58% of the participants work in companies that exclusively manage one of the two main types of bulk shipping vessels.

At the same time, a significant 37% of participants represent companies managing diversified fleets. It is worth noting that four companies appear to be managing four different types of vessels: bulk carriers, tankers, containerships, and gas carriers. On the other hand, 12 participants represent companies only managing carriers and tankers.

Graph 3 Distribution of the shipping company representatives based on the types of ships managed by the company they work for



Graph 4 "Which aspect of ships' operation has benefitted the most from digitalisation?"



THE BENEFITS OF DIGITALISING THE SHIPPING INDUSTRY

One of the questions the 75 survey participants were asked to answer was which field has benefited the most from the digitalisation of the shipping industry. The options available were:

- Diagnosis, prevention and dealing with damage
- Operational efficiency and energy saving
- Navigational safety

44% of participants responded that the field that has gained the most is operational efficiency and energy saving. On the other hand, 31% of participants consider that the field that has reaped the most significant benefits is navigational safety.

Furthermore, one in four participants considers that the field of diagnosis, prevention and dealing with damage has experienced the most significant benefits. It appears that so far, the progress of digitalisation has benefitted operational efficiency and improved energy efficiency to a greater extent, which is probably due to the greater emphasis the global shipping industry has placed in recent years on reducing its environmental footprint, particularly in view of the increasingly stringent environmental regulations that are constantly coming into force.

In any case, it is worth noting that there are some differences if the size of the shipping company represented by the participants is taken into account: among the representatives of companies with more than 15 ships, the percentage of participants who consider that navigational safety has benefitted the most increases to 38% (vs the entire sample's 31%).

Conversely, among the representatives of companies that work for companies with a fleet of up to 15 ships, the percentage that considers that diagnosis, prevention, and dealing with damage has reaped the greatest benefits rises to 32% (vs the entire sample's 25%).

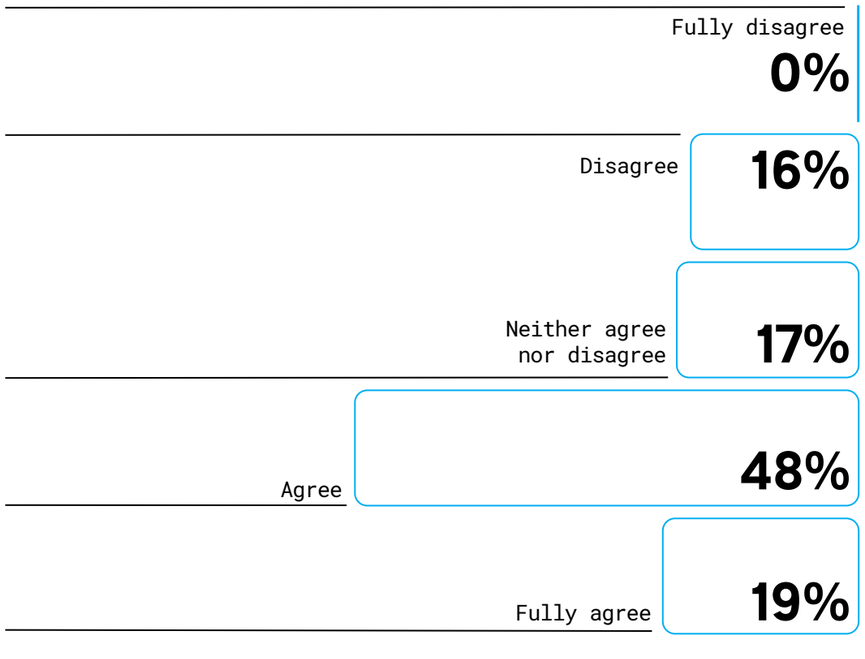
DATA ANALYSIS VS ENERGY SAVING

The next question participants were asked to answer was to what extent they agreed with the following statement: "Investing in connectivity-enhancing technologies and data analytics is just as important as investing in energy-saving technologies and alternative fuels to reduce the environmental footprint of shipping".

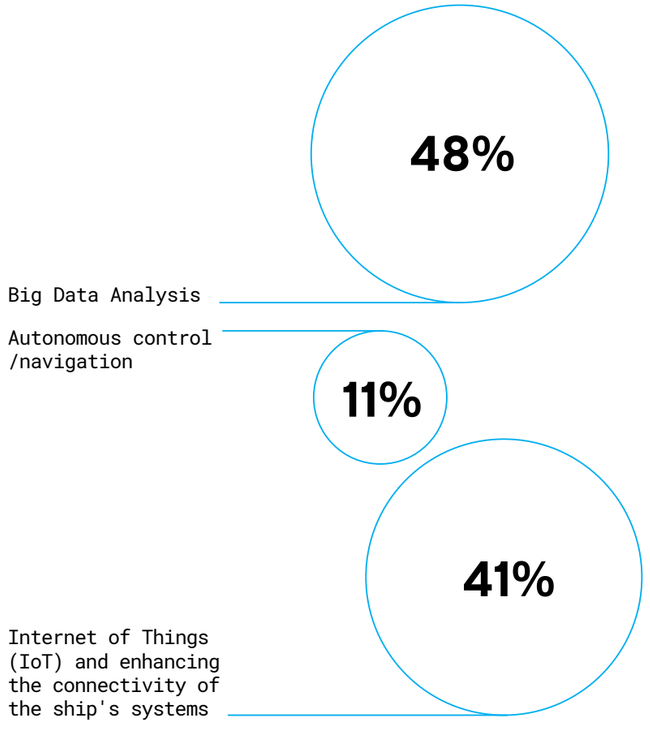
A noteworthy finding is that none of the participants completely disagreed with this statement. On the contrary, 14 participants (19% of the sample) fully agreed. Overall, those who agreed with the statement outnumbered those who disagreed: two out of three participants (67%) agreed or fully agreed with the statement.

Interestingly, when it comes to the representatives of companies managing a fleet of up to 15 ships, the percentage that agrees or fully agrees with the statement drops to 50%. This comes as no surprise, given that connectivity and data analytics needs become more pressing as a company's fleet size increases.

Graph 5 "Investing in technologies to enhance connectivity and data analysis is as important as investing in energy-saving technologies and alternative fuels to reduce the environmental footprint of shipping."



Graph 6 "Which of the following aspects of smart shipping do you think can yield the greatest results in terms of enhancing the ship's operational performance?"



THE OPERATIONAL PERFORMANCE OF SHIPS UNDER THE SPOTLIGHT

Concerning the enhancement of the operational performance of vessels, the participants were asked to answer which of the following aspects of "smart" shipping can bring the greatest benefits. The possible answers were:

- The Internet of Things (IoT and enhancing the connectivity of the ship's systems)
- Big Data Analysis
- Autonomous control/navigation

Based on the participants' responses, it is evident that the vast majority do not consider that autonomous navigation can offer the greatest benefits to the energy efficiency of ships. For example, only 11% chose this answer, while for the representatives of shipping companies with a fleet of up to 15 vessels, it drops to 4%.

Most participants believe that Big Data Analysis will yield the most benefits; however, a significant percentage of the sample said that the Internet of Things and the enhancement of the ship's systems can deliver the most benefits.

THE EFFECT OF DIGITALISATION ON CREWS

One of the most interesting aspects of shipping's digitalisation is its impact on the crews' role on board ships. The technological advances expected within the next few decades have led many to believe that fully autonomous vessels are not just a dream.

In this context, the participants were asked to answer a related question that focused on the effect of digitalisation on seafarers' roles. The possible answers to this question were:

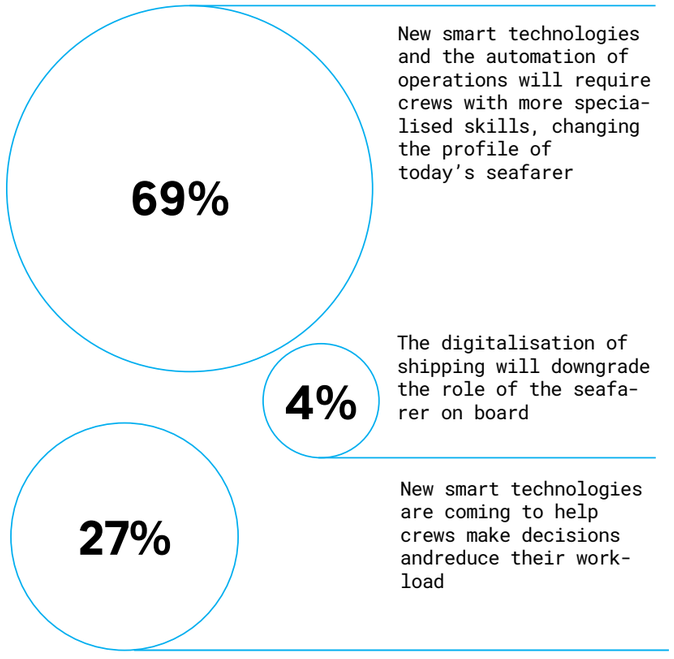
- The digitalisation of shipping will downgrade the role of the seafarer on board
- New smart technologies are coming to help crews make decisions and reduce their workload
- New smart technologies and the automation of operations will require crews with more specialised skills, changing the profile of today's seafarer

Judging by the responses, the survey participants expect the role of seafarers to remain crucial. Only three answered that digitalisation would downgrade the seafarer's role on the ship.

The majority of the participants believe that digitalisation will bring about changes in the training of crews rather than in their role on the ship. 69 participants answered that the profile of seafarers would change in the future due to the need for specialised individuals who will be able to deal with new smart technologies and the automation of certain vessel functions. Notably, for the representatives of companies that exclusively manage bulk carriers or tankers, this percentage increases to 80%.

At the same time, 27% of all respondents believe that progress in shipping's digitalisation will help both at the decision-making level and in reducing the workload of seafarers.

Graph 7 "What do you think will be the effect of shipping's digitalisation on the role that crews have on ships today? "



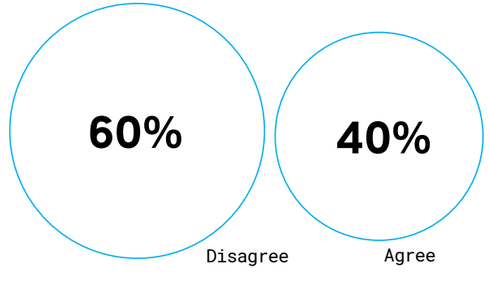
CYBERSPACE AND SECURITY: THE ROLE OF INTERNATIONAL ORGANISATIONS

One of the most critical threats posed by the digitalisation of the shipping industry is cyber-attacks. The more ship operations are carried out through remote or non-remote systems, the greater their vulnerability to cyber-attacks. This particular view has been consistently expressed by many members of the wider shipping industry, who also consider that the role of international organisations in protecting shipping companies is of great importance.

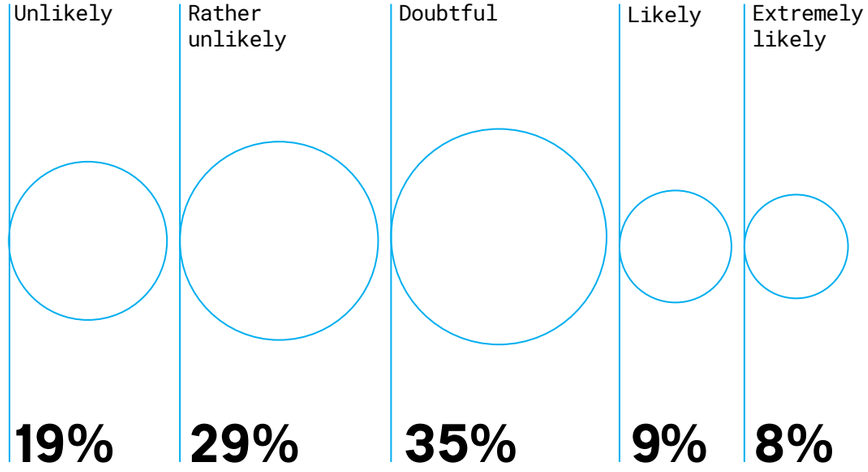
In this context, the survey participants were asked whether they believe international organisations have developed an adequate regulatory framework and provided sufficient information to protect shipping companies from cyber threats. 60% of the participants expressed scepticism regarding the progress of international organisations on this issue.

The concern expressed by shipping company executives and the wider shipping industry evident in their responses is probably based on the ever-increasing cyber-attack threats. According to Oriani Hellas, a provider of digital solutions for shipping, 2021 saw a 33% increase in cyber-attacks, with an average of one attack occurring every 39 seconds.

Graph 8 "International organisations have developed an adequate regulatory framework and provided sufficient information to protect shipping companies from cyber threats."



Graph 9 "How likely do you consider the implementation of fully autonomous navigation in merchant ships, in the near future?"



THE LIKELIHOOD OF FULLY AUTONOMOUS NAVIGATION IN THE FUTURE

Advances in technology raise many questions about the shipping industry's future, most of which are related to whether digitalisation will lead to autonomous merchant ships and, if so, to what extent. Although a part of the ship's operations does take place without human intervention, fully autonomous navigation is a complex matter that greatly depends on external factors, such as the protection of remotely controlled systems from cyber-attacks.

The survey's participants do not seem to consider fully autonomous navigation on merchant ships particularly likely: almost one in two (48%) answered that they think it is unlikely or rather unlikely. Fewer than one in five (17%) said it was likely or extremely likely.

At the same time, a significant percentage remains uncertain about the future; for example, more than one in three respondents (35%) answered that achieving fully autonomous merchant ships is doubtful.

It is noted that the participants' answers varied depending on whether they agreed or disagreed with the statement: "International organisations have developed an adequate regulatory framework and provide sufficient information to protect shipping companies from cyber threats". Of those who agreed with the statement, only 10% (vs the entire sample's 17%) consider fully autonomous navigation in the future likely or extremely likely.

On the other hand, of the participants who believed that there had been little progress in the regulatory framework of international organisations, 22% think that achieving fully autonomous navigation is likely or extremely likely. Consequently, 78% believe it is a doubtful/unlikely/rather unlikely development, which is probably linked to their belief that there has been little progress in the regulatory framework introduced by international organisations. Furthermore, it appears that regulatory unpreparedness regarding cybersecurity makes the achievement of autonomous navigation on merchant ships even more doubtful.

SUMMARY

This survey posed focused questions towards shipping industry representatives regarding the digitalisation of shipping and its possible benefits. Overall, investing in connectivity and data analytics technologies appears to be a high priority for most participants due to the many benefits they can provide in terms of improving performance and enhancing safety, but also diagnosing, preventing, and dealing with damage. At the same time, digitalisation does not appear to be a threat to the crews' role but an opportunity for their career development and improving working conditions on board. Finally, for the majority of the survey participants, fully autonomous navigation appears to be an unattainable goal for the time being. Moreover, a large percentage also believes that the current regulatory framework does not provide sufficient information on the protection of shipping companies from cyber threats.