



WHAT WILL SHAPE THE

DNV GL's Technology Outlook 2025 report is more about the probable than the possible and it suggests that digitalization will overturn today's business models and shape new modes of operation.

Every five years, DNV GL publishes the Technology Outlook to give customers and stakeholders a basis for discussion and insight into the technology landscape of the next decade. In shipping we can already see fundamental changes taking place, with many more in store.

The vessel of the future is rapidly becoming a floating computer, echoing developments in the automotive industry, where today's family cars have more computing power than early space shuttles. Digitalization of information flows will spur automation and positively impact safety and environmental performance. Advances in satellite communications will allow for a massive increase in the volumes of data transferred at ever-lower costs.

Onshore, new cloud technologies, such as big data platforms and digital twin technologies will have a dramatic effect on how the industry manages information, and how vessels and their components are designed, built and tested. Ship systems and their digital twins, virtual replicas of vessels and their systems, could be designed with the support of cloud-based information management and multimodel simulation platforms. Over time, increasingly detailed virtual models will be continuously populated with information collected on

board, accelerating the development of industrial big data and smart analytics platforms. This will improve fuel economy, maintenance and performance.

As technologies become more robust, unmanned vessels could also become a reality. This requires automation and high reliability of the engine and other integrated systems. In addition, advanced navigation systems and sophisticated algorithms to maintain a vessel's course are prerequisites. Based on different levels of autonomy, we can imagine a completely autonomous ship that reports to shore-based operators only when human input is needed or if emergency situations arise.

Cyberphysical systems

"Our view is that the coming decade will be all about the implementation of technologies that are known to us. What's new is the combination of advanced technologies from previously separate domains," says Remi Eriksen, Group President and CEO. "It may be hard to believe we're on the cusp of a technology-led revolution at a time when the global economy is slowing down. But I believe we are entering a new 'renaissance' of industrial progress characterized by a massive and accelerated uptake of cyberphysical systems."



FUTURE OF SHIPPING

A cyberphysical system comprises physical components that can be monitored, controlled and optimized by smart sensors, advanced software and actuators. Modern ships are becoming highly automated and are increasingly dependent on software-based control systems. Advances are likely to be applied to machinery systems first and then move gradually to vessel navigation systems, which will increasingly rely on advanced software and sensors to alert the navigator of possible hazards and propose appropriate courses of action to maintain safety.

These developments will also lead to on-board systems being managed remotely. Crews will be reduced, and more decisions will be made from shore-based control centres.

Additive manufacturing - or 3D printing - is dramatically changing where and how things are made in other industries, and shipping will likely see an uptake of this technology too. Spare parts for ships, for instance, could be printed out at a port of convenience; conceivably from recycled material as circular economy models become pervasive.

More efficient supply chains

Digitization will impact entire supply chains enabling them to be more efficiently organized around adaptable operations that leverage timely information on cargo, routes, and the operation and condition of assets. This will reduce lead times and fuel consumption by optimizing arrival times, while also allowing

better organization of cargo handling operations and onshore personnel.

Finally, there is little doubt that financial, regulatory and societal pressures will continue to be exerted to encourage shipping to lower its environmental impact. This will result in growing numbers of vessels being designed to offer superior energy efficiency through measures such as improved hydrodynamics, use of lightweight materials and advanced hybrid power generation systems. New, increasingly effective solutions to reduce water and air pollution will become available. Diversification of the fuel mix should also be expected, with an increasing share of distillate fuels as well as scrubbers for compliance with upcoming low-sulphur requirements. Alternative fuels such as LNG and vessel hybridization have the potential to play a more important role, and grid electricity could become standard for cold ironing in ports.

DNV GL's Technology Outlook 2025 makes predictions based on economic, geopolitical and demographic trends. It has three main focus areas: shipping, energy - including power as well as oil and gas - and life sciences. The report suggests that digitalization will feature heavily in the future of all of these focus areas. ■ PWR

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