
WHITEPAPER

Making waves in your ship's performance

Digitalization at the engine-level



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According to research conducted by Gartner, 67% of business leaders say their company will no longer be competitive⁰¹ if it can't be significantly more digital by 2020.

01 <https://www.gartner.com/smarterwithgartner/mobilize-every-function-in-the-organization-for-digitalization/>

02 <https://www.pomsmeetings.org/confpapers/020/020-0355.pdf>

03 https://unctad.org/en/PublicationsLibrary/rmt2018_en.pdf

04 <https://medium.com/harvard-business-school-digital-initiative/maersk-reinventing-the-shipping-industry-using-iot-and-blockchain-f84f74fe84f9>

With the shipping industry on the brink of digitalization, this paper will highlight how digitalization can increase OPEX efficiency by transforming operational performance and enabling remote asset monitoring and maintenance. It will also explore the cultural and mind set shift required, through digital transformation, for ship owners to be able to extract the full value that digitalization brings.

When it comes to technology and digitalization, the shipping sector has historically been slower to adapt than other industries. This is in part due to longer lifecycle of assets, but also high development costs of new solutions and strict industry regulations⁰² that prohibit incentives to invest.

It's also because of the very nature of digitalization. In essence, digitalization is a fast moving, disruptive trend with short innovation cycles. In contrast, vessels are long lasting assets that are in operation for up to 30 years with traditionally slow lifecycle investments. The challenge for shipping companies lies in integrating something fast paced into a more traditional and inherently complex industry.

Now is the time for digitalization

Global seaborne trade is doing well, supported by the 2017 upswing in the world economy. Expanding at 4%, the fastest growth in five years, global maritime trade gathered momentum and raised sentiment in the shipping industry. Total volumes reached 10.7 billion tons, reflecting an additional 411 million tons, nearly half of which were made of dry bulk commodities⁰³.

Despite this recent upturn, in 2019, external pressures are shortening innovation cycles in shipping and encouraging digitalization. These pressures include ambitious

decarbonization targets set by the International Maritime Organization; the rising cost of low-sulphur / cleaner fuel; the soft state of the market (with plenty of excess capacity); as well as the inherent cyber threat from hackers as ships become more connected. Added to these is the 'Rise of the ethical consumer' that places importance not only on cost and quality, but the carbon footprint of their purchased product.

The potential that digitalization has in terms of preserving the lifetime of assets, optimizing the performance of assets, as well as increasing the safety, reliability and efficiency of operations, means that (if executed correctly) it can enable shipping companies to thrive in this new operating environment.

The benefits of digitalization at the engine-level

Digitalization is already being integrated with various elements of ship operations. Established technologies we've seen in other industries such as Blockchain, Internet of Things and cloud analytics are changing marine-related processes and transforming logistics, supply chain and port processes. Blockchain alone is estimated to save the industry billions of dollars through more accurate container tracking capability and by automating shipping transactions⁰⁴.

ABB's propulsion performance monitoring systems

There can be the misconception within the shipping industry that digitalization makes operations and processes more complex. The term can conjure up images of flashing lights, numerous sensors and warning sounds, leaving ship operators more confused than ever. There is also a perception that one needs an IT qualification to make sense of the data that digitalization brings. This is partly due to the sheer number of digital solutions currently on the

market, all claiming to transform processes and optimize your assets.

The reality of effective digitalization is quite different. Executed in the right way, digitalization makes the complex simple. By harnessing the power of technology to transform data into simple, actionable insights, it can help you maximize the value and performance of your assets.

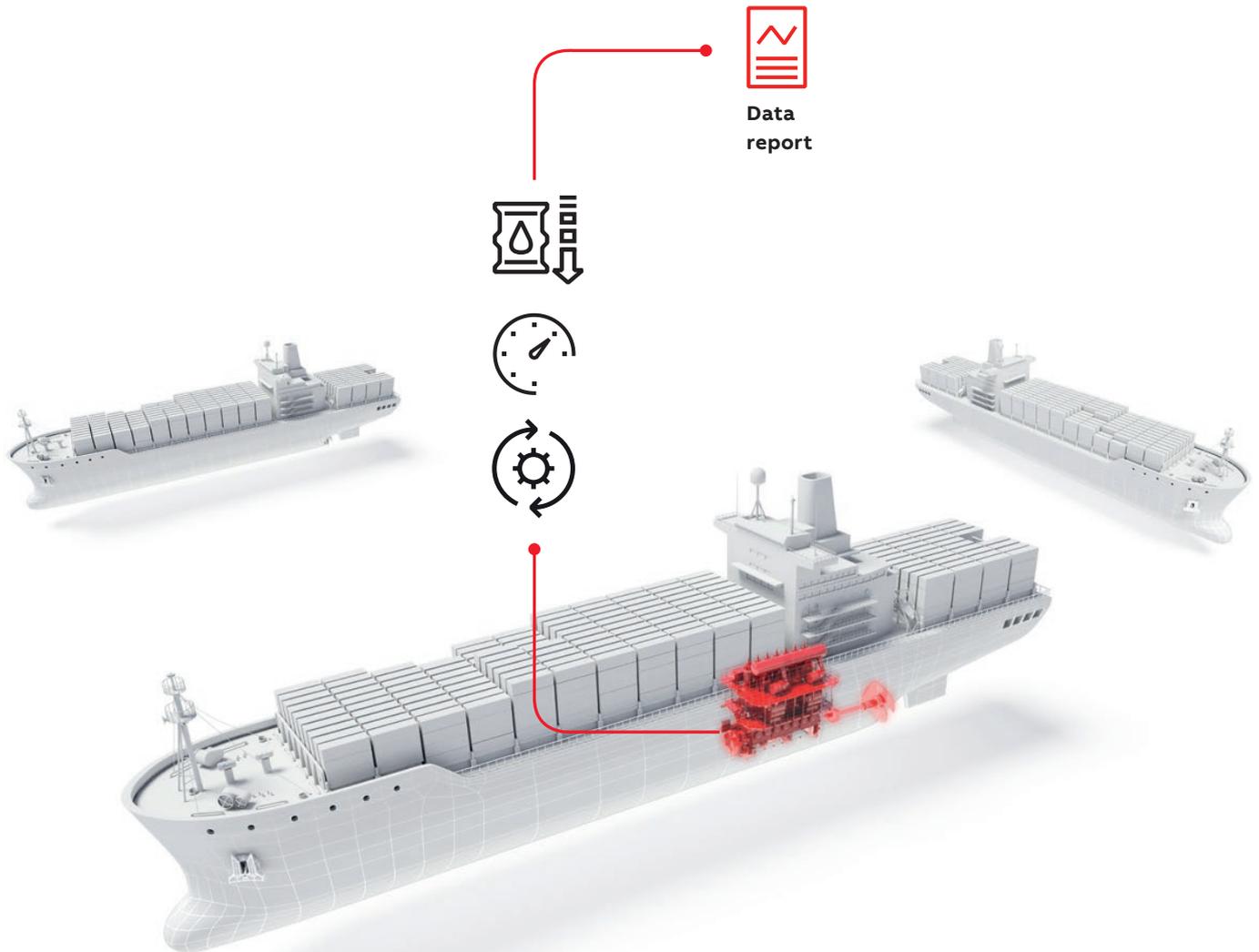
There are now thousands of digital products in the shipping industry, all claiming to be superior. At ABB, we believe that the best digital solutions on the market are disruptive by their very nature. Various ways exist to optimize the performance of your ship. Some common solutions include slow steaming, weather routing, and a design change of the hull or modification of the propellers. Yet one of the key contributors to fuel saving is often overlooked: the engine.

Current solutions on the market still view the engine as a 'black box' where fuel comes in and

results in shaft power output. This approach only allows for very limited diagnostics and advisory.

Digitalization at the engine level already provides services such as predictive maintenance. However, it can also provide instant, in-depth analysis of the engine with actionable advice or steps that reduce fuel oil consumption. This can ensure the engine is operating at maximum performance, and help extend the lifetime of the engine by monitoring asset health.

Here at ABB Turbocharging, our ABB Ability™ Tekomar XPERT solutions are changing day-to-day roles and unlocking new value and levels of performance from the engine. We are using the power of technology to transform complex data into insights and dissecting data to support Chief Engineers and Fleet Managers alike. Tekomar XPERT provides engine specific analytics to support the Chief Engineer, whereas Tekomar XPERT for fleet provides information at the fleet level for Fleet Managers and Technical Directors.



Making waves in engine performance with ABB Ability™ Tekomar XPERT

Tekomar XPERT is a unique solution that has been developed by engineers. Previously, Chief Engineers put together monthly reports around engine maintenance and performance that were sent on to their respective Superintendents. These reports are time consuming and involve complex analysis and calculations.

Now, Tekomar XPERT is making all of this easier and faster. It allows Chief Engineers to identify the reasons for sub-par engine performance at a glance. It precisely quantifies an engine's optimization potential in a systematic way, and therefore reduces the workload for the crew. It also offers recommendations for adjusting and maintaining a vessel's main and auxiliary engines. The result is total peace of mind, with cost savings and reliability for sustained peak fleet performance.

It's also unique because benchmarking physical paper reports over a period of time is challenging. However, Tekomar XPERT allows Superintendents to compare performance over any time period easily and efficiently.

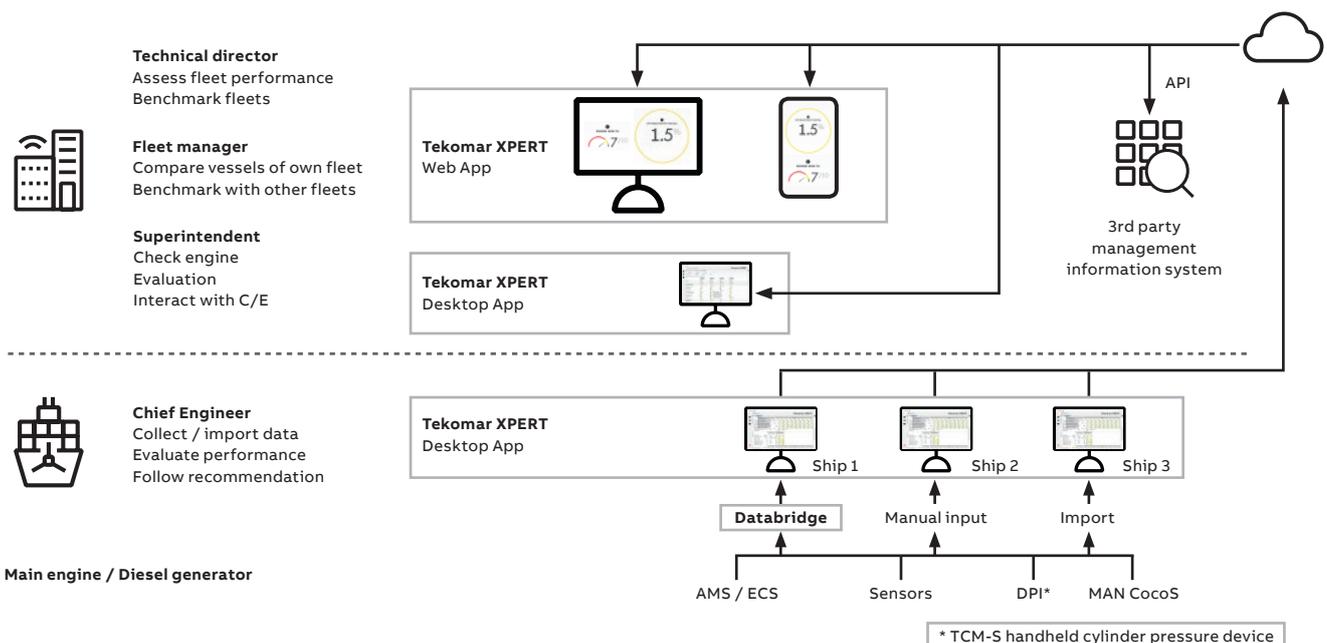
Tekomar XPERT transforms the workload of Chief Engineers and provides crucial insights into operations, offering the following potential savings:

- Optimized engine performance and fuel efficiency;
- Less maintenance costs;
- Increased reliability.

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01 Engine performance diagnostics for all levels in shipping companies

ABB Ability™ Tekomar XPERT for fleet

Engine performance diagnostics for all levels in shipping companies



Benchmark your fleet from a new perspective with ABB Ability™ Tekomar XPERT for fleet

Continuous identification of efficiency gains across a fleet can be very time consuming for Fleet Managers and Superintendents and the analysis time per engine can take up to three hours. Our competitors may have a specific solution for their engines, but not a solution that covers all different brands and types like ours. Further, if there are multiple systems in place, complexity will be high and the efforts to obtain the right information for decision making will be substantial.

Fleet management systems have also become quite large and complex, so filtering critical information and setting the right priority has become more difficult. The engine is complex and requires a multitude of various data to drive the right conclusions in a timely manner.

Our latest solution is built specifically for the Fleet Manager and the Technical Director. Building on Tekomar XPERT, it's called Tekomar XPERT for fleet and it is designed to specifically support middle and top management decisions. It provides a high-level view of your fleet performance and condition.

Previously, Fleet Managers would be faced with the daunting, lengthy task of collating physical reports to assess the relative performance of their different fleets. Tekomar XPERT for fleet alters this by processing complex data (with input still required from Chief Engineers in the desktop app) into three simple KPIs and creates a holistic view of the entire fleet performance in the Tekomar XPERT web app. Given that fleet

sizes can range enormously, this saves a significant amount of time and allows Fleet Managers to compare vessel to vessel operations, benchmark vessel to fleet, compare fleet to fleet, and benchmark fleet to company.

Furthermore, the fuel savings that can be achieved with Tekomar XPERT will be even higher when using cleaner, more expensive low sulphur fuels. Regulation is also getting tougher and expensive solutions may be required for current engines to comply with IMO tier III. Tekomar XPERT is a very cost-efficient solution to optimize your emission footprint today, and potentially safe-guard yourself tomorrow.

Aside from Fleet Managers, there are also additional benefits for Charterers. Tekomar XPERT for fleet gives Charterers the confirmation that the lowest possible fuel consumption is achieved, as well as assurance that the charter-owners are delivering a highly efficient vessel with good asset health. They can also benchmark charter-owners to ensure best in-class deals and optimize profitability.

There are additional benefits for Technical Managers too. Tekomar XPERT provides a common basis for office/ship discussion on engine performance. Technical Managers can also ensure the lowest fuel consumption at highest efficiencies to fulfil their contract. They can also compare vessels and fleets, and drill down in detail where needed, whilst also being able to report to superior management.

Digitalization Vs Digital Transformation

What's the difference?

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01 <https://hbr.org/2019/03/digital-transformation-is-not-about-technology>

According to Harvard Business Review⁰¹, of the \$1.3 trillion that was spent on digitalization in 2018, it was estimated that \$900 billion went to waste. Even the best digital solutions on the market won't have the desired impact unless the organization has the right mind set to capitalize on the technology.

Why do some efforts succeed while others fail?

Organizations that have successfully embraced digital understand that it's a journey. 'Digital transformation' and 'digitalization' are two words often referred to in any discussions around the future success of the shipping industry. However, it's important to note that they are two very different concepts. To extract the value from your digital investment, it's important to understand (and facilitate) both:

Digitalization is a technical, process-driven, transition to introduce new digital technology to a business.

Digital Transformation is an organizational and cultural shift (internally) that allows your workforce to embrace the positive changes that digital solutions can bring to entire processes, competencies and business models. It cannot be implemented as a project, it's a journey that will allow your organization to continuously capitalize on the latest technology innovations.

"Culture eats strategy for breakfast"

As Peter Drucker, the famous Austrian management consultant once said "culture eats strategy for breakfast" and the same applies for digital transformation.

Too often, the digital discourse in shipping solely addresses the technology skillset required, rather than the cultural skillset required. Almost all attention is focussed on the capabilities of the technology, rather than how it is embedded from a cultural perspective.

Even the best digital solutions in the marketplace (that have the ability to change fundamental

processes and unlock entirely new value) will have very little impact unless your organization is ready to embrace the changes the technology will bring. In other words, successful digitalization relies upon digital transformation.

To prepare for digital transformation, before implementing any new kind of digital solution, organizations must bring employees on board early so they are aware of how the technology will alter their day-to-day role. Clear transition processes with clear timelines need to be established and employees must recognize how their required skillset may change in light of new processes.

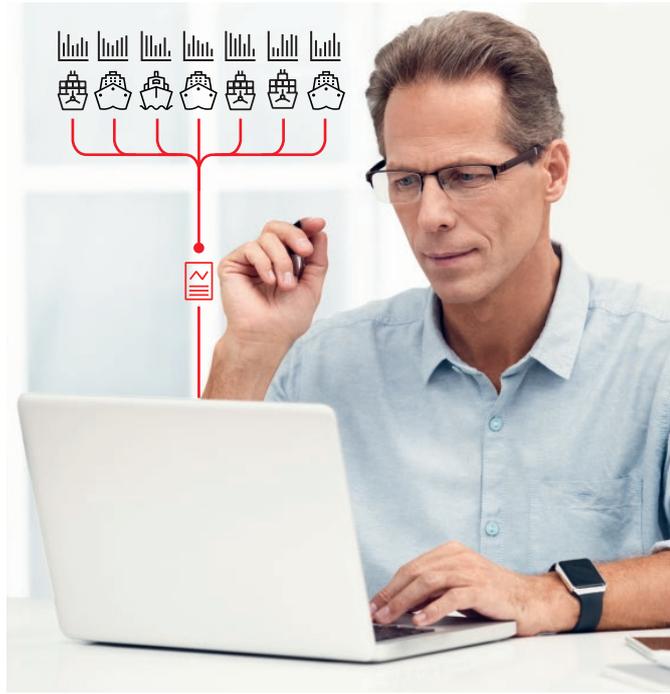
At ABB, our Tekomar team is ready to support the initial integration for customers at the start of their transformation journey, whilst rolling out the solution at the same time. Our Tekomar solution also includes training videos on the portal as part of the overall package, so that employees are clear on how their roles may adapt, as a result of the solution.

Digital transformation will never happen if it's confined to engineers or technical staff within an organization. It's a company-wide process, designed to build a culture of acceptance to extract the most value from your assets.

The benefits that digitalization at the engine level can have on the overall performance of your ship are often overlooked. The reality is that it can bring about drastic improvements to operational efficiency, asset monitoring and maintenance. Digitalization also has the potential to benefit broader stakeholders in the industry, including insurers and financiers.

ABB's Tekomar solution is a powerful example of how digitalization can change established processes and unlock new value by transforming data into actionable insights. The key is for shipping companies to be ready to capitalize on these benefits by beginning their digital transformation journey.







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