SCOPE

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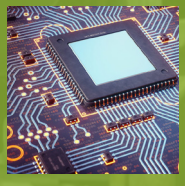

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SCOPE is an quarterly publication of Industria, Technisch Bedrijfskundige Studievereniging and Alumnia, Alumnivereniging of Industrial Engineering at the University of Technology Eindhoven.

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Industria

Shortages

The SCOPE in front of you is a special one. Besides being the last edition for me as a chief editor, it is also the first edition which is only available online for Industria members. If you are reading this SCOPE via the Industria App, but realize that you would rather read the physical one, reminder that you still can get a free ticket via industria.tue.nl. If you have a ticket for the physical SCOPE, you can pick it up at our boardroom (Atlas 2.328).

This edition contains various articles about the theme ‘Shortages. Nynke Theunissen spoke with Alex Heanen of Acccenture about their goals with hyper automation. Sander Roeleven interviewed Student Consultant about their goals of the future and Fleur Machielsen visited Advantech to discuss the issue of shortages. Furthermore, Marijn Konings interviewed AME to discuss shortages in material and Joost van der Haar wrote an article about how the world is dealing with food shortages in times of crisis.

Next to this, Bauke Wijnands discussed the future of Mobility as a Service with Oktay Türetken and Rogier Zondag reveals the theme of the 39th congress. Moreover, Niek de Jong spoke with Max Sturkenboom about his new role within the ESTIEM Board and the 59th Industria Board introduces herself. The Alumnia update, Alumnia speaking and the columns can be found on the last pages.

Now, there is nothing left for me to do than thank you for everything. Last year, it was a pleasure to be the chief editor of the SCOPE. It is time for me to pass the baton to my successor Marijn Konings. Thank you for reading the SCOPE last year and have fun reading my last edition.

Caitlin Riesewijk
Chief editor SCOPE

Preface

Shortages

Department

Other

Businesses are focusing on process automation more and more, as it improves efficiency by eliminating easy and repetitive tasks. But what if there is a way to automize automation? Hyperautomation is the solution. Hyperautomation combines multiple automation processes to make one big system. It is not only copying steps of a work process with digital tools it is also looking for smart ways to implement algorithms to make the process run even smoother. We had the privilege to talk to Axel Haenen who is working for Accenture as a Technology Consultant.

TEXT Nynke Theunissen DESIGN Marijn Konings

Hyperautomation: Taking Automation to the Next Level

What is hyperautomation?

Hyperautomation is a business-driven approach to rapidly identify, analyze, and automate as many business and IT processes as possible. Hyperautomation involves the orchestrated use of multiple technologies, tools, and platforms, including Artificial Intelligence (AI), Machine learning (ML), Robotic Process Automation(RPA), low code/ no code, and many more. In short, Hyperautomation is a combination of different automated processes to become one coherent system in an organization. It allows organizations to improve productivity by eliminating bottlenecks and optimizing processes end-to-end, to increase return on investment (ROI), and increase insights from data by adding advanced analytics capabilities on top of automation solutions. This, in turn, helps to become more time efficient, make smarter decisions with the available data, and free-up employees to focus on more value-adding activities instead of manual repetitive tasks. For the latter, it could, for example, mean that employees only have to look at extraordinary cases that require more attention and the simple cases are handled by a computer.

Hyperautomation Implementation

Accenture offers clients end-to-end hyperautomation services for clients from all industries, from strategy to outsourcing. Axel: "This means that we offer clients a way to automize different processes in multiple departments of the company. This can be done in different

industries and at different levels. In the financial sector, they are for example already very advanced automated processes, but in governmental agencies, automation is not that integrated yet." In both cases, Accenture can come up with an end-to-end personalized plan to help automate and integrate processes. These plans could entail different things:
Accenture can help clients to design hyperautomation strategies that allow them to organize the implementation of hyperautomation.

Accenture can help clients to design and set up Hyperautomation Centers of Excellence. This is a central team that owns and manages the hyperautomation platform within an organization and is responsible for end-to-end implementation.

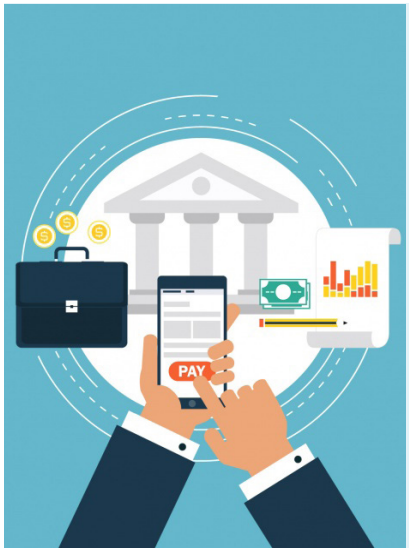
Accenture can also help their clients by taking over their hyperautomation operations and running support and maintenance activities.

The golden apple for shortages.

As this edition of scope is focused on shortages, we were curious about what Axel's vision on hyperautomation and shortages is. Axel: "First of all, hyperautomation helps to take the time-consuming manual labor out of the hands of employees." These people can be allocated to more value-adding tasks such as serving customers and making complex decisions requiring emotional intelligence. This also increases employee satisfaction as they can leave mundane tasks to the machines. It will give employees more time to spend on work relationships and challenging tasks. Axel: "At first, people might be hesitant but later on in the process, they notice that hyperautomation offers enrichment to their work." In addition to this smart algorithms can optimize logistic planning. Think about trucks for distribution, airplanes, or cargo containers. Combining these algorithms with a hyperautomation platform allows organizations to not only optimize planning but speed up the administrative progress behind it. Lastly, organizations are increasingly moving their IT landscape to the cloud. Not running automation solutions in the cloud also contributes to the shortage of physical servers.

Sustainability

Accenture tries to embed sustainability in everything they do. Take for example supply chain where they take a data-driven approach to help clients to optimize their supplier base by analyzing supplier performance on Environmental, Social, and Government (ESG) issues. Hyperautomation can help Accenture's clients to identify fitting suppliers and make the chain more



A banking onboarding process hyperautomated

An example of hyperautomation could be a banking onboarding process. If there is a request to set up a new client, a new case needs to be opened by an employee, information about the client needs to be gathered, an assessment and screening of the client need to be executed, and a final decision needs to be made. Most of the time this requires multiple actions from the client and the different bank employees. All these different processes can be automized and combined to become an hyperautomated system. In the banking example, you can think of technology that can read your passport this info can then be processed with RPA. Whereafter a name screening can take place with for example natural language processing and machine learning. In short, every step could be automized and then combined in one big system, this is hyperautomation.

Graduation internships for Technology Strategy & Advisory (MSc)

Are you an ambitious Master's student who is looking for a graduation internship in strategy and technology consulting? And do you get energized by making a true impact in a dynamic international environment? Then writing your Master's thesis within Accenture's Technology Strategy & Advisory department might be just the challenge you are looking for!

We are looking for three Master's students who want to join our team and conduct a thesis research regarding one of the following three topics: Technology & IT Strategy, Digital Transformation Excellence, or Enterprise Architecture. During the internship, you will use a scientific approach to investigate a challenge our clients facing and develop a solution that delivers value to our clients, their people, society, and Accenture. Moreover, the internship allows you to develop your core consulting skills by working closely together with our consultants all over the world and to discover that consulting and Accenture might just be the right next career step for you!

Interested or want to know more? Please reach out to Axel Haenen via axel.haenen@accenture.com.

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efficient. In addition to this, cloud usage is an example of Accenture's sustainability efforts. Through sustainability by Design, all of their cloud migrations are now green cloud migrations. This is being enabled by Accenture's proprietary myNav Green Cloud Advisor, which helps organizations make sustainability-led decisions about their cloud migration journeys. Hyperautomation helps to make it possible to move certain processes to the cloud.

A look into the future

Nobody knows what the world will look like in 10 years and how technology will advance but hyperautomation allows us to re-imagine work by leveraging (smart) technologies and applying big data and insights to our businesses to make better and faster decisions. This is true for solving issues related to both workforce management (allowing humans and machines to work together in a data-driven human-centric environment) and sustainability (leveraging data to make smart decisions to fight climate change while running operations in the cloud instead of on physical servers). Axel is convinced that hyperautomation can enable organizations to become sustainable carbon-neutral and intelligent enterprises with happy and empowered employees. Axel: " It might not be the solution to all the world's problems but it is part of the puzzle."

Axel Haenen

29 years old
Waddinxveen
BSc Science, Business & Innovation
MSc Innovation Management Alumni
Technology Consultant at Accenture

Alex Haenen is 29 years old and currently working as a Technology Consultant within Accenture's Strategy & Consulting practice and Technology & Strategy Advisory group. Axel is an MSc Innovation Management Alumni, and his master thesis from the TU Eindhoven was conducted at Accenture in the field of Robo-Advisors for Financial Services. This entails research into the reactions of clients to chatbots with different configurations and what would be the right kind of chatbots for companies in the financial sector. During his master thesis, Axel started getting the know the field of Hyperautomation. He continued to learn more and more about Hyperautomation during his years working at Accenture, implementing smart algorithms to help banks become more efficient. In addition, was involved with the set-up of a Center of Excellence. This is an internal center where automation is managed and scaled to the rest of the organization.

Eindhoven Career Platform

The platform was created to connect Industrial Engineering students to companies. Before the release of Eindhoven Career Platform, both companies and students had difficulties finding each other. Therefore, Eindhoven career platform offers opportunities such as internships, bachelor end projects, student jobs, master thesis, and starting positions. The platform offers vacancies in multiple sectors, for example, consultancy, supply chain, data science & IT, and manufacturing. Partners of Study association Industria and other companies can put vacancies on the platform to find the required student for the career opportunity. Below you can find three of the many current job openings.

BEP internship: strategy, market analysis & go-to-market planning at EdTech scale-up at Drieam

We are looking for a high-potential business student who helps us to scale to new markets, further accelerating our international growth. You will be working very closely together with the co-founders of the company on strategy, market analysis & go-to-market planning.

Logistics Engineer at Foot Locker

The Logistics Engineer is crucial in helping us to transform our supply chain as being the key lead in a number of high-profile projects and requires engagement with key functions within broader EMEA business like Geo CX (store operations), eCommerce Operations and Planning & Allocation.

Supply Chain Internship Project at Dow Chemical

Will you be our next Supply Chain Master intern? For our Terneuzen Site Logistics Plastics organization we are looking for an intern who can provide innovative solutions for our loading activities on site and for our third-party logistics partners' location usage.

Each company tries to have as few shortages as possible since that might harm the organization. How can the mission and vision of a company contribute to dealing with shortages? How will the consultancy prevent shortages in the future? SCOPE spoke with Reno Kochanowski, co-founder of Student Consultant, and Sybe Bouman, consultant at Student Consultant.

TEXT Sander Roeleven DESIGN Marijn Konings

Shortages at Student Consultant

About Student Consultant

Student Consultant was founded by two students. So, Student Consultant is for and by students that carry out consultancy projects. Subsequently, Student Consultant collaborates with top-tier consultancy firms. Reno explained: "Our consultants participate in several training sessions and are coached during their projects. Thanks to this, our consultants develop rapidly and expand both their hard as well as their soft skills. The training sessions take place in the location of the company. At the end of the session, there is the opportunity to get to know the consultants during a drink, we are students after all". At Student Consultant, many different projects are executed. Sybe said: "At this moment, we have very diverse projects, not specifically from a certain sector, but from many different sectors. It also depends on the offer and availability of course. For example, I am currently working on a project at De Efteling. We also have had projects at, for example, KPN, Eindhoven Airport, PostNL and Nationale Nederlanden". Reno added: "At Student Consultant, we have many consultants that have different study backgrounds, from Industrial Engineering to Economics, to Artificial Intelligence. In this way, there is always a match between a project and the consultants and we can form multidisciplinary teams. Students can register themselves for a project they would like to do". As Student Consultant has many consultants with different study backgrounds, they can always place the right consultants on the right project.

Mission and vision

Each organization has its own mission and vision, what are these at Student Consultant? Reno explained these: "Our mission is that we want to develop the future talent. We are building an accessible organization that attracts, inspires, and prepares ambitious students for an impactful career. We work in diverse and multidisciplinary teams, together with experienced consultants. This is how we convert our current academic knowledge into direct customer value. Subsequently, our vision is to give all ambitious students a head

start on their way to an impactful future". These mission and vision are comprehensive and challenging, but how are these achieved? "It is hard to say when our mission and vision are achieved. We mainly want to see growth among the consultants during the period that they are working at Student Consultant. This growth offers them more opportunities in the future" Reno explained. So, the student is 'central' to Student Consultant.

Shortages

The theme of this edition of the SCOPE is 'shortages'. How does Student Consultant deploy their mission and vision to prevent shortages? Sybe said: "At most of our projects, we are looking at the current situation of the company, where we will analyze the current situation. For example, we currently work on a project where we optimize RPA software to make their billing less time intensive. When we have completed the analysis, we come up with recommendations, for example, how employees can be deployed better or more efficiently. Subsequently, we have a project that looks at ways of attracting employees to their company". This way of working shows that Student Consultant is looking for smart ways to experience as little inconvenience as possible from shortages, such as employee shortage, for their customers.

In addition to the fact that Student Consultant is working on learning how to deal with shortages at their customers, does Student Consultant actually experience shortages as well? "We have little to no problems with employee shortages. We have a unique concept that distinguishes us from our competitors, both on the client as the student side. Students are willing to come and work with us to work on challenging and impactful projects. After graduating from their studies, consultants can work at companies where they have done projects or continue their career in consulting. This is an additional advantage for companies to engage with us."

The future

The current shortages in the world will not disappear soon, but what does this look like in the future? Do we need to learn from it and adapt our lifestyle or will there be times of surplus again? Sybe said: "I think a smarter way of working can definitely help to prevent shortages in the future. Subsequently, perhaps a less efficient, but much needed, is to get talented people from abroad to come and work here. Good and clear rules should be made about this to prevent problems".

What will the future of Student Consultant look like in the future? The last few months, Student Consultant is growing and growing. Many new consultants are being hired, but also the number of projects they are running, is rising. Reno told about their future plans: "Student Consultant wants to expand qualitatively as well as quantitatively. Within two years from now on, we would like to have 150 consultants throughout the whole country. We started in Maastricht, Eindhoven, and Tilburg. Currently, we are expanding our company to Nijmegen, Rotterdam, and Utrecht. The students are doing their studies at a university. Therefore, we are mainly focused on 'university cities'. On the other hand, we want to keep the quality level of our consultants high by providing workshops and training courses continuously". These future plans are very promising for Student Consultant, but Student Consultant does have one final goal: "expanding abroad..."

Reno Kochanowski

I am Reno Kochanowski, one of the two founders of Student Consultant. I followed and graduated from the bachelor Industrial Engineering and the master Operations Mangement & Logistics at TU Eindhoven. During my studies, I played football at a professional level. After I made the choice to focus on my business career, I founded Student Consultant together with my former teammate Jorick Schilken.

Sybe Bouman

I am Sybe Bouman, a consultant at Student Consultant. I am currently pursuing a bachelors degree International Business Administration at RSM, Erasmus University in Rotterdam. I joined Student Consultant one year ago and have been a project manager at a project for de Efteling during this period. Furthermore, I am part of the acquisition department of Student Consultant. In September, I will start my four month Exchange in Canada.

This edition of the SCOPE is about all sorts of shortages, as all companies have something to do with shortages, whether this relates to material shortage or labour shortage. SCOPE visited Advantech in Eindhoven, where we spoke with HR manager Europe, Roel van der Poort, and Senior Manager Production, Warehouse and Order Fulfilment, Ozdal Turp. Advantech positions itself as a community and is one of the leaders in the fields of embedded platforms and IoT intelligent systems. Where can we recognise their systems? And what difficulties do they experience related to shortages? Or are they well prepared to handle shortages?

TEXT Fleur Machielsen **DESIGN** Caitlin Riesewijk & Marijn Konings

Can Advantech's community overcome shortages?

Invisible, but present everywhere

You probably have heard about the 'Internet of Things' all around you. It is behind a lot of products and services, and so is Advantech. Turp: 'We have a lot of products, but you probably do not recognise them, as we are everywhere on the background'. Examples of familiar products are the systems behind monitors in the Catharina hospital in Eindhoven, or the scanner at the parking place barriers. Next time you travel via Eindhoven airport, you should check the information screens at the gates, in order to spot Advantech at the backside of the screen. Even if you go to MacDonald you will encounter Advantech's services. The system behind the interactive self ordering screens is namely built by Advantech. 'We are experts in the background, customers are allowed to adapt the delivered software or system and attach their own name to it. That is why Advantech is not visible, but often present', according to Turp.

Internationality

In the Netherlands, Advantech's largest location is in Eindhoven. Other facilities in Europe are ranging from London to Stockholm, and from München to Milan. Production sites are also located in China and Taiwan, from which the materials are shipped to Europe. Van der Poort:

‘We are in 10 different countries and have 35 different nationalities, which we are proud of. Our employees are used to work in international and intercultural dimensions, which is one of the reasons why they enjoy working here. Working together with many diverse cultures also adds an interesting diversity to your work’

“Enabling an intelligent and sustainable planet.”

Labour shortage

A shortage which affects all companies in current times is labour shortage. Companies try to create the best offers to gain sufficient employees, and to keep their current employees. How does Advantech experience labour shortage? Van der Poort: ‘It has two dimensions. Everyone was at home during the corona pandemic, and everything was unstable, which resulted in lower labour mobility. After the corona pandemic, the delayed mobility wishes are still being fulfilled. In addition we have to cope with inflations, which can rise to eight to eleven percent. Employees do not want to hand in too much purchasing power, and therefore expect higher salaries’. To cope with these two dimensions, Advantech started a project which focusses on engagement. It highlights the importance of strong relationships within a company and with the company. The trust in each other makes sure that employees are less sensitive to offers from other companies. Thereby, another focus is on career development. Advantech wants to show the opportunities for growth and how employees can further develop their skills and themselves. ‘It is especially important to be clear to your employees, which steps can be made and how those steps can be achieved. What should you do to realise this? Making employees ready for the next step also helps the bonding process’ states van der Poort. At Advantech they also realise that additional effort is needed to gain new employees. Van der Poort: ‘Whenever you have a suitable candidate for a vacancy, you have to be fast. If you wait for two days, the candidate can easily be gone to another company. You should be very dedicated and quickly and seriously go through the process. We are controlling this process very well, however, I have to admit that mistakes can be made easily’.

Who is missing?

In the past there always was a high demand for higher educated employees, and there still is. However, the demand for employees from all educational levels is rising. At Advantech, the highest labour shortage is present at the warehouse and in the production processes. Companies such as ASML are also expanding a lot, which increases the demand for personnel in the logistics sector even more. ‘Although the demand for technical educated personnel is high everywhere, you should have something to offer which makes you different from the others. We really want to make sure that employees bond with our company and feel at home. If you cannot realise this, people will search for something new very fast’, tells van der Poort. Overall, people who start working at Advantech stay there for a longer time of their career. Besides hiring more employees, labour shortage could also decrease with the help of automatization. Turp: ‘In the manufacturing processes an increase in automatization is indeed always possible. All paperwork has already been removed from the warehouses and all administration is digital now. We are still continuously trying to improve ourselves to increase the efficiency’. Turp adds that the goal is not to send all employees home, but to automate the easy but necessary tasks. This makes the employees more involved in the actual processes or support services. All software systems

Roel van der Poort

Roel van der Poort is HR manager of Advantech Europe. His job consists of recruitment, work councils, selection procedures, employment conditions policies. In the current market in which marketing and recruitment are of importance, van der Poort fulfils and important job.

Ozdal Turp

Ozdal Turp works as a Senior Manager Production, Warehouse and Order Fulfilment and already works 21 years at Advantech. His function ranges from supply chain activities, production activities, customer service, to warehouse management. All these activities are kept together and not regulated by separate managers.

are of course 'home-made', from the warehouse management system to the production systems. The software tools which are created by the application engineers, are being copied to the facilities in Germany and Poland. Van der Poort adds: 'These automatizations really increase the efficiency, but some functions cannot be automated. We also have to sell our services, and this goes through personal contact with the customer, in which human interaction is key'.

Strategy to gain new candidates

Whenever people start working at Advantech, they often do not leave fast. First, how does Advantech gain new employees? Advantech works with a referral bonus, which means that when an employee knows a perfect candidate for a vacancy, and this person gets hired, the employee receives a bonus. Contrary to many other companies, Advantech barely works with temporary employees. According to van der Poort, the secret of a successful company lies at connectedness. 'When people are working somewhere, it at first has to be fun, people should feel at home, should feel like they can achieve something and grow. Whenever employees do not have this feeling, we are looking for ways to improve it, to make sure people are willing to stay with us. I really believe that you should enjoy working here and that you should not only work for the money.' In Taiwan this is called the 'ABLE club', which stands for the Advantech Beautiful Life Experience. This focusses on being a community and making sure everyone enjoys their work and work surroundings.

Material shortage

When material shortage arises, the prices could rise, or processes are paused. At Advantech, everything becomes more expensive, due to high freight costs. This implies that the prices of Advantech's products rise a bit as well. Although the prices keep rising, no problems are being experienced. Turp: 'Costs are rising everywhere, so everyone is familiar with the situation and accepts the higher prices. In addition, our product range is not equal to 100 products, but to 5000 products. Whenever one product sells less, another product will be sold more, which means that our turnover is stable'. As other companies in the same field need the same materials and have to cope with higher prices and higher delivery times, the customer cannot gain any profit by switching to a competitor.

Future

To achieve Advantech's future goals, Industrial Engineering students can really help. Van der Poort: 'We believe that we have the social responsibility to help students with their studies and to show them the practical sides of the job. Through an internship or project, students can get used to the company, and the company to the student, as many start working at us after their studies. I believe that a student cannot only learn from us, but that we can learn a lot from the younger generations. We are always trying to improve our efficiency, so Industrial Engineering students are very welcome'. Within five years, Advantech is willing to double its turnover and to achieve that, efficiency should be improved as well. What van der Poort made clear is that achieving future goals will never be at the expense of Advantech's community and community feeling. 'Our motto is 'Enabling an intelligent and sustainable planet'. We have the confidence that our solutions can improve efficiency in a lot of processes, which we want to achieve as a community, as a family, together'.

Advantech as a community

Advantech is also located in Poland, close to Ukraine. Multiple Polish employees are helping Ukraine refugees by giving them shelter at their homes. As a community, Advantech decided to organise a crowdfunding action in which all sorts of materials have been collected. All basic products such as clothes and hygiene products have been gathered at all Advantech's locations. Full pallets have been transported to the location in Poland, where the materials were given to the employees providing shelter. Employees at all sites were committed to help, so together really made an impact. This is one example of the power or character of Advantech as a community.

‘More than a tech job’ ASML

Meet Pieter Smorenberg, a 2017 Delft University of Technology graduate who recently found himself back at university, this time explaining to students how technologically fascinating his job is. Originally from Amsterdam, Pieter couldn’t have guessed that he would find so many technical and social opportunities in Veldhoven at ASML, the fast-growing tech giant. Pieter studied precision and microsystem engineering, and now works as an applications engineer in customer support at ASML. He also spends some of his time as one of over 400 ‘ASML Ambassadors’, giving guest lectures at his alma mater university or promoting STEM among school-aged children in the region.

“The more I tell people about working here, the more things I realize I appreciate about the company,” he says. “A lot of people don’t realize just how big ASML is in the semiconductor industry. You realize it when you visit the campus in Veldhoven. You see the big tower, the cleanrooms, the huge gardens and parking lots; it’s impressive. And then at the complete other end of the scale, almost all of the metrics we work with here are practically at an atom level – no other company is producing such advanced chip-making equipment.” ASML is the world’s leading provider of semiconductor lithography equipment, in an industry worth $438 billion. All of the world’s top chipmakers are our customers, including Samsung, Intel, and TSMC.

Pieter has certainly found more than he expected in Eindhoven. “Coming from Amsterdam and Delft, I was a bit uncomfortable about moving to Eindhoven, but there’s a lot going on that you only discover after you get here. It’s not a ‘small city’. It’s a melting pot – people come from all over the world to live here.”

Celebrating our technology isn’t the only way we have fun at ASML. “I sometimes go for drinks with the ‘Young ASML’ group for young ASML professionals,” Pieter says. “You get to meet colleagues from all kinds of different departments. It’s a really open-minded atmosphere, because everybody is there for the same reason: to share a good evening with each other.” The ASML campuses are like small cities – more than 12,000 people work just at the Veldhoven campus alone. Young, old, male, female, LGBTI+, living abroad, you name it – it’s easy to feel at home at ASML.

As a customer support engineer, Pieter also gets to travel a lot, listening to ASML’s customers and helping them to achieve their technology roadmaps. During his travels he experiences other cultures first-hand. “You learn a lot – socially and culturally as well as technically. It’s been an eye-opener for me. We’re diverse, in terms of education, background, and nationality, but we’re all working together as one team because we all have the same goal: make this incredibly complicated technology a reality.”

We’re a dynamic team of 32 000 people from 122 different nationalities and counting. Headquartered in Europe’s tech hub, the Brainport Eindhoven region in the Netherlands, we have over 60 locations in 16 countries and annual net sales of €18.6 billion in 2021.

Curious how you can be part of progress? You can contact your fellow student and Campus Promoter: Cas Dijkstra at cas@workingatasml.com or visit www.asml.com/careers

Global pandemics and geopolitical events have shaken up the world of logistics. While most people have gone back to the normal way of life, companies and suppliers are feeling the effects of lockdowns in the form of logistic delays and shortages. Companies are trying to close the gap between demand and supply, Applied Micro Electronics, or in short AME, being one of these companies. Aparna Goyal, procurement manager at AME, explains the current situation regarding shortages, how they are closing the existing gap currently, and plan to do so in the future.

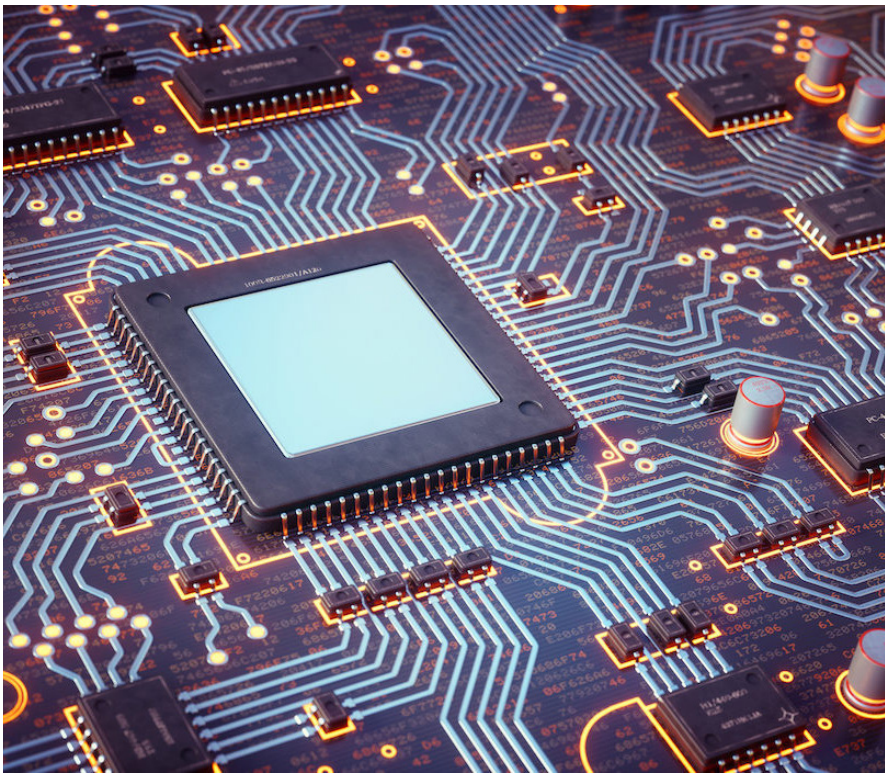
TEXT Marijn Konings **DESIGN** Marijn Konings

Client involvement in resolving shortages

About AME

Starting off in 1996, roughly 25 years ago, AME was founded as an electronics-design company. In the beginning, AME would purely design the electronics for the products of its customers, while later moving to the design of final products, as well as manufacturing. Throughout this full journey, the customer has remained central, providing key inputs and receiving full flexibility from AME, as well as support through the full lifecycle of the products. The markets, the customers of AME operate in, vary significantly, from the Internet of Things to power conversion, and from coffee machine manufacturers to the e-mobility sector. As 'the design of electronics' is quite a broad definition, some examples of products AME designs are displays for coffee machines (as you might recognize from the coffee machines at the university, or at your office), but also the electronics required for connecting a smart vacuum cleaner to your Wi-Fi, and full-power chargers for electric cars. Thus, a very broad variety of applications, which is possible due to the high level of knowledge of design. As Aparna mentions; 'we started off as a design company, so that remains in our DNA', showing that AME has a competitive advantage on this level. However, as mentioned before, AME wants to focus on its customers and keep the customer satisfied. Aparna; 'Our aim is always to fulfill demand, and we are also very flexible in helping

our customers when needed. We try to help our customers to provide what they are looking for. We also try to be their partner for the complete life cycle of the product.' This led to AME starting to do manufacturing, to better serve their customers. Aparna mentions the transition that AME went through; 'We were, in the past, only making electronics. We would design a basic panel and put electronics on it. Then we would sell it to the customer, who would put it in their end product. Now we have also developed ourselves into a company that makes full functional modules and end products for final customers. We continuously work on new designs and then, when it functions, we start manufacturing and delivering it to a customer. The customer can customize and make their own products. That is how AME has grown.'



Procurement

To design and manufacture the electronic appliances AME delivers to its customers, many components per product are required. Aparna is the procurement manager of AME. Together with a team of 6, she is, as she mentions herself, responsible for ensuring that all components or material needed to produce in the factory are available on time, for a good price and of acceptable quality. It includes supplier relationship management, interaction with suppliers, and defining procurement strategies. Through contact with suppliers, she is usually working at the front end of the supply chain. However, this does not mean that the further supply chain does not influence her job. 'I help R&D make good, strategic choices when designing new products. They may want to use certain parts that are, for instance, sustainable, but must also be easily available. I bring knowledge from the supply side to R&D to ensure that production runs smoothly.' It is key for the production at AME that procurement is done efficiently. 'If a chip is put in a certain product, this will have to be done for the next five years. The availability and price are key inputs to whether production will run smoothly.' This shows the high value of industrial engineers at AME, as no supply means no production, and thus no revenue.

Shortages

The worldwide pandemic and current geopolitical situations are making the inflow of raw materials to companies around the world complicated. The effects of this are present at AME as well. 'The lead times of components have grown from 15-20 weeks to 52 or even 76 weeks, so it is already a big change. Even if you order today, you are not sure whether it will be here by the end of the year' says Aparna. Not only are the lead times growing, but the availability at suppliers is also declining. 'We see that, firstly, suppliers do not confirm whether they will deliver anything we order. They are not able to keep their promise because there can be sudden changes such as a COVID-outbreak in the factory, port congestion, or simply because not enough has been produced.' What makes it even more complex is the fact that AME uses hundreds of components per product. 'Sometimes, we might have 299 of the items required on stock, but 1 is missing, meaning that production is not possible.

This leads to dissatisfaction at the customer, as we cannot deliver what we promise.' Not only is this a problem in terms of production, but the remaining parts stay on stock, creating a large amount of inventory and blocking cash from flowing in, showing another way shortages affect organizations.

"We want to help the environment and the society with our products."

The number of problems arising from shortages keeps adding, as Aparna mentions another effect; 'It is good to mention the hard-seen facts, but we should also mention the softer impact, which is the amount of work people have. In the past, you would get an order, place it, and it was done. Now, you have at least 10 emails back and forth discussing when products are coming, what is coming, and making sure it is coming. The amount of work people have to do has risen.'

The biggest shortage is apparent in the need for chips. Aparna mentions the chip shortage being the current biggest challenge, and all tactics to close the gaps are based on this type of shortage. 'As we are a design company, we keep close contact with chip manufacturers. We have quarterly meetings with them to understand how the market is evolving. We work with quarterly allocations, so we make a request, and they allocate us all or part of what we need.' But why is the chip shortages such a major concern? Aparna answers that this is twofold; 'It is in every product that we make, while it is not something that you could just replace. It requires a complete redesign of the product. We have to work together with customers to see what solution we can come up with to still deliver them what they need.'

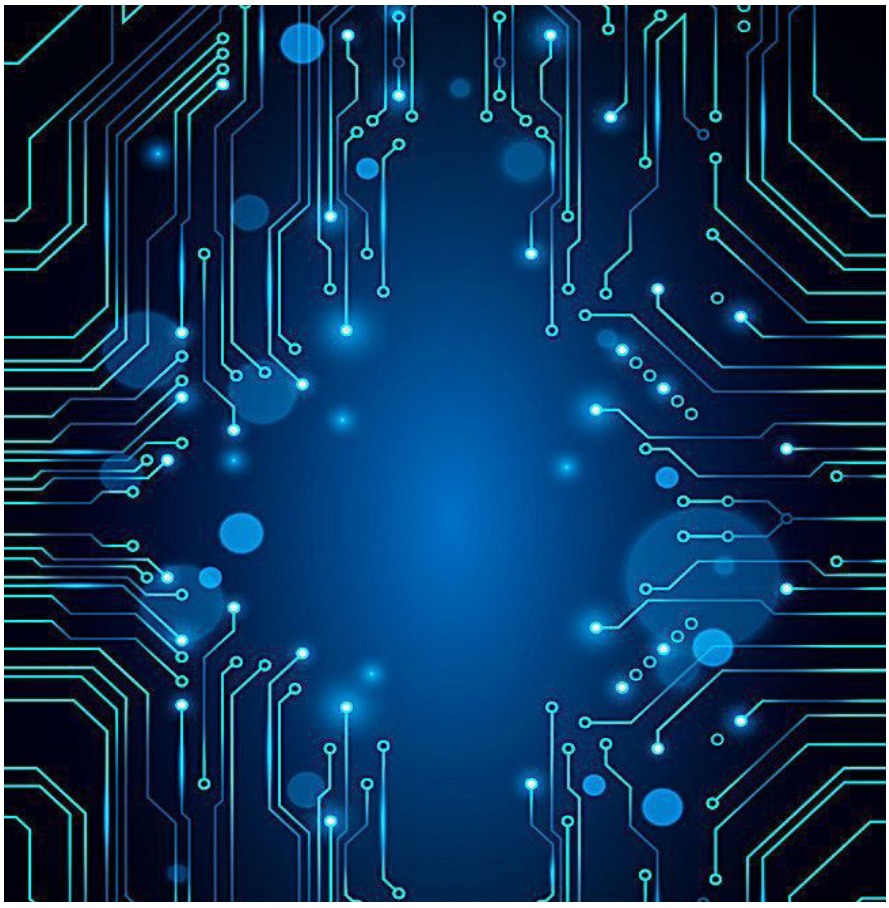
Closing the gap

Shortages have a big impact on the way AME must work, but also on her cash flow. Aparna thinks that the problems with shortages have to, at some point, disappear, but it is difficult to say when. Therefore, AME needs to be creative in the way it works with their suppliers and customers.

'What we do to control that risk, is to anticipate where the risk is and where the gap will be, and for that we need information from suppliers. With that information, we identify the gap, and search for solutions.' There are various solutions AME can go for; approaching different suppliers, trying to find alternate components that can be used, or reaching out to the open market. Before using these solutions, AME approaches the customer. Aparna clarifies: 'We get in contact with the customer and give them the options they have to close the gap in the supply, and ask them which one would be most suitable. Sometimes, customers agree in receiving only, for example, 90% of the products they ordered. Other customers want all of their products, and we then give them the options and associated extra costs, as we need to purchase parts elsewhere.'

This is only possible when the customers of AME are so actively involved in this process as they are at AME. It is important for them to know what is coming at what moment, and what challenges AME faces. 'They are able to help sometimes,' says Aparna, 'as we see that customers are able to find parts which they have in their system, and AME has not'. Customers have been involved actively since AME was founded. Since the foundation, AME has chosen to align their orders to the supplier with the orders from the customer, thus showing a make-to-order pattern. 'Customers give us fixed orders, so whatever they order

is their liability'. Of course, as Aparna mentions, forecasts are discussed with the customer, to help plan ahead for manufacturing, but the main principle still remains producing based on orders. This strategy turned out to be ideal when shortages are present. Of course, having products on stock at the start of shortage is good, but the probability that components will remain in stock and are not used for a long period of time is present, making the inventory problems that are already faced even larger. How does this strategy help close the gap of shortages? 'If we talk to manufacturers for orders, we can tell them real numbers, which we will actually use. It is in line with what we used last year or aligned with the growth we are aiming for'. The big advantage of this is that AME is able to give the manufacturer confidence that they can invest in capacity. If the manufacturer would not have the security AME can provide, and doubt that components will be bought from a different source, suppliers will be hesitant in investing in capacity extensions and cannot provide a quick closing of the gap. Close connections with customers to find alternatives and expressing confidence to manufacturers has helped AME coping with the shortages and has built a good base for the future.



The future of AME

AME intends to double its revenue by 2025. Big plans have been set in place, and a special strategy for this has been designed (which is what we can expect from an initial design company). As Aparna confidently says; 'We want to grow in revenue, in margins, and in people. The growth is on the way.' This growth is aimed to be realized through sales to current customers, but AME is expanding in the e-mobility and climate control markets. 'We want to help the environment and the society. E-mobility is going to help that a lot, not just e-cars but also chargers for the cars and e-bikes.' AME is very proud of their own designed car chargers, the AC and DC chargers. They want to collaborate with the customer, have them adjust the product bit by bit until they are satisfied, and then sell it to them. The climate control market is also a big target for AME. 'The products we make for climate control help get good and clean air in houses and offices.' This provides a safe environment for those living in it. Despite the current shortages that have a big impact on people, operations, and inventory, AME is confident their growth will be as expected and works hard to achieve this, using the strategies they designed. Along with the focus on more sustainable development, AME looks ready for the future.

Aparna Goyal

Originally coming from India, Aparna Goyal has been working at AME for 5 years as a procurement manager. Prior to her job at AME, she obtained a master's degree in mathematics in India. Having worked in India for several years, she made the decision to move to the Netherlands with her family and start working in Europe. Her job has given her the chance to start on a large learning curve. Since the start of her job at AME, she has learned very valuable lessons, especially in the last one and a half years, where the impact of COVID-19 demanded changes in work styles and an adaptation to a more insecure field of work.

The war in Ukraine has shown the fragility of the global food system. Last year, the country of 41 million people produced enough to feed 400 million people. With Black Sea trade disturbed, millions of metric tons of grain are now awaiting transport while other parts of the world are facing food shortages. The United Nations World Food Programme (WFP) is tasked with reducing hunger and increasing food security, especially in circumstances like these. In this article, SCOPE will examine how the WFP deals with such challenges.

TEXT Joost van der Haar DESIGN Marijn Konings

The World's Safety Net

Building upon earlier organizations and programs, the WFP was established in 1961 as a multilateral alternative to existing bilateral food programs. The organization would focus on preventing hunger through a combination of emergency aid and development programs. And that was exactly what it did. In the decades that followed, it would grow to be the world's largest humanitarian agency. Major contributions include alleviating the 1983-1985 Ethiopia famine, providing relief after the 2004 Indian Ocean tsunami and mounting a response operation after the 2011 Haiti earthquake.

Food aid in practice

Whenever a disaster strikes, responses from many organizations are triggered. Quickly establishing a reliable supply chain is essential for these responses. To this end, the WFP maintains a network of six logistical hubs around the world. Any location in the world can be reached in less than 48 hours from at least one of these locations by either truck, rail, boat or plane. Furthermore, with up to 5600 trucks, 30 ships and 100 planes on the move around the world each day, resources can easily be rerouted if the need arises. This sheer scale allows the WFP's network to provide about 70% of all supplies in the first wave of emergency response, including both their own supplies and those of almost a 100 different NGO partners.

Setting up a supply chain requires more than just sending boats and planes. Both physical and digital infrastructure is often damaged after disasters, hindering transportation and communication. To rapidly restore or create the required infrastructure wherever necessary, the WFP maintains specialized teams of experts. These teams enjoy a great amount of autonomy to allow them to swiftly adapt to local circumstances. In doing so, they have global resources such as specialized information and communication systems available to them.

Once a supply chain has been established and emergency aid starts flowing, it is time to start looking at the long term. Partner organizations can leverage the established lines of transport to help the affected area recover. In the meantime, the WFP can start looking at exit strategies. The exit moment is crucial

Locations of the WFP's response depots

for the WFP. Stopping food aid too early can lead to famine, whereas stopping too late can create longer-term problems. Making the right choice requires taking a broader perspective.

A broader perspective

Ever since its inception, the effectiveness of the WFP's food aid programs has been put into question. Food aid traditionally involved giving away surplus food to those in need, creating a win-win situation for both parties involved. Exporting countries would be able to dispose of their surpluses, whereas receiving countries could alleviate their shortages. Critics however argued that this approach would create unhealthy dependencies, as receiving countries would be disincentivized to increase their own agricultural production. Furthermore, years during which exporting countries had the biggest surpluses were already the years where food prices were low and the need of receiving countries was typically lowest.

Preventing unhealthy dependencies has been a consideration since the founding of the WFP, but for a long time mainly played a role in deciding when to start providing food aid, how to provide food aid and when to stop providing food aid. It led to for example school lunches, food-for-work programs, and land settlement & reform programs. Providing school lunches promoted education and thereby stimulated future economic growth. Food-for-work programs let laborers work on projects to boost agricultural production in exchange for food for them and their families. Lastly, land settlement and reform programs supported communities transitioning towards new lands and agricultural systems until they could produce their own food. In the last few decades however, there has been a shift from providing food aid to providing food assistance.

From food aid to food assistance

Many humanitarian organizations focus on helping countries and regions develop. There is no reason for which the WFP would be better at promoting development than these other organizations. In contrast, the WFP excels at quickly setting up large logistical operations in emergency areas and feeding affected residents. In an effort to play to its strengths, the WFP has increasingly focused on alleviating hunger in emergency situations, while partnering with other organizations to tackle longer-term issues. This perspective has led to addressing such situations with new approaches.

	PREVALENCE OF INSUFFICIENT FOOD CONSUMPTION (HIGH→LOW)	TOTAL POPULATION (MILLIONS)	NO. AFFECTED (MILLIONS)
Afghanistan[ACTUAL]	91%	40.4	36.6
Somalia[ACTUAL]	89%	12.3	10.9
Niger[ACTUAL]	75%	22.4	16.9
South Sudan[PREDICTED]	59%	11.0	6.5
Mali[ACTUAL]	58%	19.1	11.1
Guinea[ACTUAL]	57%	12.4	7.0
Mauritania[ACTUAL]	57%	4.4	2.5
Burkina Faso[ACTUAL]	55%	19.8	10.9
Yemen[ACTUAL]	54%	30.0	16.3
Sierra Leone[ACTUAL]	54%	8.2	4.4
Haiti[ACTUAL]	50%	10.9	5.5
Syrian Arab Republic[ACTUAL]	50%	18.0*	8.9

*The total population displayed here is less than the national population. This is attributed to not every region being covered by near real-time food security monitoring systems.

The NGO landscape

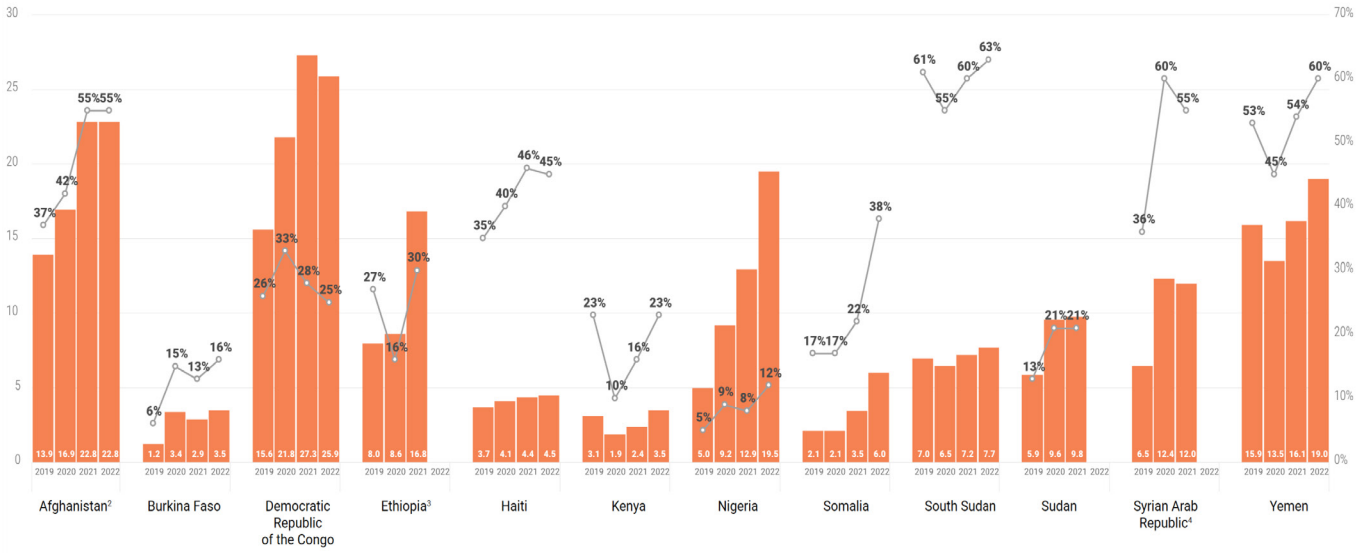
While among the largest, the World Food Programme is only one of many NGOs in the worlds of emergency response and development aid. Some of the organizations it collaborates with most closely are the FAO, the World Bank and the UNDP. The Food and Agricultural Organization (FAO) provides assistance for projects aimed at improving and developing agricultural output. The World Bank offers grants and loans for projects and organizations to stimulate economic growth in developing countries. Lastly, the United Nations Development Programme (UNDP) aids developing countries by sharing expert technical and policy knowledge, while at the same time executing development projects that make further investments more financially attractive and feasible.

Rather than only providing aid 'in-kind', the WFP is looking more and more at new types of aid. One of the oldest 'other' types of aid is the use of voucher programs. These programs are and were used in for example Burkina Faso, Pakistan and Sri Lanka. When a region's economy is failing, a steady local supply of food is often still available, but the poor cannot afford buying enough. Simply bringing in food from outside could damage the local economy. Voucher programs or cash transfer initiatives can then be a good alternative. By handing out food vouchers or small cash transfers to the needy, they can get enough food in a way that does not damage the long-term local production.

Another alternative is the use of insurance products, which were offered in Ethiopia and China. When no safety net is in place, people from poor communities tend to make decisions based on short- rather than long-term outcomes. Saving up for emergencies such as accidents and weather conditions is often more interesting than investing in better seeds or equipment. Insurance products eliminate the need for saving up, thereby freeing up funds to invest in their companies and farms.

A turbulent future

A combination of logistical capabilities, partnerships and decades of experience have allowed the WFP to serve as a worldwide safety net. Innovations in food aid have further enabled it to achieve its goals of reducing hunger and increasing food security, while at the same time minimizing negative long-term impact. Nonetheless, there is still a fine line between helping the needy and creating dependencies. The WFP's ability to quickly intervene in emergency situations will undoubtedly prove useful in the years to come, but difficulties remain. Operating in politically unstable environments will stay challenging, as will walking the fine line between aiding and hindering development. Consequences of climate change are expected to further complicate matters. The WFP has however shown its ability to innovate, evolve and above all act quickly in times of need. Whatever the future holds, the World Food Programme will have a role to play.



Amount (millions) and percentage of people facing food insecurity

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Finding a room in Eindhoven has become very difficult. The price of a barrel of Brent oil has increased by 59% between December 2021 and July 2022. Last summer, the "Zwarte Zaterdag" was experienced by all travelers heading to Southern Europe by car as they always did. Shortages in housing, availability of fuel and space on the highways cause problems directly experienced by the user - also in the mobility domain. Oktay Türetken, associate professor at our department IE&IS, describes his vision for the future of mobility and especially MaaS.

TEXT Bauke Wijnands **DESIGN** Marijn Konings

Always at your service

MaaS as a concept

MaaS, the abbreviation for mobility as a service, is one of the main topics Oktay Türetken performs research on. Since the mobility domain will be (partly) characterized by MaaS, it is convenient to start with introducing this concept from a traveller's point of view. Hereafter, his vision of the mobility domain's future will be described.

Currently, multiple apps are installed on our smartphones, each having its own purpose in the mobility domain. NS, Uber, Google Maps, Flixbus, Felyx, Amber, KLM, etc. All apps require personal data, such as profile and bank account information. Here comes the idea of MaaS: suppose that there is a single application or a single platform that allows you to check your travel options from A to B with multiple service providers that are required all at once and combine them. You, as a consumer, don't bother whether different service providers are being used; you just want to get to B and use your phone to easily check the route. These platforms aim to ease how you reach out and use public transportation and shared mobility services.

Why is MaaS important? The entire idea is to move away from private car ownership – regardless of whether your car is electric or uses a combustion engine. Such platforms aim to ease how we reach out and use public transportation and other shared-mobility services. It has to be an affordable, convenient, and environmentally sustainable alternative to private car ownership.

It promises more efficient use of underutilized transport assets.

This trend supports moving away from private car ownership. Instead of owning the product, we use it and enjoy the experience of using it in a particular context. A product is important for us only due to the value it brings when we use it in a particular context for a particular reason.

The need for MaaS and similar shared-mobility services (such as the micro-mobility services with bikes) is increasing because of the current fuel shortage. It gives another consideration to car ownership since users feel more urge to find alternatives for driving a car that has become more expensive. Oktay; "people, of course, already understand the need to take fast actions towards sustainable mobility and therefore energy use and renewable energy sources. However, crises like these change the perspectives on car usage even more. Therefore, in case initiatives of shared vehicles, such as Felyx, Go-Sharing and Amber, are regulated carefully by municipalities, they can offer great advantages regarding sustainability and last-mile transportation. Still, these are often isolated micro-mobility solutions."

Challenges for MaaS

These initiatives also bring challenges that they are facing now. Internal challenges these initiatives suffer from are, for example, increased energy prices and a lack of user acceptance. Yet, the biggest challenge we aim at is integrating all these solutions in such a way that the traveler can use a single application that combines all these initiatives and providers in an optimized manner.

One of the most important aspects of building a successful MaaS platform is to create trust among mobility service providers and other stakeholders in the mobility ecosystem. This is difficult because there are a lot of prerequisites and factors that play a role there. For example, NS, Amber, and Go-Sharing all have their own technical language (the way they store and manage their business data), and there is a lack of data exchange standards. Hence, when combining services, they should communicate with each other; and currently, they don't speak the same language. The NS provides information in terms of schedules; while Uber just offers vehicles, they are scattered all around and you can reserve them. So, it's a completely different type of service.

Following Oktay "we can formulate the problem in general as the lack of standardization of how travels can be defined. How can you book a service? How can you pay for it? How are payments between multiple service providers arranged in the background to be correctly distributed? We are currently trying to develop an open platform that contributes to developing an open data exchange standard to address this issue."

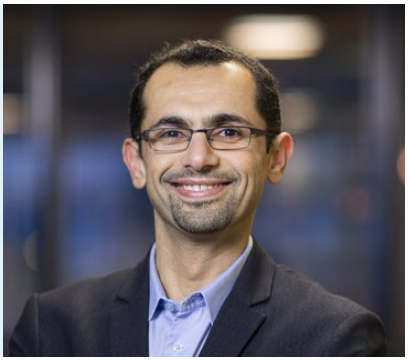
Also important is to discuss the issue surrounding data governance; data can be individualized or anonymized. Individualizing the data results in detailed information per traveler and anonymizing the data leads to an overview of information about the traffic at a certain point in time. Oktay adds: "still, who is eligible to do the calculations? We are not talking about negotiations about the rates among the services providers, but this really opens new business models. We call it data exploitation. We can look at personalized data, but also analyze the traffic conditions in general at any point in time."

Another issue: who owns the data and can make use of it? By combining services, data is being shared, and all parties should have access to the data. When you buy a ticket from NS and it combines the services with Amber, should Amber know that it's me who is traveling? Do you allow your credit card information to be accessed by all service providers connected to the platform?

Oktay: "I think it's revolutionary since it adopts many business models. Although, because of the challenges described earlier, it is not attractive enough yet. The first step should be to standardize the data exchange among service providers and other stakeholders. Secondly, we need public bodies to define clear policies and regulations to foster MaaS and similar initiatives in a controlled manner. Third, we need to define governance mechanisms in the ecosystem, particularly those related to data governance. Data sharing and data access are recurring issues for MaaS. In the digital economy, data constitutes a key asset and a competitive advantage. As in many other business domains, mobility data is commonly found in silos, or lacks a common format. Privacy and security issues, low quality or poor data management, and data

Oktay Türetken

Oktay Türetken is an associate professor in the Information Systems group of our department IE&IS. He has a PhD degree in Information Systems, and worked as a business analyst and consultant for several years in the industry. Currently, he is involved in the MobilityEU project, co-funded by the European Union. It aims for integrating mobility services, hubs, and providers to create infrastructure for seamless and sustainable mobility. Find more information via this link: https://www.mobiliteu.eu/



"Technology is not the biggest barrier. It is already there, but other factors act as roadbocks, showing there is so much to do for Industrial Engineers"

fragmentation are related issues, together with the lack of well-defined standards. But issues regarding governance also relate to the operation of MaaS: What happens if something goes wrong and who is to blame, who compensates, and how can these complex compensation processes be designed and implemented across all partners?

There are more challenges, of course, such as the lack of clear business models. Currently, public transportation is highly subsidized, but that is not something you can expect to happen – at least not in the short run- for MaaS platforms. So, currently, it is not clear who should initiate this. Public or Private, or together. However, as you can see, technology is not the biggest barrier here. Essentially, it is already there, but other factors act as roadblocks. Hence, there is so much to do for Industrial Engineers."

Future of mobility

Now that we have talked about the concept of MaaS and its opportunities and challenges in the future, we will discuss the future of mobility services in general. Next to a stronger emphasis on shared mobility and a strong discouragement of car ownership, Oktay foresees more emphasis on electrification, a changing mobility infrastructure, further interconnectedness, and autonomous vehicles. "While electrification can bring us advantages from a sustainability point of view, we must be careful since electrification doesn't guarantee carbon-neutral transportation unless that energy comes from renewable sources. Also, to speed up the process of electrification a very strong charging infrastructure is required. This will take some time, but it will be there in the upcoming

decades. Another important ongoing trend in the mobility domain is the interconnectedness of all components in the mobility infrastructure. We can already see intelligent traffic lights with sensors communicating with cars by providing priority. By connecting infrastructure elements and vehicles, a lot of data is being shared to optimize processes within the mobility domain. The last one, autonomous vehicles, is almost already a dominant phenomenon, heavily influenced by AI. I think in 5 to 10 years, we will see driverless fully autonomous cars. I think they will be mostly more effective outside the urban areas since exceptional occurrences occur less frequently there. In case these autonomous cars serve as taxis, autonomous driving will be for everyone!"

Next to these trends, blockchain is a technology that can have a great impact on mobility too. It contributes to addressing the problems of privacy, data sharing, governance, and eventually establishing trust. Currently, many MaaS systems have a central MaaS operator – a legal body that orchestrates the service of multiple service providers and sometimes resells their tickets and combines them with others. However, having a platform or MaaS owner challenges the idea of establishing trust among ecosystem actors since established service providers, such as NS, prefer to keep their own customer contact point and do not want to share this with other providers.

An alternative is the decentralized MaaS enabled by blockchain or similar technologies. In such an approach, you get rid of the central MaaS operator and enable services of other service providers to be reached through other service providers' applications. Let me give an example, I have NS and Amber apps on my smartphone. I open the NS app and check travel options from A to B. It not only checks its own database for its own services but also connects to Amber (which it has a deal with) and combines its services wherever it makes sense to NS. So, it complements its services with Amber services. Suppose I can do that also through Amber's app. In this case, I get access also to NS services wherever Amber considers it a good idea. Besides, I go to another country and use NS, based on my location it shows available options from those service providers that it has agreements with. It is like service roaming. When you go to another country, your smartphone still connects to another GSM service provider; you do not care which, but it somehow works.

The ideal future

There are many things that we fantasize about, also about the mobility domain - some are more realistic than others. Oktay describes his ideal future: "the first thing I want to see is that everyone has access to any affordable transport service - wherever we are and whenever we are. Second, the travel options that I have are sustainable, in the sense that they produce minimal CO_2 emissions, and are probably electrified, but the energy comes from renewable sources like solar or wind farms but not through burning coal or natural gases. Third, if there is a central MaaS operator, it is operated as a not-for-profit entity and potentially established with a public-private ownership structure. This means it serves the well-being of society and the environment first, and later comes the economic viability. In fact, it is the economic viability that often collides with trust. Such systems obviously make use of the vast data produced by these transportations. It is smart.

Fourth, such systems would serve not only for mobility services but also for any relevant services, such as parking, charging, insurance, entertainment, or event tickets. For example, if I would like to go to a concert in the Amsterdam Arena, using this service platform, I would say: Ok, I would like to go to this particular concert, buy me a ticket, and arrange my entire service. So, I take the Felyx scooter and NS train to Amsterdam Arena and enter the concert, all as a single service. It's already there, but we can make more out of it. So, these systems can be "open service platforms" not necessarily only mobility service platforms.

Finally, such systems would also serve as a "platform-as-as service", to minimize the cost of setting up new mobility services in different locations, enabling easy expansion of services. I mean the following: suppose you would like to initiate a bike-sharing business in a city. You can be a mobility service provider or even a public body. You bring your vehicle – hardware, i.e., the bikes. And such systems- I mean the MaaS platforms- can handle the digital infrastructure for you. You register your bikes into the system (bikes are equipped with IoTs, GPS, and Bluetooth, so on), and boom!; your bikes are ready to be used by travelers, and even the platform combines your services with the offerings of other service providers that are already around. "

Our future

The mobility landscape is currently heavily influenced by forces like electrification and diminishing car ownership. New business models like MaaS are being developed, which could change the landscape even more. Maybe you will even buy your ticket for the concert in Amsterdam and the tickets for travel all at once in a few years. How will you get your desired service in 2030?

Embracing servitization: Customer experience as the basis for innovation

TEXT Rogier Zondag **DESIGN** Caitlin Riesewijk & Marijn Konings

In this ever-changing world, where technology grows faster than ever, customers become more and more demanding.

It is very important for an organization to cope with the competition and keep customers satisfied, while their needs increase. Companies must differentiate themselves by being innovative and collaborating with others while keeping the core business in mind. Combine this with a clear business model that will help a business to capture and act upon the voice of the customer and this will set the business on the path to customer experience excellence.

But what is considered to be key in achieving business success in this fast-growing world? Simply selling a product may not be enough to create a long lasting relationship with customers. Companies can distinguish themselves by providing services on top of their products. Rather than only focusing on the product, they should focus on the service around a product as well. This is exactly what the theme of the 39th Industria Congress is about, to use customer experience, and using these insights as the basis for an organization to be innovative.

Nowadays, customers expect companies to know who they are and what their interests are. To satisfy these needs, companies need to collaborate since some processes become too complex to maintain within a company, while also creating meaningful lasting relationships with customers.

To achieve this, it is essential to move from an individual business world to a world where companies use a service from another and focus on what they are good at. This goal can be reached by embracing servitization. Exploring the changes and innovations across identity management, measurement, and loyalty will allow a business to tell the stories that inspire and deliver these valuable moments.

The partners of the congress will link their workshops and readings to obstacles they have faced, what they have learned and what they see as opportunities for the future in the field of servitization and customer experience. Altogether, this year's theme creates plenty of interesting questions, cases, and topics to discuss with each other, making the Industria Congress 2022 an incredible event.

On the 22nd of November, the Industria Congress will be organized. We welcome you to join the biggest Industria career event of the year. Come and listen to multiple compelling readings, join the interactive workshops, and grab a beer while talking to representatives of the partners. The ideal opportunity to score a job, a BEP or get insight in your future possibilities. We hope to see you on the 22nd of November!

Industria Congress '22

Congress committee, from left to right: Jons Duivenvoorden, Jarne Erkens, Rogier Zondag, Renata Wintjens & Joris de Groot


TU/e

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After graduating high school in 2016, I had the chance to study in the charming and vibrant city of Eindhoven. Even when I did not really know what I was actually doing and why I was studying Industrial Engineering, I did see many opportunities that Eindhoven and its associations (from sports- to student- to study associations) had to offer. While being a bit lost in all these opportunities, I decided to get more involved in Industria and I was able to make my first travel in ESTIEM, an exciting and culturally enriching exchange to Grenoble. From this point on it was clear for me that traveling through Europe, meeting new people, and experiencing new cultures was something I wanted to do next to my studies.

ESTIEM

Before continuing my story, I will first introduce the fascinating network called ESTIEM. European Students of Industrial Engineering and Management (ESTIEM) is as its name suggests a network of Industrial Engineering and Management Students, which consists of 77 associations from 26 European countries. ESTIEM aims to connect those students and to develop them professionally, interculturally, and personally. The high variety of event types in ESTIEM guarantees that there is something enjoyable and of value for every student.

Council Meeting

After two exchanges, Grenoble (France) and Minho (Portugal), I had the privilege to represent Eindhoven as a delegate at the biggest event ESTIEM has to offer, the 62nd Council Meeting in Warsaw. The Council Meeting is the General Assembly of the network. It gathers more than 250 people from all over Europe in one place. The event lasts around 5-6 days, and it is the perfect moment to get a taste of the famous ‘Work Hard, Play Hard’ culture ESTIEM is known for. During this event European students work hard every day by collaborating in strategy sessions, facilitating trainings to improve others’ soft-skills, and by presenting important topics and achievements for the network. And when the work of the day is over, and the night falls, those 250 people gather to enjoy a magnificent, wild, and humorous party with an amazing theme.

International Teams

ESTIEM gave me the possibility to visit more than 20 cities in 14 different countries (till now). Besides that, ESTIEM also facilitated the opportunity to work in new areas. In total I joined 3 international teams where I learned about knowledge management, development & management of local associations, and recruitment & people management. These experiences made me aware of how to work in an international team, it made me more able to understand students with diverse backgrounds and it allowed me to communicate in the correct way to the right person. Altogether, these travels and international work experiences have led me to take the next step and apply for the 33rd Board of ESTIEM.

Vice President of Finance

At the 64th Council Meeting I communicated my vision for ESTIEM by presenting my application for Vice President (VP) of Finance. I got elected with 5 other students, all from different countries. After our election we acquired the right knowledge in Istanbul during the Handover Board Meeting, and we became closer and more aligned as a board during Board Meeting 1 in Berlin. Here, we decided upon our non-position related tasks. Next to bookkeeping and accounting, I will acquire new partners, organize career fairs, develop support opportunities for local associations, improve human resources in ESTIEM and make strategical decisions about the future of the network.

In conclusion, ESTIEM is a network of wonderful people from all over Europe, which has the potential to change people’s lives in the most positive and best way I could have ever imagined. I acquired a huge amount of knowledge and gained many new valuable skills that will be relevant for the rest of my life. Most importantly I have been able to experience different cultures, which enables me to appreciate and understand others. I am extremely grateful for the development I have already obtained in ESTIEM; I cannot wait to continue this journey as Vice President of Finance of the 33rd Board. Finally, I am tremendously excited about providing this development (and maybe even more) to the future generation of ESTIEM and hopefully to all the Industria members that are interested in developing themselves on an international level.

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Spotlight

Are you or do you know someone who did something remarkble? Does he/she deserves to be in the spotlight? Please mail to pm@industria.tue.nl

Introducing t

Breaking

Marijn Pieter Konings was born on the 30th of January in Strijen, in Zuid-Holland, but luckily I quickly moved to the beautiful town of Steenbergen, located just in Brabant. I started playing football at V.V. Steenbergen. Until this year I have always played there, but decided to switch teams and play in a team with a lot of friends in Eindhoven at Pushphaira. Among those friends are Stef, Twan and Jens, meaning I will be able to enjoy their company for 6 days per week. I enjoyed my primary school in Steenbergen, after going to Bergen op Zoom to do VWO with bilingual education. Here is where I met great friends, had six very nice years of education and got to know that the combination of interest in Math, Economics, and the application in real life would point me towards Industrial Engineering. After visiting 'het Paviljoen', my choice had to fall on Eindhoven. It is the city where I got to know Industria and all it has to offer to students. Industria helped me forming myself in Eindhoven, both academically as well as socially. Forming a great group of friends, with whom I will be playing football next year, living with some of my best friends, and joining several committees, as well as the Crew last year. Ever since joining the F.A.C.U.L.T.I-committee and introduction-week committee in my first year, and seeing what opportunities you had as a member of the Industria board, I knew that I wanted that to be my next step after finishing my bachelor. As I liked my BEP so much, I decided to spend two more weeks after my first presentation to improve, with a passing grade as the result With my love for Industria, I am very proud to be the Project Manager of the 59th board of Industria!

Marijn Konings
Project Manager

21 years ago, a little man named Jens Adriaanse was born in Zealand. Terneuzen, to be more precise. At the age of 4, I started playing football and I never stopped. I played 16 years for our local club V.V. Terneuzense Boys and next year I will play at Pusphaira with some friends. One of the first open days I joined was at the University of Technology Eindhoven. I was immediately enthusiastic about Industrial Engineering, and the other open days did not make me change my mind. In my first year, I was active in the First-Year committee. Unfortunately, we could only organize one drink, but it was still a pleasure to do this committee at Industria. That is why I also joined the Company Tour committee and the Tappers. I really liked the Tappers and that is why I applied for the Crew the next year. The Crew organizes almost every Thursday drink and the big parties of Industria. This made me even more enthusiastic about Industria. I decided to apply for a board year at Industria. Next year, I will be the Officer of External Relations of the 59th board of Industria. I am looking forward to being in contact with both the members as the company relations of Industria. I would really enjoy seeing you all to have a beer or a coffee at the Villa in the upcoming year!

Jens Adriaanse
Externe Relations

In 2001 I was born in a city named Ede. At twelve years old I lived in a small village named Lienden. This was in a region called the 'Betuwe', which is known for all the apple and pears (boomgaarden) who are there. Here comes my love for there two fruits from, and I have never a shortage of them. When I was twelve, I moved to a somewhat bigger village called Sleeuwijk. I achieved here my VWO diploma after 6 years, after which I decided to go to the TU/e and study Industrial Engineering. After the Introduction Week I was sold and loved the student live. After six months, the time came and I decided that it was time to live in Eindhoven. This is the best choice I ever made. I became an active member of Industria and joined the Introduction Week Committee and became a Tapper of The Villa. During these committees I got to know a lot of people, and got to know how exciting Industria is. After this I did Company Tour, F.A.C.U.L.T.I., Business Trip 2.0. After this I decided that a Board Year would be a exciting new chapter. I am looking forward to being the Secretary of Industria. Organizing big parties and managing such a big association is something you cannot experience every year. Hopefully I see you soon in The Villa to drink a beer with us!

Twan Vredendaal
Secretary

he 59th board


PHOTO ARF Fotografie

21 years ago, Maastricht got another inhabitant: me. However, before I could get the Limburgs accent, we moved to Vught! Here, I played hockey and went to school to eventually finish my VWO.

When it came to choosing a study, I had absolutely no idea what I wanted to do. I checked out a lot of studies, but eventually it was my dad who said 'Hey, what about Industrial Engineering?'. It seemed interesting so I just enrolled because I could not find anything better. Luckily, it turned great!

I continued my hobby of hockey at DonQuishoot, and joined Industria as well. I did 2 committees during my second and third year, and the most memorable is the Gala committee. Fun Fact: this was one of the longest running committees due to the gala date changing because of corona. Next to that, I organized, together with fmy fellow board members Stef and Twan, a trip to Budapest, Hungary.

Now, I am looking forward to being the chairman of Industria and investing my time in Industria! Feel free to join in the Villa for a cup of coffee and I will show you my other hobby: talking :)

Rosan Kolff
Chairman

Let me introduce myself in this beautiful magazine for Industrial Engineers. I was born on a warm Sunday evening in June 2001 in Valkenswaard, in the cozy province Noord-Brabant. Here, I grew up playing a lot of football at my local club: RKVV Dommelen. I really enjoy playing all kinds of sports, so you can always hit me up for any kind of sports activity. I went to elementary school and subsequent VWO (high school) in my hometown, after which I decided to study Industrial Engineering in Eindhoven. This was a logical choice for me, because of my interest in economics and math and the small distance between Eindhoven and my hometown. Immediately from the start of my studies I was active at Industria, starting in the freshman committee. As I enjoyed this so much, I participated in six more committees since then. Of course, ever since that warm Sunday evening in 2001, I knew I was also going to apply for a board position at Industria. And now, after finishing my Bachelor a few weeks ago, I am very proud to become the 59th treasurer of Industria. I am really looking forward to this exciting upcoming year, and I also hope to meet a lot of you at activities of either Industria or Alumnia. Have fun reading the rest of this SCOPE!

Stef Knoben
Treasurer

Boundaries

In 2001 I was born in Eindhoven, and grew up in the beautiful place Best (very close to Eindhoven). When I was six years old, I decided I wanted to play the trumpet. Now, many years later, I still enjoy it a lot. I am part of the Philips Harmonie in Eindhoven and the National Youth Fanfare Orchestra, with which I went to Lithuania for a concert tour last summer. After I started studying Industrial Engineering, I joined a committee, namely the Belgium Trip. I felt like this was a valuable experience: besides having fun with your fellow members, you learn a lot and gain more professional skills. I decided I wanted to do more things besides my study to develop myself and to have fun, so I also joined the Company tour, Gala, Financial Control Committee and the Tappers. After this, I wanted to become more active for Industria, and I have always loved the Thursday drinks and the big parties like Pullûh Vullûh, so I decided to join The Crew. Besides being active for Industria and playing the trumpet, I have been busy with education over the last years. I have been a student mentor for two years, and I am also a student assistant Teacher Support. I enjoyed it a lot: I find it interesting to see the other side of education which we as students do not normally see and get to give input from students view to make sure the quality of the education keeps improving and we are even more ready for entering the work-life. I am really excited to be the Educational Officer of Industria's 59th board! If you want to share your opinion about the study and the courses, know that you can always come to me!

Farah Schepens
Educational Officer

Alumnia Board Update

Shortage is the theme of this edition of the SCOPE. The good news is that there is more work than ever, the bad news is that it is hard to find qualified personnel for the vacancies that are present. A really interesting situation that enhances the role of Alumnia. Activities that we organize for both alumni and students are ideal to find this job-person fit. Whether you are looking for a company to write your master thesis or looking for a next step in your career. Your potential manager might be closer than you think.

Some examples of those activities were the Social Drink and the Outdoor Activity. In June we celebrated the anniversary of Alumnia as we currently exist 45 years. We enjoyed some drinks and food, while being competitive on the petanque court.

On Saturday the 13th of August we were able to enjoy each other's company again during the outdoor cooking workshop. This time we choose to host the activity closer to some members that we don't see that often in the south. We had refreshing company and conversations in Oud Ade, where we prepared our own meals under guidance of the team of "BuitenKokers". Many got inspired and several smoke and Dutch ovens ended up in the online shopping baskets.

Kind regards on behalf on the Alumnia board,

Tom Koks
Chairman Alumnia

Upcoming activity
November 18th - Social Drink

For more information, contact:
alumnia@tue.nl

Do you want to enjoy one of the following activities of Alumnia? Make sure you subscribe via www.alumnia.nl/activities. Good to know that as a master student you can already join Alumnia as try-on member. This membership is free and gives you the opportunity to already connect to current alumni. Also very useful if you are looking for a job after graduation. For more information visit our website.

We hope to see many of you on 9 September during the BBQ Master Activity, where we aim to connect master students to alumni and speak about what life as a TU/e alumnus is like.

In November this year we also have several activities scheduled, amongst which the Alumnia Career Activity and another Social Drink. Check our website for the latest details and subscribe for these events. Let's Inspire, Connect & Play together!

Alumni Speaking

In 'Alumni speaking', each SCOPE two members of alumnia association Alumnia are interviewed. They talk about their careers, current activities and the relationship with their studies.

TEXT Loek Botman & Emmy van Schijndel **DESIGN** Caitlin Riesewijk & Marijn Konings

Loek Botman

What has your career been like so far?
I conducted my master thesis at Océ (nowadays Canon Production Printing), where I used sensor data from machines to predict when a machine would fail. This is where I started programming and working with large amounts of data, which I really enjoyed. After graduating, I stayed at Océ for a couple of weeks to implement my master thesis, after which I started as a Big Data Analyst at bol.com. This role quickly changed into a Data Scientist role after an internal reorganization. For the first two years I worked in more commercial teams, but since about three years I'm working in the logistics department, where I try to optimize the outbound process in our warehouses.

What makes you happy in your work?
In our team, we run our own software applications that support the operational process, but also constantly innovate on them. The combination of being highly involved with the operational process, but also having the intellectual challenge of modeling and improving our algorithms is something I really enjoy.

What was the most important moment in your career and why?
Making the decision to work in data. Back when I was applying for jobs after graduation, I was doubting between an operational job as a team leader in operations or a more analytical job in data. In the end I decided to choose the latter, and in hindsight I think this was indeed a good fit for me. In my current role, I can still be highly involved in the operational process, but also challenge myself in a more technical and analytical way.

Looking back on your career, would you make the same choices with today's science?
I have been quite an active member at Industria, being in the board and doing all sorts of committees. Also, I worked part-time as a logistics engineer at AME during my masters. These activities have given me a head start in my career. Although I started as a junior at bol.com, I felt I could already contribute a lot to the company since the start, due to my relevant work experience and organizational skills that I learnt during my study. Besides that, I made friends for life during my student time during these side-activities, which provides me with a strong personal network.

How do you distinguish yourself as a business manager from managers with a different background? In which aspect is the greatest added value as a business administrator?
The technical background of our study, in combination with a very pragmatic focus on business. I generally see a lot of businesspeople who are very pragmatic but are struggling with analytical complexity. On the other hand, technical people can often lose themselves in the complexity they create themselves, and therefore forget about the actual problem they're trying to solve. I think Industrial Engineering finds a nice balance in the two.

New question:
What subject or skill you wish you would have learned in university and why?

Why:
Although I think most of the curriculum in Industrial Engineering is solid, there's always room for improvement. And who knows, maybe the program manager will actually read this interview and will implement your suggestions.

Loek Botman

Age: 30
Graduation year: 2017
Role: Senior Data Scientist Operations Research
Company: Bol.com

Cas van Elderen
SCOPE 4, 2022
Team lead Business Engineering at ASML Wilton Factory

Nick van Lanschot
SCOPE 2, 2022
Entrepeneur at NDI ICT, I.E.T., Allurion, Ulthera and CoolSculpting Kliniek

Emmy van Schijndel

What has your career been like so far?
Dynamic! I started as a strategy consultant at Roland Berger because I wanted to understand companies broader than operations only. That has been a truly steep learning curve, where I saw many different types of projects and industries. It was a great start of my career, as it has given me experiences, knowledge, and skills that I don't think you will find in many other jobs. At some point I specialized in strategy development for food ingredient companies and from that I took a leap towards the industry itself: I am currently a strategic project manager at DSM in Delft, where I most recently led the transformation/integration of 3 separate business units into the new business group DSM Food & Beverage.

Why did you choose the industry you work in now?
I am very passionate about food and innovation, as I see our current food system as one of the key challenges to solve in this century. The majority of the innovations that you see in your daily food and beverages actually do not come from the names on the package, but from the companies supplying the ingredients. I find it fascinating to see all the steps that are taken in the industry and by DSM specifically, and it is great to be part of an organization that is actively rethinking our food systems to become healthier and more sustainable.

ALUMNIA
associated with Industria

How do your expectations about your career during your student days differ from today?
Well, I am not really one to make long-term plans (I only figured out I wanted to move into consulting about 2 months prior to graduating), so I also had little clear-cut expectations. Maybe the largest difference is about how "makeable" your job is, it is definitely not only about the predefined job title or role but much more about your own initiative to create the job that fits with you – within boundaries of course ;)

What is the key thing that you have learned during your studies that you use a lot and appreciate?
Critical thinking & creative problem-solving. I vividly remember those exams or assignments (typically logistics related) that you could not really prepare for, as there were always new questions that pushed you to think outside the box and combine all the knowledge you had to come to an answer.

What advice would you give current students?
Be curious and just do it! I have done a lot of things throughout my studies and career that I was unsure of or nervous about at first, but in the end, those were the instances where I personally grew the most. So especially when you are in doubt about something, just say yes and see what comes your way. The worst that can happen is that you learned something, the best is that it opens up a whole new world of opportunities.

Old question: How do your expectations about your career during your student days differ from today?

New question: Where do you get most energy from inside and outside of your work?

Why: Currently all questions are related to the career path, for me it is also interesting to learn more about the person behind the job title.

Emmy van Schijndel

Age: 32
Graduation year: 2014
Role: Project Manager
Company: DSM Food & Beverage

Maarten Vermeulen
SCOPE 4, 2022
Supply Chain Strategy & Network Manager

Bram Sprenkels
SCOPE 2, 2022
Manager Supply Chain Strategy at Deloitte Consulting

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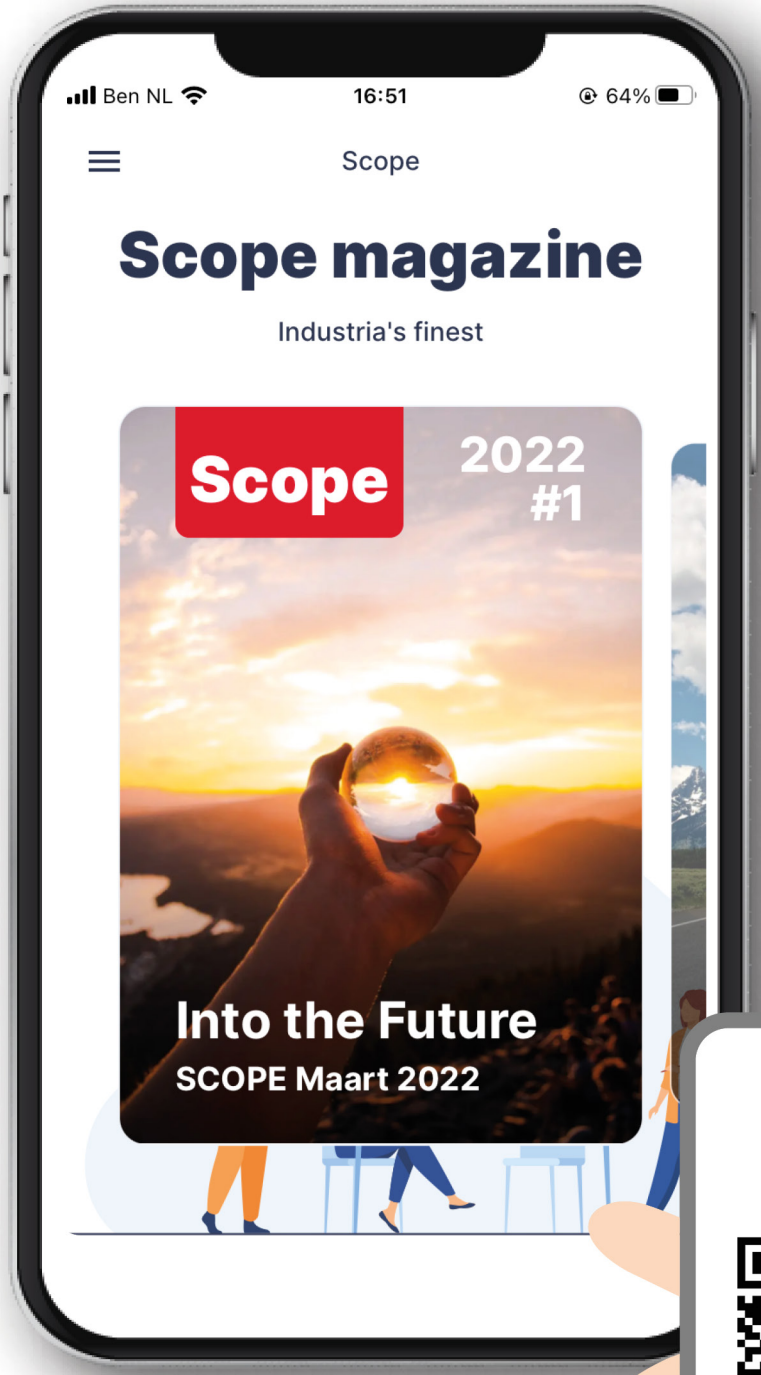

Students only

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No Shortage in Opinions

There always seems to be a shortage of something, time, money, resources, and so on. However, there never seems to be a shortage of opinions. All humans do it. Upon a first encounter with a person or situation, your brains form an opinion and this opinion, or rather judgment, can impact your behaviour. Such a first impression can be positive, and it could help you make new connections and have a good experience. On the other hand, a negative first impression can cause you to be cautious, or perhaps even act with an attitude, which could harm your own reputation or chase people away. Therefore, one of the most important characteristics that should go hand in hand with forming a judgment is the ability to adapt. The information on which a first impression is based is usually very limited and can even be misleading. So it's not strange that over time, the situation might turn out to be completely different from what you first believed. Having an opinion is fine, and only natural, but being able to adapt that opinion based on new information is a valuable quality. Without it, a lot of opportunities could be missed. So, may there never be a shortage on opinions, as long as there is also no shortage on the ability to adapt.

Rosan Kolff
Chairman Industria


PHOTO ARF Fotografie

The Relevance of Shortages


PHOTO ARF Fotografie

Shortages are an important topic in Industrial Engineering. Every tiny detail must be present to create an efficient supply chain. For example, if a whole car is manufactured and ready, but the chip is missing, the car cannot be delivered. If the chain is disrupted, lots of extra time and costs can be the consequence. And that is something we despise as Industrial Engineers. Nowadays, we have to deal with shortages a lot. The supply and demand have not been in balance for a while now, and the terrible war in Ukraine has made it worse. Lots of chains are disrupted. An example of this is the lack of containers from Asia to Europe and the USA. This situation has an effect on all of us. The prices of many products are increasing in a fast pace. This is not only caused by the war and for example the shortage of grain, but also because of a shortage of work force. The topic of shortage is most relevant at the moment. Furthermore, humans expect more from the Earth than what the Earth can give us. It is impossible to continue living in this way. In the end, this will result in for example water and food shortage. The impact of climate change was clearly visible again this summer: dryness, heat, forest fires, shortage of water. As Industrial Engineers, we have a chance to organize processes as efficient and effective as possible, and to avoid waste. As humans, we also have the chance to live in a responsible way and to respect the limitations of our planet.

Farah Schepens
Educational Officer Industria

Boosting Shortages

While we all do not want to admit it, we all complain. We do it every day, and at times about the silliest things. While some people complain about having too much of something, think about a hangover or having too much to do at the same time, most complaints are about shortages.

There are two types of complaints; the deserved and the undeserved complaints. As you can probably guess by the name, the first ones give you the right to complain. Those are most often also the complaints that are most true, as for instance hunger in Africa or home shortages in various countries. To keep this column a light piece of reading, I will mostly talk about the latter complaint; the undeserved complaint.

One ironic comment that came into my head was that 'while most undeserved complaints are about shortages, there is never a shortage in undeserved complaints'. A couple of the complaints I have probably made on the day of writing, as well as on the day you are reading this are;

'I had way too little sleep last night' (after either going out the day before, or staying up to watch a series on Netflix)

'I have way too little money on my bank' (while just having bought too expensive lunch at the Spar, and buying another round at the bar the Saturday before)

'This food has no flavor at all' (while being too cheap to buy spices and herbs)

But what do these complaints do to us? The last edition of SCOPE talked about The Bright Side, with various columns discussing the effect and importance of having a bright view


PHOTO ARF Fotografie

on your days. However, complaining causes your body to release a stress hormone that makes you more prone to becoming angry, hence not being as much in touch with your bright side. It might even lead to relationship and health issues, therefore having even more effects on your world than on just yourself. This should awaken you not to complain, right!

With some of the shortages in the world showing signs of decreasing, and creative and intelligent solutions for shortages appearing more and more often, the future does look bright. Although there is no shortage at all for complaints, this is exactly the shortage that we would want to have. Creating a shortage in complaints about shortage (and overage at times) is something we can strive for as a society. By all complaining a little less each day, the world will be a happier place, which is what we all want, right?!

Marijn Konings
Project Manager

2500 prints at Industria, Alumnia & companies

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