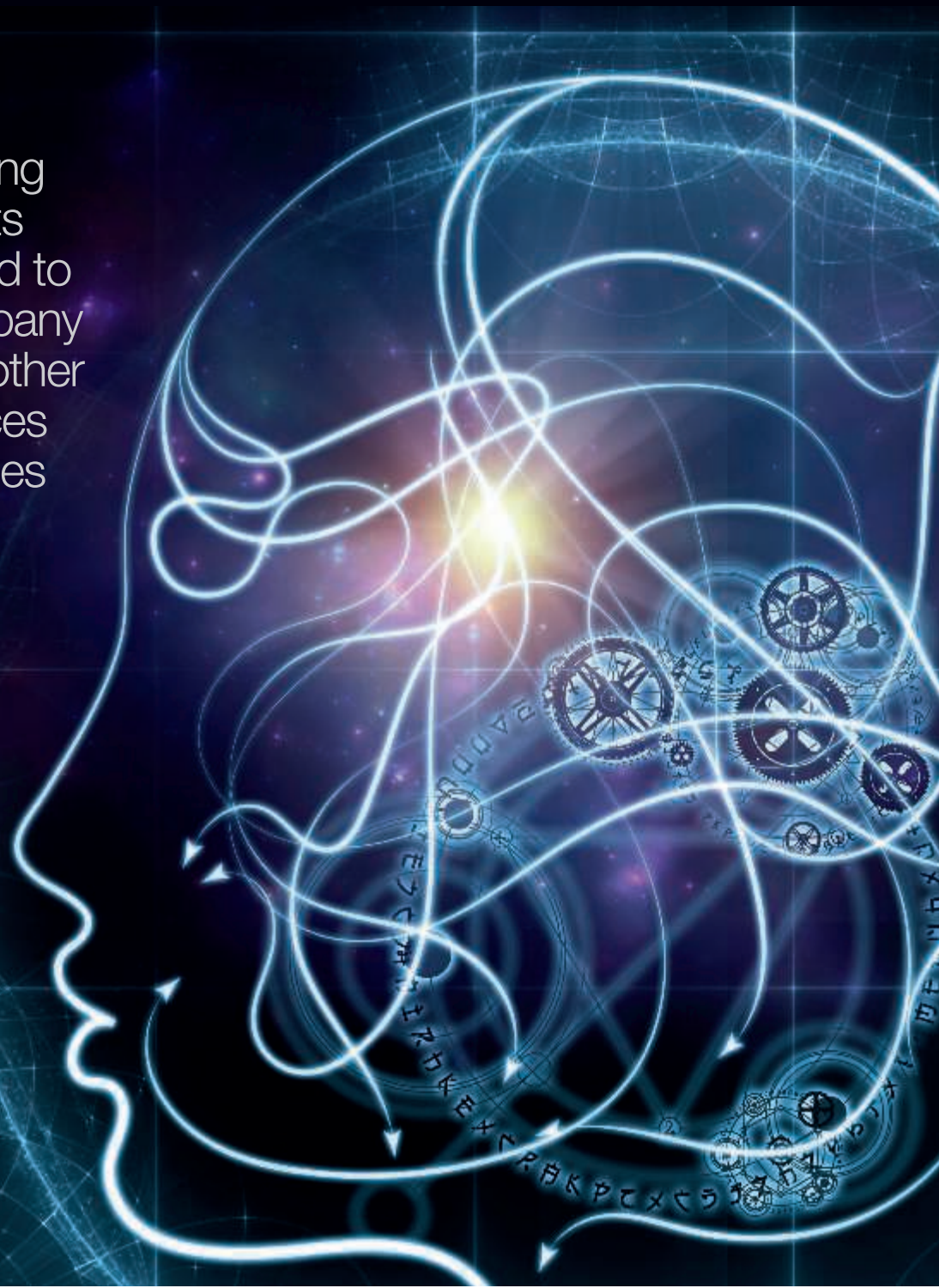


External research

extends a company's industry insights

MacGregor understands the importance of making an ongoing commitment to its own research and to expose the company to scrutiny from other informative sources such as universities



MacGregor is no stranger to industry and university collaborations, participating in numerous projects over the years. It values collaborative approaches and understands that research is designed to create competencies that outlast individual projects by developing existing processes, creating new knowledge and through organisational changes based on insights gained throughout a research cycle.

“We have multiple ongoing collaborative R&D projects, both in business development and also in product development,” says **Henri Paukku**, Director of Cooperation and Funding, MacGregor. “We encourage knowledge sharing inside our organisation and my aim is to help

others within MacGregor build collaborative relationships with universities and together then identifying interesting focus areas for research and innovation.

“Collaboration works well when mutual benefits are easy to identify,” he notes. “From the university’s side, I think it needs to find and adapt theories to match our current problems – this is the universities’ value proposition for MacGregor.”

A different perspective

“Research collaboration is important because of the different perspectives it provides,” Mr Paukku continues. “We tend to be very focused on the details, while researchers can consider a wider, more general level or a cross-industrial view.

“We have multiple ongoing collaborative R&D projects, both in business development and also in product development”

Henri Paukku

Universities also help set up situations in which new ideas are tested, raising new questions which lead us to new opportunities.

“Fundamentally, I think that working with universities gives companies a better insight into their own organisations.”

MacGregor looks to use this better insight to meet the needs of today’s changing industry and sees its expertise as a crucial driver in this new landscape.



With a three-decade background in cargo handling and now a recent university endeavour, Industry Professor Matti Sommarberg, understands more than most how the merchant shipping industry is transforming

Photo: TUT photo library

Industry Professor, **Matti Sommarberg**, from the Tampere University of Technology, Finland, understands more than most how the merchant shipping industry is transforming. He enjoys the benefits of a three-decade background in the cargo handling industry and now a more recent university endeavour.

“Business predictions are most often based on histories,” Professor Sommarberg explains. “Currently, you could argue that the containership market is going through one of its normal economic cycles, one that I have witnessed many times over. These cycles are driven, yes by a need to replace tonnage, but it is entirely dependent on consumer demands. For hundreds of years merchant shipping has existed and even today, despite the progressive changes that we see within the industry, its premise is still the same, it meets consumer needs. I do not see this fact changing significantly, but how we meet these needs will fundamentally change.”

Ships have been getting bigger to cope with a general increase in consumption. This is not limited to container shipping, but also includes larger bulk carriers to meet the rise in demand for raw materials to support infrastructure development and energy production. “However, it is important to note that these increases are largely driven by a growing middle-class and at some point this will plateau,” he notes.

The changing shape of business

Business in the merchant shipping industry is increasingly directly and indirectly impacted by the rise in digital technology. “This is changing the shape of how to do business; how companies serve their customers and will ultimately alter the products and services that a company offers,” says Professor Sommarberg.

“In system integration businesses, there is a high value in combining technologies into products to solve a problem. Components and systems can be

refined to reduce fuel consumption and increase efficiencies. Products still have to function in the environment that they serve; lifting heavy loads or keeping a vessel watertight, but digitalisation will eventually significantly impact these physical products as well. These are the hidden drivers of technological advances.”

“We do not yet know the full implications of a network economy or the exponential changes that digital technology will bring... However, it is clear that we will still need the tool maker”

Matti Sommarberg

On one level, the impact of digital technology across industries is easy to see; almost everyone works on computers in some capacity and smartphones are ubiquitous. Professor Sommarberg believes that this disparate collection of technology within every business will one day bring about an exponential technological revolution; one that people are not capable of seeing as it is on such a massive scale. “At the beginning these changes look reasonable and progressive, but at some point in time, these technologies will combine and the end result holds almost countless opportunities.”

A new business model

Alliances in the merchant shipping sector are making businesses more competitive. “Although not on this magnitude, they have happened for years,” he says. “The question that we should be asking ourselves is: should there be a business model change?”

“Thirty or forty years ago, with a new wave of digital technology, companies were developing in-house systems at great expense. Then these companies looked out to see that perhaps shared platforms and

co-creation could increase their business’ value-chains and the entire eco-system. This required a paradigm shift. Companies are becoming more data-centric and are learning that success is based on how you intake this knowledge more effectively and what you then do with it.

“We are approaching the arrival of a network economy, but there are considerations for the platforms that this network will depend on. I often ask the question: how successful would the internet have been if there had been five or even ten internets? Its success was dependent on it connecting everyone in one place. The success of a network economy will be dependent on much the same phenomena.”

Disruptive and progressive technology

Professor Sommarberg notes that from his own research the biggest barriers to a network economy are managerial beliefs and a lack of capabilities. “We see that truly disruptive innovations do not often come from within industries themselves. Businesses have an inherent wish for the ‘status quo’ and this is really not surprising, it is logical; they have invested in a structure that supports the way they operate. A disruptive technology would potentially undermine this investment. Successful businesses were potentially once disruptive; they remain successful because of their stability and continuation in feeding a market need that they in part created. However, disruptive technologies are arriving along with other more progressive changes.”

MacGregor recognises these barriers and looks to preserve its innovative roots. A notable example was pioneering the use of electric-drive products decades ago. “For quite some time, electrification has been a major technological trend and it is also one of the biggest advances in recent times in merchant shipping,” says Professor Sommarberg. “Electric-drive products provide a way to store or recover energy through their use and remove any

potential environmental impact of oil pollution as they eliminate the need for hydraulic oil. If more of them enter service, then there are obvious benefits from economies of scale, so they can then be even more competitive.

“There are many other advances that I could mention and I should also highlight 3D printing. I am not sure yet whether it will be evolutionary or revolutionary, it has the potential for either.”

Service is key

With all these digital changes, a key factor that will have even greater influence in the future is service. Through direct data collection from equipment and data-sharing platforms, it is possible to achieve deeper business understanding by using

performance data, safety statistics and maintenance data, and by applying artificial intelligence tools. This knowledge will improve products and services. Businesses can then share these benefits directly with the customer and through the development of improved or new equipment. “The benefits of this are so clear and of evident value that we should no longer be talking about them,” he stresses. “We should be implementing them. We have the tools, we have had the tools for a while; we now need to do something.

“We do not yet know the full implications of a network economy or the exponential changes that digital technology will bring. For example, this might include technology with augmented intelligence; learning how to operate

“For quite some time, electrification has been a major technological trend and it is also one of the biggest advances in recent times in merchant shipping”

Matti Sommarberg

better as it performs. This in turn will inform how we design and build a product and it has implications for the materials we use to construct it. However, it is clear that we will still need the tool maker. The future lies in being able to combine the acquired knowledge and having the skills to use it. This is why collaborations with companies and the academic community will be beneficial.” ■

University collaboration empowers cargo handling business strategy

A university collaboration that reached its conclusion this summer was the three-year R&D project, part of DIMECC's (Digital, Internet, Materials & Engineering Co-Creation) Rebus project with Turku School of Economics and Åbo Academi in Finland.

During the project, collaborative action research focused on empowering MacGregor's cargo handling business

strategy and developing value-adding operational practices.

Henri Paukku, Director of Cooperation and Funding, MacGregor, has been involved in the project since its beginning. “Initially we were challenged to thoroughly analyse the structure and dynamics of our industry,” he says. “The research team also helped us to structure our organisational changes and

development processes when we were going through the transformation of becoming a more service-oriented company from a very product-focused one.”

Notably, the project led to the development of the MacGregor PlusPartner concept, including the Cargo Boost service, which are already benefitting MacGregor's globally operating customers.

The shipping industry depends on safe, reliable and efficient towing operations

New robotics project promises efficiency and safety increases

MacGregor has entered into a new three-year robotics project with the University of Agder in Norway. The purpose of the project, which is partly funded by the Norwegian Research Council, is to further develop a long-reach lifting and mounting manipulator robot so that it could ultimately be adapted and further developed for precision robotics in challenging environments.

“Currently, the lifting and mounting manipulator is being developed for automating the construction of facade panels,” says **Eivind Gimming Stensland**, Director, Technology & Development, Advanced Offshore Solutions, MacGregor. “Ultimately, we hope it will combine the best of various technologies, which will then be adapted and further developed for use in remote operations and the offshore industry.”

The manipulator will use robotic controls and an advanced sensor system. “Automated build processes contribute to increased quality, efficiency and safety,” Mr Stensland adds.



Service solution collaboration for augmented reality ships

MacGregor has started a joint research project with the Technical University in Hamburg, Germany, to develop an augmented reality-based system, supporting maintenance and service activities on ships. The aim is to have a solution that offers real-time images with enriched information, allowing the replacement of traditional user manuals with digital service documents that have embedded augmented reality for intelligent visualisation. The system will provide easy-

to-understand, step-by-step instructions for regular maintenance tasks. Furthermore, tele-maintenance and spare parts ordering facilities will be integrated into the digital documentation system.

The project, funded by the German Government, started in July 2017 and is planned for completion at the end of June 2020. MacGregor will collaborate and share expertise with the university as well as with Alfred Kuhse GmbH and MAN Diesel & Turbo.

Collaboration project enables remote-controlled harbour tug operations

MacGregor has announced its participation in a collaboration project that will see the company work together with industry partners, academia, a shipowner and the Hamburg port authority to enable remote-controlled harbour tug operations by 2020 and to start marketing the technology during 2022.

As the remote-controlled tugs will be crewless, winch-handling processes need to be automated; MacGregor will develop the technical solution for an autonomous rope handover system.

“The shipping industry is dependent on safe, reliable and efficient towing operations,” says **Jörg Peschke**, Director, Drives and Controls, R&D and

Technology, MacGregor. “Ships are getting bigger and bigger, whilst harbour infrastructures will remain the same in size. Therefore it will be increasingly difficult to coordinate and control the number of vessels involved in towing manoeuvres.

“In the future, software-supported central operators will optimise towing manoeuvre patterns and coordinate the collaboration of various tugs,” Mr Peschke continues. “Remote-controlled harbour tugs are key to this kind of application and will improve the safety, reliability and economic efficiency of future tug boat operations.”



Photo: F. Berkeleer