

# INNOVATIE **NU**

March 2022



# 05

**THINK GLOBAL**  
**ACT LOCAL**

# REFLECTIONS

## — A LETTER

## FROM THE EDITOR

*We would like to acknowledge and thank the support from the following organisations:*



It has been just over a year since we started InnovatieNU magazine. Initially conceived as a means of reaching out to industry in the East Netherlands region, our magazine focuses on topics related to advanced manufacturing, with a particular attention to topics of interest to local businesses.

Crucial to nearly all national economies, and none more so than here in the Netherlands, manufacturing is undergoing rapid changes as it attempts to keep up with consumer demands. We can see that there is increasing emphasis on high-tech and high added-value production and these bring new opportunities and also new challenges. It is abundantly clear that our region is embracing these opportunities and not only meeting the challenges they face, but surmounting them. The solutions our manufacturers are creating are always innovative and often groundbreaking, and our region is developing a reputation for excellence in advanced manufacturing that rivals that of any of our competitors. Furthermore, the concentration of talent in Twente makes it an attraction for other manufacturers wishing to move to the region to share and build on our depth of knowledge and experience.

InnovatieNU regularly features local champions of industry, outlining their responses to these new and varied challenges. In this particular issue, for example, our editorial team has reached out to key members of our local manufacturing community who are ardent supporters of InnovatieNU. We requested their viewpoints on how they are riding the wave of manufacturing advancement, how they see the future of manufacturing in the region and how they anticipate it may impact them, now and in years to come. Their answers proved to be very insightful.

When my colleagues and I started this magazine, we were uncertain how it may be received. After all, people today can get their information from many different sources. A new magazine is quite a rare thing to see in this day and age, and could be seen as a risky venture. We were extremely pleased with the overwhelmingly positive response we received from companies who obviously appreciate what we are doing to highlight both the manufacturing industry

and the region. They gladly provided articles for this special edition. The support we have received from local industry has been exceptional and it was great to receive and read the articles presented in this latest edition of InnovatieNU. We trust that you too will be interested to read their viewpoints.

I may be jinxing things (and I sincerely hope that I am not), but 2022 certainly seems to be starting with a spring in its step. Although we are still dealing with COVID on a daily basis, it does seem that the worst may indeed be over and that most of us can finally start to concentrate on rebuilding our daily lives. As I look out from my office at the University of Twente campus, I can see more people out and about than I have for many months. I can also see that most of them are (at least when they are seated or outside without the omnipresent masks on) happy and smiling. The future is looking brighter than at any time in the past two years and in 2022, we are gearing up to present you with more outstanding articles offering you a wealth of new ideas, innovative approaches to old problems and cutting edge techniques, to help you keep abreast of a rapidly changing industry.

## **IAN GIBSON**

*Chair Professor of  
Industrial Engineering (UT) &  
Scientific Director  
Fraunhofer Project Center  
at the University of Twente*





InnovatieNU is a quarterly magazine published by the Fraunhofer Project Center at the University of Twente (FPC@UT) created for the manufacturing industry with content covering advanced manufacturing tools and techniques.

The online version can be found on [amcenter.nl/knowledge/library/innovatie-nu/](https://amcenter.nl/knowledge/library/innovatie-nu/)

### **InnovatieNU Team**

#### **Editor-in-chief**

Ian Gibson

#### **Managing Editor**

Gijs Beumkes

#### **Management**

Azlina Azman

Annemiek Rouchou-Bloemenkamp

#### **Design**

Ale Sarmiento Casas

### **Contact details**

Fraunhofer Project Center  
University of Twente – Horst Building  
Drienerlolaan 5  
7522 NB Enschede  
The Netherlands

T: +31 (0)53 489 1818

E: [media-fpc@utwente.nl](mailto:media-fpc@utwente.nl)

### **Copyright and conditions**

© Fraunhofer Project Center at the University of Twente 2022

It is allowed to copy or share an article from InnovatieNU, as long as a link to the original (online) article from InnovatieNU is inserted and the publisher is notified at [media-fpc@utwente.nl](mailto:media-fpc@utwente.nl). FPC@UT are not responsible for any inaccuracies in this edition. FPC@UT are not responsible for actions of third parties that may arise from reading these publications.

Printed by te Sligte-Olijdam BV, Marssteden 31, 7547 TE Enschede, The Netherlands, March 2022

Printed on FSC certified paper

We would like to thank our industry partners that have contributed towards Issue #5 of InnovatieNU:

**BOLK Transport**

**IMS**

**K3D**

**Lely**

**Novel-T**

**Riwald Recycling**

**Royal Grolsch**

**Trioliet**

**Twente Board**

**VIRO**

**VMO**

# CONTENTS

## 33

### TWENTE BOARD

## REGIO DEAL

*Twente*

### ROYAL GROLSCH

**41** *Grolsch is Getting Greener*

### BOLK TRANSPORT

**47** *Innovating transport, logistics  
and warehousing*

### AMC

**53** *Advanced Manufacturing Center  
Ecosystem Supports Digital Reformation  
Manufacturing Industry East Netherlands*

### VMO

**55** *The Vital Link Connecting the  
East Netherlands Manufacturing Industry*

### VIRO

**59** *Smart Model Systems Engineering  
Exploits Dormant Potential*

### NOVEL-T

**63** *Eyes on the Future.  
This is how your business stays agile in a  
rapidly changing market*

### K3D

**1** *3D Printing Solutions*

### LELY

**5** *New Circular Barn System for Livestock*

### IMS

**11** *Getting Aligned:  
High Performance at High Speed*

### TRIO LIET

**17** *Premium Feeding Technology*

### RIWALD RECYCLING

**21** *High-tech Circular Hub*

## 29

*AI Hub*

## EAST NETHERLANDS



MASTERS IN 3D METAL PRINTING

# METAL PRINTING SOLUTIONS



*Author:*

**Jaap Bulsink**

CTO  
at K3D

## Expertise and capacity

K3D is a 1-stop-shop for 3D metal printing, operating from two centers in the Netherlands. The first MetalFAB1 was purchased in 2016 for the headquarters in Terborg. Terborg is located in a region with a long history in manufacturing metal and machinery. Until this day, more than 95.000 industrial applications have been printed with this industrial 3D metal printer. A second location was opened in Eindhoven, in 2018, with the same printer. Both printers are able to produce parts up to 420 x 420 x 400 mm. As a result, our services are applicable to specific target markets, such as the aircraft industry, oil and gas industry, medical supply and sales, food tech and high tech industry.

The centers in Terborg and Eindhoven offer businesses knowledge, capacity and assistance in the design and manufacturing process. This unique support enables you to utilize the benefits of 3D metal printing to its fullest potential. In addition to printing 3D products, K3D can assist you in developing your business cases and they offer training programs. The 3D printed parts can be used on their own, implemented in prototypes or used as full-fledged parts in different machines.

## Local production

One of the goals of K3D is to create print hubs on, or nearby, production locations. This ensures fast and easy access to printed parts for their customers, without loss of quality. By implementing these hubs, the need for transport is greatly reduced. Additionally, it empowers local communities by creating employment opportunities.

Another goal of K3D is to instill an innovative way of working in the companies of their customers. For example, they have integrated 3D printed parts in the traditional design of

various bakery machines. By doing this, the use of raw materials was reduced and the functionality improved because of the new design. The possibilities of 3D metal printing are endless. Parts that previously had to be assembled can now be printed as a whole. For example, hinges, leaf-springs and bearings. Materials can even be given completely different properties, such as the porous material for the bakery industry, which K3D developed. This material stays clean while cutting dough, when air is blown through.

## High-tech developments

3D metal printing is a development in itself. However, developments never stand on their own. Therefore K3D tries to stay on top of innovations and developments in various branches. Digitalization and automatization are very important to be able to produce parts fast and with a constant quality. These developments are necessary to take K3D to the next level: local production.

## Partnerships

K3D has set up various partnerships with leading companies and educational institutes to share and acquire knowledge. One of these collaborations is K3D-AddFab. Located mainly in the south of the Netherlands, K3D-AddFab is a print and expertise center, with state-of-the-art machines and facilities, where further steps in the industrialization of 3D metal printing will be achieved through an innovation program in the aforementioned areas. K3D works with participating companies and educational institutions to advance the 3D metal printing technology. K3D-AddFab's ambition is to further develop a wide range of high-tech and high-end production applications for 3D metal printing, for industrial series production and to upscale the capacity for high-quality applications.





▲ *The MetalFAB1 printer has two print cores and storage allowing to use multiple material continuous production.*

The collaboration is an example of open innovative partnership and knowledge enhancement in the field of next-generation printed metal products. This expertise is brought together in the new center on the Brainport Industries Campus in Eindhoven.

### **Impact on the region**

K3D has made a big impact on various regions throughout the Netherlands. Since the start of K3D there is a visible growth in the market of 3D metal printing. Many businesses have been implementing printed parts in their day-to-day production methods and activities. K3D helped and guided many companies on their way to realize this.

Next to this, a lot of employment opportunities have been created by K3D. With the rising demand, there is a good chance that the amount of opportunities will increase even more in the future. Additionally, K3D works together with local educational institutions and universities. This is not only to make production technique known to students, but also to help these students to gain experience in the field of 3D metal printing. Throughout the years, K3D has been supervising a lot of interns and there are many more to come.





MASTERS IN 3D METAL PRINTING

# NO MORE PANCAKE WASTE!

## HOW K3D TRANSFORMED BAKERY PRODUCTION LINES

Baking pancakes can be a messy business. K3D discovered this challenge when pancake lifters used to make 20,000 pancakes per hour needed to be optimized. The traditional design used in these lines faced issues with waste. The pancake-making process began as pancake batter was baked on a large plate in an industrial oven. But upon removing the pancakes from the baking plate, the lifting device would regularly get clogged up with the sticky batter.

### The issue

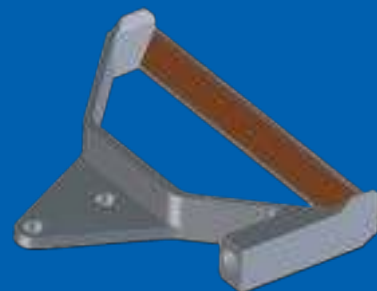
This issue in the line led to a few other bumps in the road. Firstly, it resulted in major product waste. Any pancakes that stuck to the lifter would no longer meet the quality requirements and therefore would need to be removed. Secondly, all the waste build-up caused postponements in the production line. The stuck batter dirtied the machines, resulting in teams stopping the entire line to clean them. The delays and excess waste meant that this process needed a serious boost in efficiency.



### The result

After completing the process of determining the optimal parameters and redesigning the part, the K3D had a 3D-printed design to combat the stickiness experienced in the production line. The new design is one complete part featuring internal channels and porous metal parts that allow airflow. This air is pushed into the lifter and blows out of its pores. The pancakes can then hover above the lifter, much like a hovercraft over water.

The team also used this redesign to reduce the amount of material needed. 3D printing allows for integrated, organic forms that, with the right know-how behind it, means improvements such as this can be made. Less material benefited the project in multiple ways, including reducing material costs and accelerating machine build time.



“Now, each production line is seeing a reduction in pancake waste by thousands of kilograms as well as a 10% increase in productivity. Just imagine how much more we can achieve with 3D printing.”

**Jaap Bulsink**  
CTO  
K3D




**NEW**

# **CIRCULAR BARN SYSTEM**

**FOR LIVESTOCK**



A photograph of a cow in a barn stall, overlaid with a semi-transparent red filter. The cow is white with black spots and is looking towards the camera. The background shows the metal structure of the barn.

***“Livestock farmers can use the exact type of fertiliser needed to fertilise soil and crops, precisely where and when it is needed.”***

**L**ely presents a new barn system for separating mineral flows and converting emissions into value; Lely Sphere. The system separates manure and urine, converts nitrogen emissions, and creates 3 valuable types of fertiliser. Dairy farmers can use these separated fertilisers for precision fertilisation. This closes mineral loops better, reduces nitrogen emissions, and creates a healthier climate in the barn.

The system was launched today during the Lely Future Farm Days. Korstiaan Blokland, Head of Innovations at Lely, says:

***“Lely Sphere is designed to help dairy farmers exploit the valuable nutrients in manure to the maximum, and thus promote crop growth. This practical solution is easy to deploy, and part of the transition to more sustainable and even more circular dairy farming.”***



***“Official measurements at test farms have shown that total ammonia emissions from barns are reduced by approximately 70%.”***

## **Better closure of mineral loops**

For dairy farmers, closing mineral loops is becoming increasingly important because it improves the social acceptance and sustainability of farming. Minerals leave the company through milk, meat, manure disposal and emissions from manure. By making better use of the minerals in manure and converting losses through emission into value, the mineral loop is better closed and less fertiliser needs to be purchased.

## **How Lely Sphere works**

The Sphere system consists of various simple and easily applicable parts. In the first place, manure and urine are immediately separated from each other. The urine flows through separation strips to the pit, while the manure remains above. This is the first step to limiting emissions, because separating at the source results in less ammonia in the barn. The Lely Sphere N-Capture creates an underpressure in the pit, and extracts manure gases that are created under and just above the barn floor. This also includes the remainder of the ammonia formed on the walking surface and the pit. The filter in the N-Capture captures the ammonia, and uses acid to convert it into circular fertiliser. The Discovery Collector barn cleaning robot regularly sucks up the solid manure, keeps the barn floor clean, and transports this solid fraction to a chosen disposal site.

## **Optimal fertilisation of crops**

The Lely Sphere system creates three types of fertiliser:

- 1** mineral nitrogen of mineral fertiliser quality in the discharge water produced by the N-Capture;
- 2** phosphate and organic nitrogen in the solid fraction;
- 3** potassium in the thin fraction in the pit.

Livestock farmers can use the exact type of fertiliser needed to fertilise soil and crops, precisely where and when it is needed. As an added bonus, fewer emissions are formed when spreading on grassland.

The 3 types of fertiliser allows livestock farmers to respond better to the needs of their grass and corn. This is just the beginning of the Sphere system, as Lely is continuing to look for possibilities to get even more value from manure, and optimise precision fertilisation.









## Around 70% reduction in ammonia emissions

Official measurements at test farms have shown that total ammonia emissions from barns are reduced by approximately 70%. As an emission-limiting system, Lely Sphere also distinguishes itself by reusing nitrogen as a substitute for chemical fertiliser. Practical tests have shown that 10 to 20 kg nitrogen per cow per year can be 'harvested'.

## Healthier barn climate

Separating manure and urine and ventilating the pits reduces ammonia in the barn. Extracting manure gases from the pits also increases safety, as these harmful gases no longer accumulate in the manure pit. It also keeps the air in the barn fresher. The natural ventilation in the barn is maintained, and cows can walk in and out of the barn freely. The Discovery Collector keeps the barn floor cleaner, which improves hygiene and claw health. Besides creating value from manure, Lely Sphere also keeps the barn climate healthy and safe for humans and animals.

## The next steps

Work on developing Lely Sphere began in 2015. The systems have been operational since 2017, and are now running on four test farms. The system has international potential, but initially Lely will focus on the Dutch market. At the moment, approximately 60% of the official measurements necessary for recognition under the Netherlands Livestock Farming Ammonia Regulation (RAV), have been completed. Meanwhile, Lely Sphere does have a provisional RAV of 3.6. It is expected that this official recognition as an innovative housing system against ammonia emissions will be granted in the third quarter of 2021. Following this, Lely hopes to make the system available to more livestock farmers in the Netherlands.

**For more information, go to:**  
[www.lely.com/sphere/](http://www.lely.com/sphere/)



## About the Lely Group

Lely, founded in 1948, directs all its efforts towards creating a sustainable, profitable and enjoyable future in farming. Circling the cow, the company develops premium robotics and data systems that increase animal welfare, flexibility and the production on the dairy farm.

For more than 25 years, Lely has been leading in the sale and service of automated milking systems to successive generations of dairy farmers across the globe. Every day, Lely inspires her employees to offer customers innovative solutions and be a reliable partner for long-term advice and support. With her Head office in The Netherlands and a worldwide network of dedicated Lely Center locations for tailor-made sales and support, the Lely Group is active in more than 45 countries and employs around 1.600 people.

More information: [www.lely.com](http://www.lely.com)

Contact:



[communications@lely.com](mailto:communications@lely.com)



+31 (0)88 122 82 21



# GETTING ALIGNED

## HIGH PERFORMANCE AT HIGH SPEED



*Authors:*

**Wouter Spoorendonk**

R&D project manager  
at IMS



**Marc Beusenbergh**

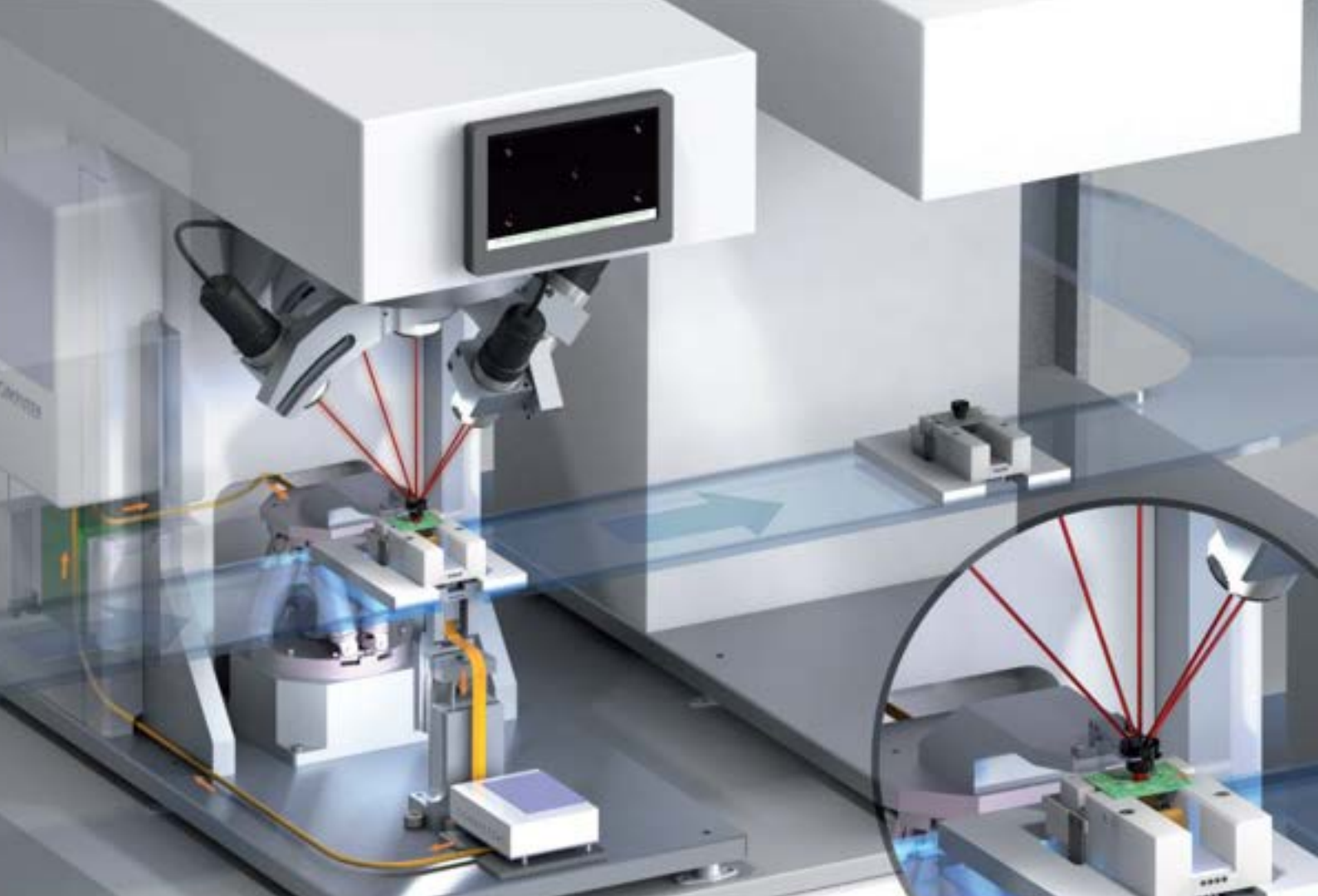
R&D director  
at IMS

In the world of micro-optics and micro-structure assembly and testing, alignment is critical to achieve the desired performance. For more than 20 years, Integrated Mechanization Solutions in Almelo, more commonly known as IMS, has gained an expert position and a considerable track record in this field. IMS develops, builds, supplies, and supports high precision production systems 'from lab to fab'. Over 120 professionals work with high precision to create test systems, operator workstations, stand-alone assembly systems, and fully automated production lines for customers worldwide.

### High Precision

High precision assembly at IMS means small and complex products that need to be assembled with precision levels of a few-hundreds of millimeters down to one-tenth of a micron or even less. Examples of products that require such accuracy are automotive lighting systems and sensors, medical implants and surgery equipment, security systems and drone cameras, and many components in mobile phones and other smart devices.





▲ *Consumers, and therefore industries, are asking for higher performance, more complex, and smaller devices and sensors, which in turn increases the demand for high quality imaging. This drives up the accuracy of manufacturing optical systems. As complexity and accuracy increase, so do manufacturing challenges. Many optical system production systems can no longer rely on only mechanical alignment of components but need active alignment.*

## Assembly of Optics

A very specific class of products for which IMS builds production systems are micro-optics and camera modules. Keeping cost down while still achieving high performance requires more than just considering size and shape when we deal with optics. Here, we need to look at actual optical performance while putting components together – also known as active alignment. Whether lens-to-lens, lens-to-camera sensor, laser-to-lens, lens-to-LED, and many more, these subassemblies require measuring optical performance using an image or projection while putting components together. Quite often this means that components need to be manipulated in 6 degrees of freedom while continuously measuring optical performance until an optimum configuration is reached.

## Scalable Solutions

A major consideration in developing production systems at IMS is offering solutions that 'grow' with the customer's challenge – both in volume as well as in product design. Especially in early stages of product development, design changes need to be handled. Also, very often a family of products need to be produced using the same or similar equipment. Furthermore, production volumes are expected to increase as the customer's product becomes more successful, requiring a higher level of automation. IMS builds modular production systems to handle these challenges.

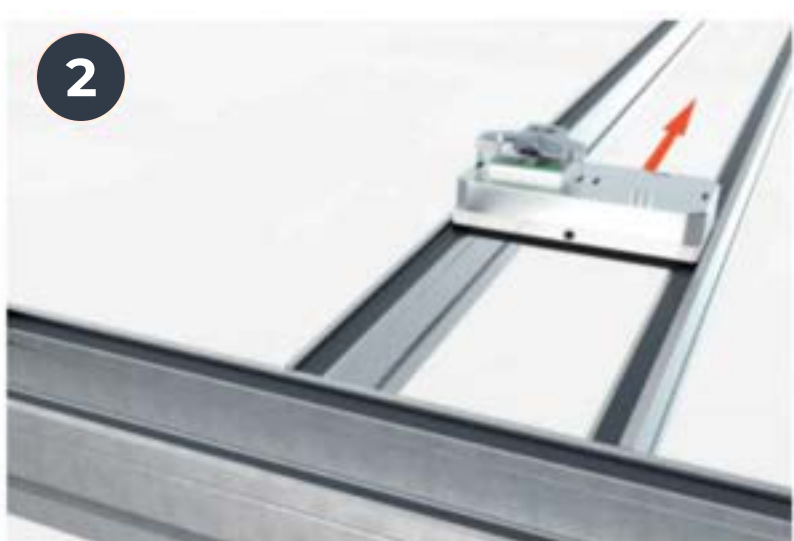


▲  
***Our production lines are scalable in capacity, capable of a high-mix and flexible in layout. When developing a production line, we're making use of our standard automation platforms, which form a reliable and robust basis to integrate the needed manufacturing and assembly processes on.***

## **Active Alignment System with Unique Features**

Recently, IMS released a highly modular and scalable production system for optics assembly: the A-Lign5. The A-lign5 is a camera module assembly workstation fit to be used alike in R&D environments, small to medium volume production systems, and in highly automated production lines. Lens systems can be actively aligned to a camera sensor using the A-lign5 with an accuracy of only 1 micron – a high accuracy that is needed to obtain the best camera module performance. Fast algorithms and controls provide quick feedback and short cycle times, which is needed for scaling up production volume. With only a limited number of modifications, the system can handle different types of optical systems, e.g. lidars.

The A-lign5 can be equipped with different types of cleaning, dispense and curing systems in accordance with customer demands. Furthermore, and unique to the world of active alignment production systems, is a feature to freeze the alignment without fixating the components. This feature is called the Position Freezing Carrier: it holds the aligned optics and allows it to be fixated in a parallel step, next to the alignment station. This eliminates the need for pre-curing glues and reduces cycle time – hence saves costs. Additionally, it allows product developers to reconsider the fixation of components altogether, thus provides high design freedom.



▲  
*The main steps of the Position Freezing Carrier (patent pending).*

## Scaling Up and Down

Active alignment is applied in many applications. Automotive head lights using more advanced (accurate) LED, laser, and lidar systems, require economic, scalable, and accurate active alignment solutions. Quality and performance of components are going up, enabling the automotive industry to meet increasing sustainability and safety demands and get ready for autonomous driving.

Another field of application of active alignment that is rapidly increasing is integrated photonics. Photonic integrated circuits (PICs or photonic chips) are now finding their ways into telecom, medical, computing, and many more applications rapidly. Allowing these PICs to communicate to other PICs or the 'outside world' using glass fibers or fiber arrays, rely on active alignment to guarantee the best coupling and minimal signal loss. Here IMS is working on production systems that make this possible – in other words: IMS is aligning for high performance at high speed.

## Main steps of the Position Freezing Carrier (patent pending):

- 1 After actively aligning the optics in six degrees of freedom, the 'intermediate body' that holds the optics is 'frozen', i.e. clamps are closed.
- 2 It can now be moved into a parallel process, e.g. glue curing, while the AA-workstation can continue with the next product.
- 3 Once the bonding is completed, the parts return to the main production track.
- 4 When the assembly is completed, parts are removed from the production line and the intermediate body is in its rest position.





# We are IMS, will you join us?

## Do you want to contribute to tomorrow's world with high-tech production solutions?

Join the club! We are looking for new high-tech colleagues. With more than 120 colleagues we develop and build advanced assembly lines for small composite products. You can think of automotive lighting systems, pressure sensors or many components in mobile phones and other smart devices. In the coming years, we will need new colleagues to optimally serve the growing number of customers.

## Involved from A to Z

Working at IMS means working on innovative projects in a flat organization with multidisciplinary teams. During a project you are involved from A-Z and you are in direct contact with our customers. The passion for technology and commitment to the customer and your colleagues, makes that we continuously challenge ourselves to achieve the best results.

Visit [www.werkenbij.ims-nl.com](http://www.werkenbij.ims-nl.com) to find out which of our career opportunities match your ambitions!

[WERKENBIJ.IMS-NL.COM](http://WERKENBIJ.IMS-NL.COM)







# PREMIUM FEEDING TECHNOLOGY

PROVIDING **FEED MIXERS** AND  
**AUTOMATIC FEEDING SYSTEMS** FOR  
DAIRY FARMERS

 **TRIOLIET**  
FEEDING TECHNOLOGY





**T**rioliet is a manufacturer of premium feeding technology. Every day, millions of cows all over the world are fed with our machines. Over more than 70 years, our family business has grown into a global player. We view it as our duty to provide optimal, sustainable solutions for the mechanised and automated feeding of cattle on professional dairy farms all over the world.

### **Trioliet Green-Label**

Trioliet regards sustainability as of the highest importance. We want to contribute to a better environment for both people and animals. The population of the world is increasing, with a growing demand for dairy products, so it is ever more important that we should be conscious of our environment.



We have patented a number of inventions that make our machines not only safer and more user-friendly, but also durable and economical. **The following inventions contribute to a greener, more sustainable world:**

## 1. CUTTING SYSTEM



The unique Trioliet cutting system requires less energy than, for example, a shredder. Furthermore, it produces a smooth, sealed silage face which reduces secondary fermentation and over heating. This maintains the optimum feeding quality of the silage due to reduced wastage at the silage face. The machine requires less fuel because the cutting system provides optimal cutting strength with relatively low power. The structure of the feed remains intact leading to better utilisation of the feed and less wastage. The TU silage cutter, the self-loading UKW feeders, the self-loading mixer feeders, the self-propelled Triotractor and the Triomatic automatic feeding system are equipped with a cutting system and are therefore assigned the Green label.

## 2. SELF-PROPELLED MIXER FEEDERS



Research has shown that the fuel consumption of the Triotractor self-propelled mixer feeder is exceptionally low. Due to the fact the mixer feeders are equipped with the Trioliet cutting system with a low power consumption, the self-propelled feeders are equipped with a light motor. A motor 175 hp/129 kW for the Triotractor is sufficient for operation.

## 3. SHIFTRONIC 2/3 SPEED



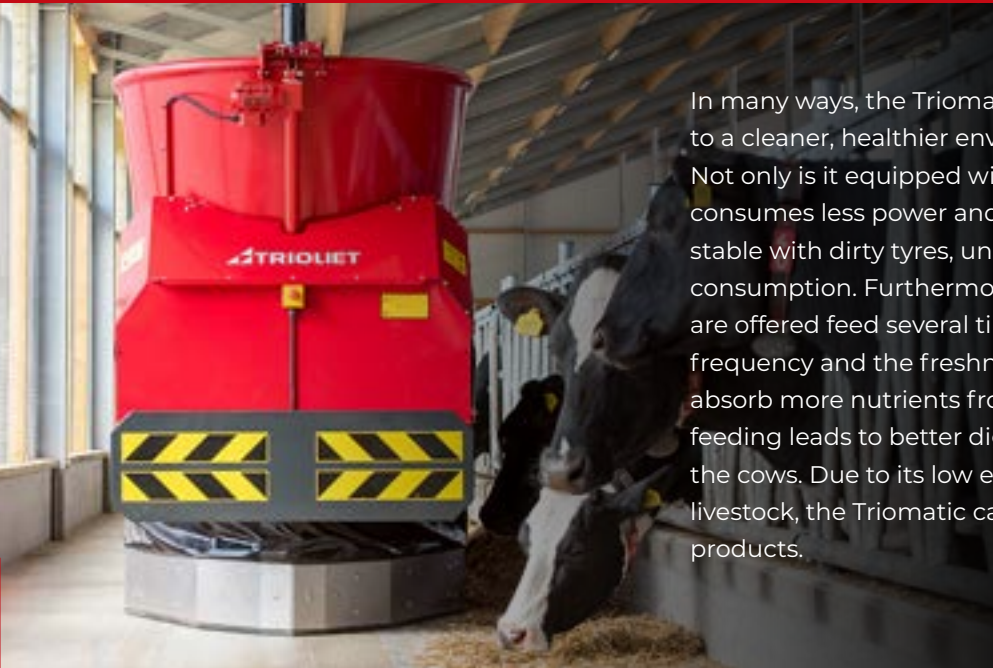
The Shifttronic makes it possible for the heavier machines (>18m<sup>3</sup>) to be driven by lighter tractors. The Shifttronic switches automatically to the most appropriate mixing speed. This prevents overloading in the drive line of the mixer feeder and of the power take off of the tractor, and requires less power.

## 4. SPRAY UNIT



The spray unit with water tank can be installed on the straw blower unit. The spray unit moistens the straw so that less dust gets out into the air. Cleaner air for both people and animals. The Solomix P therefore qualifies for the Green label.

## 5. TRIOMATIC AUTOMATIC FEEDING SYSTEM



In many ways, the Triomatic automatic feeding system contributes to a cleaner, healthier environment for both humans and animals. Not only is it equipped with the Trioliet cutting system, it also consumes less power and no tractor needs to drive through the stable with dirty tyres, unhealthy exhaust gases and a high fuel consumption. Furthermore, the stable is kept quieter as the cattle are offered feed several times a day. Thanks to this higher feeding frequency and the freshness of the feed, the cows are able to absorb more nutrients from the feed. More regular and structured feeding leads to better digestion and rumen function among the cows. Due to its low energy consumption and a healthier livestock, the Triomatic can also be counted among Trioliet's green products.

### Triomatic battery-powered feeding robot

Automatic feeding is now an integral part of professional livestock farming. This Triomatic battery-powered robot has the largest capacity (3m<sup>3</sup>), the best mixing quality and the lowest total cost of ownership. The robot follows its route using sensors. Detection sensors on the robot ensure that it stops automatically when it detects objects in the way. The feeding robot can be combined with all types of Triomatic feed kitchens.

The feeding robot has a large-capacity battery with a short charging cycle. Once the robot enters the feed kitchen, it connects to the electricity grid, meaning the battery is not used in the feed kitchen to move the robot or mix the feed. The battery begins to charge as soon as the robot is connected to the grid. It can also be charged via solar energy.

### Accurate and energy-saving

The Triomatic loads feed to an accuracy of one kilogram. The feed is mixed and cut at high speeds to create a homogeneous mixture, preventing the cows from choosing which feed to ingest. The robot can mix while in motion, enabling multiple groups of cows to be quickly fed one after the other. The robot starts to administer the feed using just one auger to save energy. To empty the mixing tub fully, the augers rotate at a higher speed at the end of the feed session.

### High capacity system

The Triomatic feeding robot makes it possible to feed animals multiple times a day with a balanced ration without losing any feed or requiring additional effort. One robot can feed about 350 cows, but multiple robots can be deployed at the same time.

Go to [www.trioliet.com](http://www.trioliet.com) to view all Triomatic automatic feeding systems.



**RIWALD RECYCLING** IS THE

# *HIGH-TECH* **CIRCULAR HUB**



*Authors:*

**Ömer Avci**

Green CPO  
at Riwald Recycling



**Ewald Huzink**


Co-CEO and Founder  
at Riwald Recycling



**Gert Huzink**

Co-CEO and Founder  
at Riwald Recycling





“Imagine a world where almost  
no new raw material is needed.”

**T**oday consumer society relies heavily on raw materials to satisfy increased production and consumption. Every major crisis in the world reflects on the raw material prices, and it's not only the global container shortage that is problematic for industries. It is the scarcity of raw materials in an ideal crisis-less world. Technological innovations combined with mass consumption and short product life contribute to these shortages, and population growth also plays a significant factor.

Imagine a world where almost no new raw material is needed. Policymakers in the European Union and Netherland already set the goals for such a future. The idea of a circular economy is not new, but the standards in front of industry are.

***Companies should use at least 50% fewer minerals, fossil raw materials and metals by 2030 and become fully circular by 2050.***

Europe is hungry for raw materials, and creating sustainable recycling industries will relieve some geopolitical issues. Moreover, access to

critical raw materials will be crucial to maintain Europe's high-tech lifestyle and safeguard the competitiveness of European companies.

Such ambitious goals are essential in tackling climate changes and would create an economy that would use recycled raw materials. However, a few technological steps are required to develop a circular economy, and Riwald Recycling is on the right track to creating the high-tech circular hub. This almost self-sufficient recycling company produces high-quality recycled raw materials.

### **High-end recycling equipment and green initiatives**

Riwald Recycling has several businesses under the recycling umbrella. The company owns a state-of-the-art metal recycling plant. A granular, unique metal processing machine is capable of separating ferrous from non-ferrous materials. Waste separation technologies enable the separation of remaining waste from incoming metals. Extracted raw materials are suitable for 100% reuse.

Riwald Recycling has substantial container service and is specialises in demolition works and product destructions. How can these intensive works be sustainable and green at the same time? Riwald Recycling shared its vision on the sustainable recycling of raw materials.

*Based on our business strategy, consisting of the combination of the Trias Energetica philosophy and the 3R philosophy, Riwald Recycling invests in the latest developments (separation and sorting) techniques, machines, and equipment with the aim of processing materials to the same high quality. Building upon the Trias Energetica, which is linked with our electrification policy, we invest in a green future by working with electric cranes, a sustainable fleet and transport over water - environmentally friendly, fuel-saving and noise-reducing. Our circular business philosophy considers the future. We believe that metal recycling can also be done differently: more focus on sustainable operations and reducing emissions/CO<sub>2</sub> footprint to become a professional and responsible organisation.*

## **The technology that allows 100% reuse of recycled metal**

Riwald Recycling has a high-tech granulator that can sort ferrous from non-ferrous materials, and other machines in the production line can sort products by induction, colour, and weight. The recycling plant contributes heavily to the circular supply chain, and it invests heavily in green technologies.

Each year, Riwald Recycling process hundreds of thousands of tonnes of waste materials. The high-end machinery on-premises can deconstruct household electrical appliances, high-grade industrial residues all the way to aircraft. In addition, the company can recycle this wide range of waste into more than 150 types of sustainable raw materials. Here is what the company says about the underlying technology behind such granular capabilities:





*Thanks to our high-tech granulator combined with our high-tech equipment – double scrap shears, eddy currents, drum screens, wet separation tables, Infrared (NIR), X-Ray, metal sensors, NF fines processing and colour sortings - we enhance raw material efficiency. These technologies result in no ‘new’ raw materials being needed anymore, whereby materials are processed to the same high quality. The economy would then run on recovered raw materials, and no ‘new’ raw materials would be needed.*

## **Where to get reusable green raw materials?**

Recover, reuse, and recycle is the philosophy of 3R. In the case of Riwald Recycling, the 3R relates to valuable ferrous materials like steel, cast iron, and stainless steel, with iron as the main ingredient. However, recycling also applies to aluminium, copper, lead, zinc, bronze, and brass outside of iron-based raw materials.

Due to Riwald Recycling unique metal processing machine, the high-quality raw materials are 100% suitable for reuse. The final product can go directly to companies in the manufacturing industry, smelters, and end processors for reuse.

On one end, the innovative recycling company invests heavily in energy reduction and sustainability and produces raw materials crucial for the circular economy.

## **Dismantling of massive structures, vehicles, and vessels**

Recycling must start somewhere. But, what if you have a huge installation, construction, infrastructure, or giant machines. Riwald Recycling can handle all types of dismantling with a fleet of well-equipped machinery and transport fleet.

Additionally, the company has expertise in dismantling vessels, vehicles, aircraft, locomotives, and bridges. The recycling plant can receive large demolition objects like lock gates, discarded windmills and other heavy constructions by water to the recycling locations.



## How to remove huge discarded products

A complimentary part of Riwald Recycling company is the product-removal department. Industries that have discarded, damaged, secretive, or unsaleable overstock products, prototypes, or waste need help to remove such items from their premises.

The best way to handle discarded products is with destruction and removal. Riwald Recycling uses a team for high-tech physical destruction, and the whole process follows the strictest European Union guidelines.




The critical component for this process is innovative separation technology in the company's machinery. All products are transported and destroyed.

***The customer will get a detailed destruction report and the accompanying documents. Simultaneously, due to the granular extraction of raw materials, all extracted parts are ready for 100% reuse.***

The whole process contributes to the circular economy goals and maximum raw material efficiency.

## How to safely collect scrap metal and complementary waste?

The best way to create a safe policy for discarding metal products is by having quality waste disposal containers. Riwald Recycling can place such containers, and you could use them for the collection of:

-  *Scrap metal*
-  *Production waste*
-  *E-waste*
-  *Surplus stock*
-  *Machine & installations*
-  *End-of-life-cycle products*

Riwald Recycling offers various types of containers ranging from 1 to 40m<sup>3</sup>. You can choose between open containers, containers with lids, lockable containers, and liquid-proof ones. The products come with an anti-theft lock for security. If you have specific container needs, Riwald Recycling can provide a custom product.

Once the container is filled, the emptying is done by professionals and according to the agreement. In addition, the company can provide mobile cranes with equipment for dismantling, cutting, and loading workloads.

## Becoming a circular hub

High-tech granular machinery already contributes to the reuse of raw materials that are high in demand.

***But did you know that almost 85% of scrap metal is recycled in the world? Why is that so important? Well, every tonne of scrap used for steel production avoids the emission of 2.0 tonnes of carbon dioxide and the consumption of 1.4 tonnes of iron ore.***

If we know that global industry employs around 2 billion tonnes of iron ore and burn 1 billion tonnes of coal, the positive effect of metal recycling is apparent. With that in mind, Riwald Recycling shared its long term goals.

The long-term goal and mission of Riwald can be explained in threefold: being flexible, circular, and innovative. Due to our efficient operations,

in-house production process and geographic locations, Riwald Recycling occupies a prominent place in the metal recycling industry within the Netherlands and the rest of the world. On an annual basis, Riwald Recycling recycles several hundred thousand tonnages of waste materials - varying from complex E-waste to complete trains and aeroplanes. In addition, these materials will be recycled into more than 150 different types of sustainable raw materials.

To get on the right track towards ambitious future goals, the company will focus on several vital areas to create an extremely sustainable production and transport process and get the most out of recycled materials for the circular economy.

Our goal is to become a “circular hub” where all flows come together in our ecosystem - transforming complex products into pure raw materials and transporting these materials in a sustainable way to companies in the manufacturing industry. As a result, the economy would run on recovered raw materials, and ‘new’ raw materials would not be needed. Via this way, we are closing the chain/loop. The result will be that Riwald Recycling will become the new benchmark in metal recycling industry.

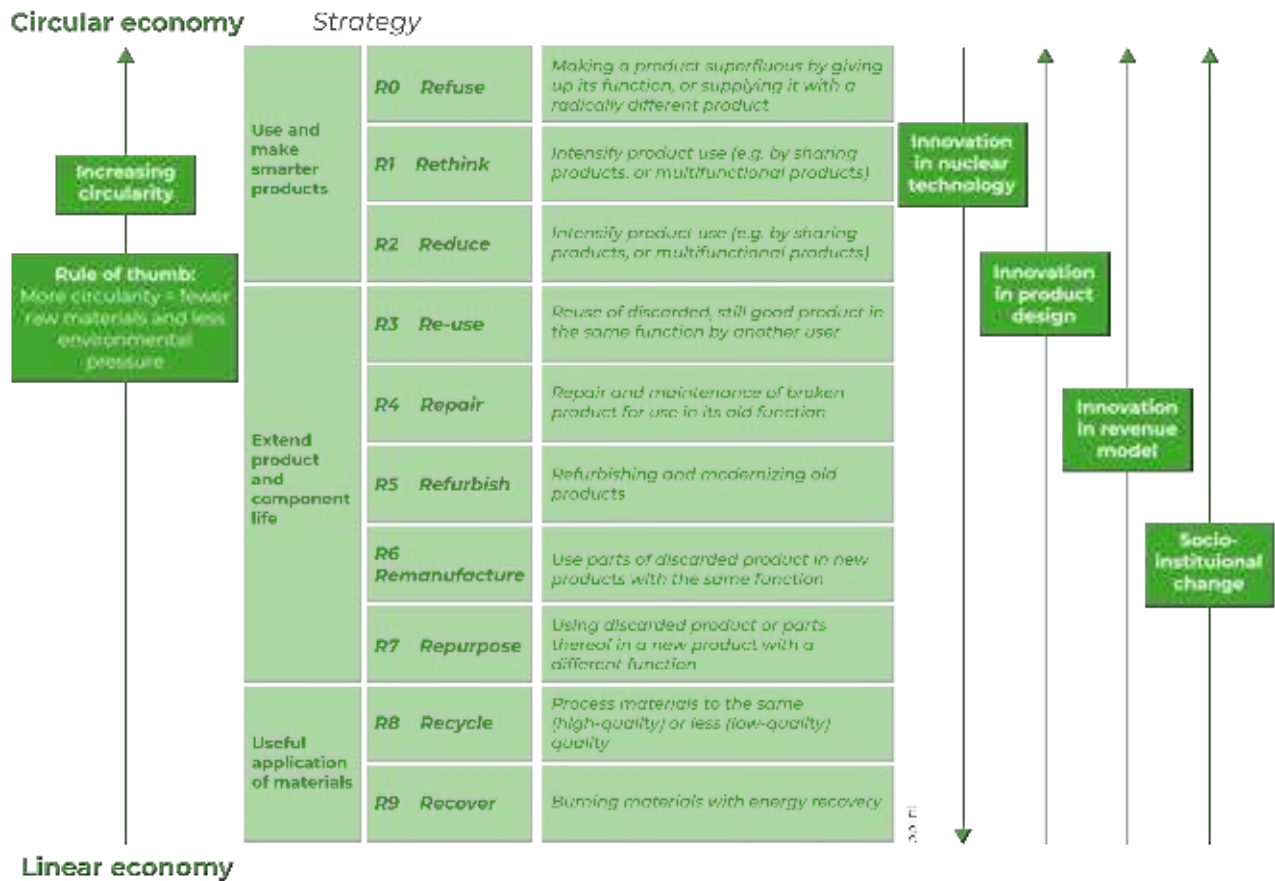
The company thinks outside of the Netherlands and can help in the global movement to the circular economy. The high-tech machinery and workflow are cogs in the big picture, and Riwald Recycling's mission coincides with the country's, European and global environmental plans.

*Based on the position and expertise of Riwald Recycling, in combination with its high-tech separation technologies, Riwald Recycling plays a crucial role in finding solutions for global environmental issues.*

*Finally, Riwald Recycling aims to drastically lower the energy demand in the coming decades via innovations in IT. To realise our goals, we actively engage with societal and industrial partners, such as digital measures for green process optimisation and methods to assess the future environmental impact of new technologies reliably. Also, AI solutions for computing architectures and new materials for data storage plays a pivotal role, which we will apply via an interdisciplinary approach.*







## Our priority order of circularity strategies and role of innovation in production chains

### Hop on the circular economy bandwagon

If your company uses raw materials, the best way to cut global emissions of CO<sub>2</sub> is to use recycled materials. Complying with the green initiatives is not easy, but luckily some companies can aid in the process. Riwald Recycling contributes to the ideal circular economy by sourcing raw materials from a wide range of waste and discarded items.

In ideal circular world all products would be remountable, but with so many unique designs and products, IP rights and consumer specific taste this is not the case. Until we reach utopian global standardisation, recycling will become more and more important. Riwald Recycling fit that picture with options to deliver new high quality materials from high quality products such as airplanes.

Reuse is the most visible part of high-tech raw material extraction, but all subjects must invest in sustainable production, including recycling companies. With Trias Energetica philosophy behind the complex recycling process, it is possible to achieve ambitious goals and set the standard for the Netherlands and globally in innovative metal recycling. Moreover, leading with technological initiatives can help other companies to hop on the circular economy bandwagon and the society to reach set goals, including cutting down carbon dioxide emissions, dependence on raw materials, and consequently creating a circular economy.



# AI HUB

## EAST NETHERLANDS

---

APPLICATION DRIVEN **TECHNOLOGY HUB**  
TO DRIVE **EUROPEAN AI INNOVATION**

**T**he AI hub East Netherlands is a new technology hub that will drive Artificial Intelligence (AI) innovation in the region and connect to other initiatives in the Netherlands and Europe. Artificial Intelligence is the ability of a system to correctly interpret external data, learn from this data, and use these lessons to achieve specific goals and tasks and ultimately make decisions autonomously. AI is already becoming embedded and influential in our modern lives, both socially and industrially. It can be expected that it will only become more critical to the future of life and economic prosperity as our world evolves evermore towards digitalisation.

This new hub comes as a collaborative effort between industry and the knowledge institutes of Overijssel and Gelderland and is instrumental to the wider AiNed programme, which has the mission of accelerating the development and application of AI across the Netherlands. This all falls under the governments' strategic action plan and the Netherlands AI Coalition (NLAIC) to further establish the nation as a world leader in AI technology.

AiNed is a network of AI established hubs, with each hub having dedicated working groups and an industry or application-specific focus. As part of a well-connected network of partner



hubs, opportunities in AI can be identified in cross-collaboration efforts between the private-public sectors. Through this wider collaboration a network of over 400 different organisations is involved. The AI hub East Netherlands will place specific focus on AI for the manufacturing industry as well as AI for health. These two industry focuses align with the strategic themes and existing specialised expertise already established in the local region.

The new Hub itself will see very close collaboration between entrepreneurs in start-up companies working alongside and in collaboration with established research institutes, private companies, and government bodies. All this is with the common aim of improving lives through leading AI applications research and development across a wide span of industries including health and nutrition, advanced manufacturing, energy, and education. The hub will allow all stakeholders and involved partners in AI the guidance and rich knowledge needed to improve the way machines and software operate and how people's lives are lived.

Victor-Jan Leurs, Managing Director of the Twente board gave some commentary on the Ai Hub's greatest benefits to the region. He believes that the Ai Hub will further strengthen the regions strong position in medical technology innovation and smart industry development;

***“Artificial Intelligence is an important technology to help strengthen entrepreneurs in our region, both larger and SME companies. The technology enables many new opportunities in for example the manufacturing and medical industry. The Ai HUB East Netherlands aims to be a connecting hub to develop new projects and link us to other regions with complementary skills in AI. That is of great value to develop and integrate this technology in new products and processes and so make companies in our region more future ready.”***

**– Victor-Jan Leurs**  
Managing Director,  
Twente Board

With possible funding of 1.05 billion Euro from the National Growth Fund, in addition to matched investment from private partners, the Hub is positioned for substantial and rapid growth over the 6-year road map between now and 2027. Currently in the first phase of this growth journey, the national AiNed program has already been allocated 276 million Euro to kickstart the first instance of this exciting initiative worth roughly 560 million Euro.

The AI hub East Netherlands will be a haven for budding entrepreneurs, growing start-ups right through to the larger established companies that will take up residency. Operationally, the hub will be able to provide intimate guidance in the mapping out of growth plans, partnerships, project help and funding opportunities. The hub also allows for partners looking at growing AI applications, network connections and partnership structures required for success. This can happen locally in the East Netherlands, nationally as part of the wider established AiNed network and European industrial networks.

A key driver of success for the innovative applications that grow out of the hub will be in the way investment funding is allocated to new start-ups and projects that have high future return prospects. As part of the AiNed network, the AI hub East Netherlands will allow for the identification and nurturing of AI applications and technologies that show high future earning potential, with large investments being made in the infancy of these projects. With substantial upfront investments and a very strong ability to network complementary skillsets across different fields of AI, both SME's and larger firms will get the opportunities they need to pave the way for the future.

Scientific Director Ian Gibson of the Fraunhofer Project Centre at The University of Twente, described the benefits they are already seeing through collaborative AI project work in the region.

***“FPC is already working on a number of projects in the field of AI in manufacturing, alongside colleagues from UT and the Fraunhofer Institute for Production Technology (IPT) in Aachen. As we gain more knowledge and as more companies start to realise they need help to make sense of all their data, we can expect an ever-increasing number of future projects. Although we recognise that the AI Hub is about more than just manufacturing, it is clear that being part of the Hub can only benefit FPC and its partners and vice versa.”***

**– Ian Gibson**

Scientific Director,  
Fraunhofer Project Center at the  
University of Twente



Being interconnected with research experts and knowledge leaders also has enormous benefits for both research and industry. As well as the synergy of knowledge transfer from research to application, the hub will also allow for researchers to have direct access to valid and highly relevant data sets and in-situ application specific environments. These aspects are crucial for the research and development of new tools and systems that are of high relevance and applicability to commercial and industrial application.

Scientific Director of the Digital Society Institute, Maarten van Steen, described the importance of The Hubs network and community approach. He believes that the only way to effectively mature the technology practically is if the hub's network, companies, and institutes come together to solve tomorrow's and problems and technology application needs.

***“Most important is that each of the seven hubs does not operate on its own: a hub is a node in a national network. It has regional and national responsibilities. The hubs play a crucial role in defining regional-based, but nationally connected programs and projects for the approximately 560 million Euro that needs to be realised in the coming years. No single entity, be it a university or a company will ever succeed without teaming up.”***

– Maarten van Steen  
Scientific Director,  
Digital Society Institute

For the local Twente region, the AI hub East Netherlands will also further embed the well-known reputation as a centre for advanced technology and manufacturing. Through the hub's access to the extended network of 400+ stakeholders, the local region as a whole will prosper from the increased AI maturity that is developed. Maarten goes on to say

***“No single organisation can boost the AI maturity level of a region. For that, it is crucial to maintain focus and team up with organisations with shared ambitions. Scale is essential. And despite how difficult it may be, any organisation that wants to participate in an AiNed project just for its own benefit, will eventually not come as far as they may have anticipated. An AI hub is there to help build the best consortia to reach higher AI.”***

# REGIO DEAL TWENTE

**T**wente aims to become a leader in high tech developments, and since the beginning of the corona crisis, new projects have accelerated their shift to more innovative technologies. For example, under the Regio Deal Twente, which is together with the Agenda for Twente called Investing in Twente, the central Dutch government and the Region of Twente are investing €60 million towards developing technological knowledge and talent. Twente Board is a triple helix organisation that stands for strengthening the economy in Twente; they are responsible for and invest in the social-economic agenda of Twente.

## **Investing in technologies and directed education**

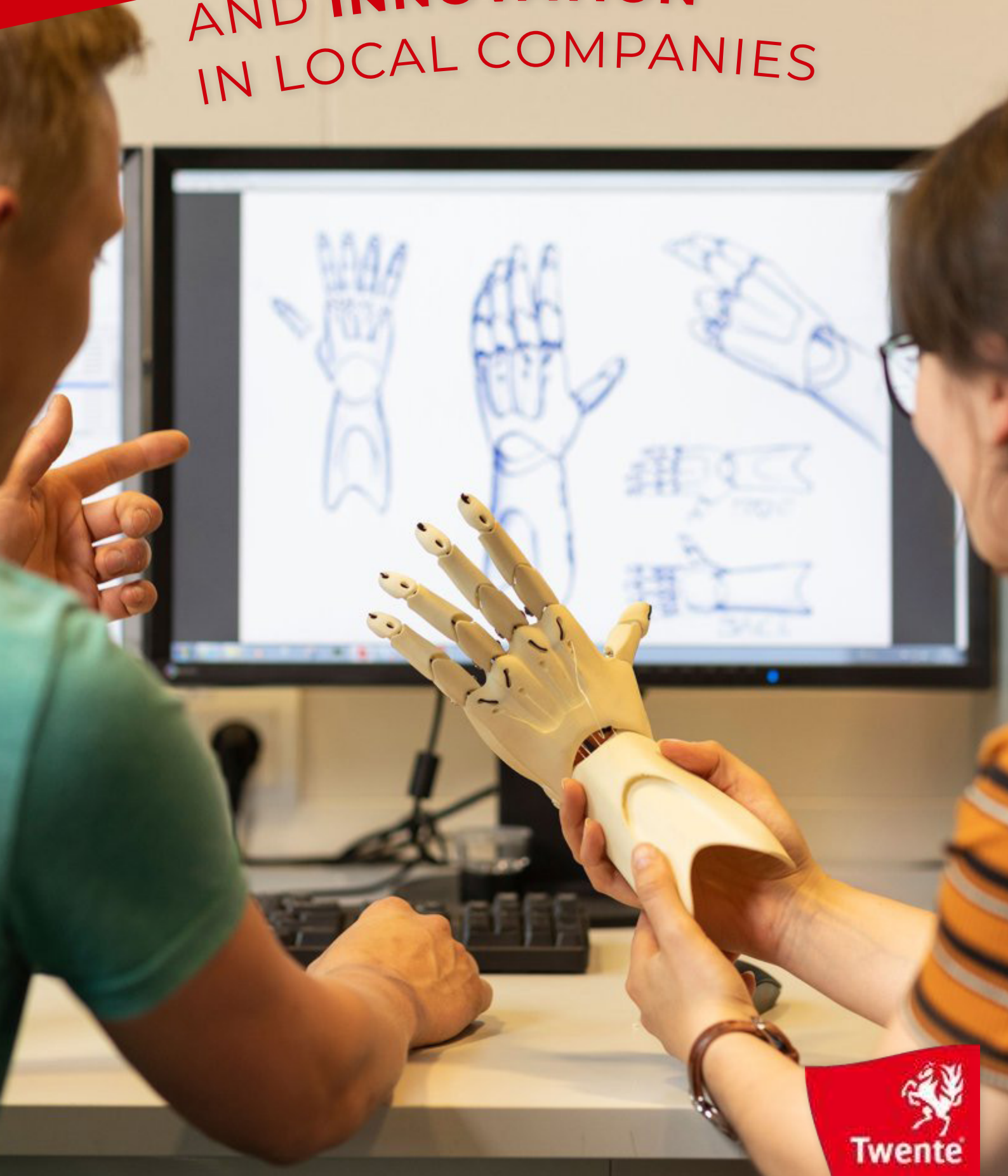
With Industry 4.0 and technologies like machine learning, extensive data analysis, additive manufacturing, the Internet of Things, and others that are changing the business landscape, no one can afford to stay behind the innovation curve. So, to get on the right track, Regio Deal Twente set up 12 initiatives with some ambitious goals. Wim Boomkamp, Chairman of Twente Board, said:

***“Our ambition is high, with the preservation and strengthening of business activity and employment being central. In addition, we encourage technical innovations and invest in an attractive and accessible region for living and working.”***

Investing in Twente's projects include co-funding a programme for part-time jobs at IT companies for students to connect regional business and IT talent in an early stage. There is also co-funding for training in the fields of, amongst others, healthcare, logistics, and technical education, worth up to €5000. Also, Regio Deal Twente invests in a programme that is coworking with civilians on new ICT applications, for e.g. patient care. Other project funding examples are trials with agricultural drones, the development of novel production techniques with the help of the university, and trainings that are optimally aligned to the current business needs.



# SPARKING THE USE OF **NEW TECHNOLOGY** AND **INNOVATION** IN LOCAL COMPANIES



## Projects and goals

The Triple Helix collaboration exists of municipalities, educational institutes such as the University of Twente and Saxion, and entrepreneurs, and works closely together with the Province of Overijssel and the National Government to carry out the investment agenda. Within the Regio Deal Twente, the programme development takes place between two lines:

- **Technology & Innovation:** Technology as an engine, accessibility and business climate, circular economy, and sustainability.
- **Talent:** Work and education.

To achieve the country's and the Region's sustainability goals and accelerate technological initiatives, the parties involved developed and carried out several projects to reduce the labour market shortage and increase innovations in healthcare and agriculture, and investment in technical knowledge. Wim Boomkamp explained:

***“The Agenda for Twente is the foundation for this, and the Regio Deal functions as an accelerator. The projects are taking shape, and new collaborations are emerging, also in the triple helix context. For example, entrepreneurs, knowledge institutions, and the government are working together on various campaigns to attract, fascinate and bind talent.”***





*[...] creating a more **comprehensive technology-driven talent pool** is essential for future growth [...].*



## Helping industry with innovation

The actions under Investing in Twente go in several directions. Circular economy and sustainability are topics all of Europe must work together on, to achieve the global climate goals. However, labour market initiatives, such as the PDEng programme, are more fundamental requirements for regional companies wanting to stay on top of the innovative technologies required to enable such plans.

**“Technology as an engine”** is the motto for one line of action within Investing in Twente. On one side, the focus is on SMEs and creating innovation and talent. On the other hand, there is a strong focus on intelligent business applications backed by scientific research.

While creating a more comprehensive technology-driven talent pool is essential for future growth, investing in new tech and teaching employees to adopt such innovations is a parallel process. For example, among the 12 projects under the Regio Deal Twente, the Advanced Manufacturing Program plans to directly implement Additive Manufacturing and other advanced techniques into manufacturing processes.

“

*The end game for Twente would be **sustainability**, huge strides towards **green technology**, and **welfare for everyone**.*

”





## Sharing the know-how for Additive Manufacturing and another new tech

Twente already has a robust high-tech industry and knowledge base. However, staying on course to catch the Industry 4.0 train means companies and communities must continuously reinvent themselves. Luckily, the industry base, higher education and local government have recognised the potential of innovation and are cooperating to create a framework that will allow companies to embrace new technologies in advanced manufacturing.

The contribution of €3m comes from Regio Deal Twente and the Province of Overijssel. The driving force for the Advanced Manufacturing Program is the Fraunhofer Project Center at the University of Twente. Prof. Dr Ian Gibson, Scientific Director of Fraunhofer Project Center at the University of Twente and Chair Professor of Design Engineering, commented on the project:

***“AMP is an enabler for local industry to investigate new manufacturing technologies. By combining with other companies, they can leverage their involvement and contribution to look at technologies outside their current scope or budget. Furthermore, their staff can quickly learn about the technology and determine whether it is suitable for their immediate needs or in the future.”***

To date, there are 3 projects currently running under this programme, consisting of 10 companies in total. Interested companies have support from the project to familiarise themselves with the new technologies, attend knowledge transfer sessions and work towards viable solutions for enhancing their manufacturing processes. A couple of companies from Twente are already in the programme, and the initiative is picking up steam, with local companies and from outside of the Region also interested in the programme.

Maurice Herben, Program Director of Fraunhofer Project Center at the University of Twente, explained:

***“In addition to the financial assistance, they can partner with other companies towards a common goal. Even if these other companies are competitors, they can learn from each other to gain confidence in moving forward together. They also get direct access to world-class expertise and experience.”***

Further efforts are being made to enhance production processes with new and innovative monitoring of the condition of resources. One example replaces visual inspection with constant monitoring where measurements are automated, and a maintenance alert results if they deviate from the norm. The use of technology here allows personnel to be diverted towards areas where they are more needed.





Maurice Herben from Fraunhofer Project Center at the University of Twente is delighted to deliver initiatives like AMP. He said:

***“Too often, the knowledge gained from top-level research institutions does not benefit local SMEs. This programme can surely overcome this for the betterment of the Region.”***

## **Education of workforce**

Implementing new technologies in companies is part of the equation, and the next step is the education and training of personnel. You cannot integrate new tech into the manufacturing process without also training the workers. To further this, the Fraunhofer Project Center works alongside internationally recognised experts, contributing to the knowledge and innovation in the Region.

Companies can find out more about several topics within the Advanced Manufacturing Program, such as support within the Region, learning about and the implementation of technologies, and other topics.

## **More examples showing significant potential**

In Technology as an engine, part of the Regio Deal project, there are two more exciting programmes. First, TopFit CitizenLab follows the collaboration of citizens, patients, and healthcare partners to investigate technological innovations to health in a CitizenLab.

***A second example would be the PDEng programme for Digital Transformation and Advanced Manufacturing*** which is about training and deploying designers to help companies create tech solutions in their workflow.



*“The use of technology here allows personnel to be diverted towards areas where they are more needed.”*



Other projects also use technology, create disruption, and offer better opportunities. A great example can be seen in technology for more efficient goat farming. The Veelers family participates in a project that tries to lower costs for goat feed by using drones. Drones are equipped with advanced cameras that can see many more colours than humans, and automatically measure the amount of proteins in the grass. Such valuable information can be used to indicate when to use extra fertiliser and the timing for mowing, all leading to better quality grass. The result is the Veelers do not have to buy so much other food.

### **Positive outcomes**

Investments are in full swing, with 23 projects that are part of Investing in Twente (Agenda for Twente and Regio Deal Twente). Results are visible all over the region. For example, the University of Twente has growing student numbers with more engineering candidates than the national average.

Simultaneously, we see advancements in renewable energy and an increase in the number of homes with solar panels. With the rise in initiatives to fill these new jobs, the Region has found less tension in the labour market. Usually the tension on the labour market increases when new jobs are realised and the influx of new employees lags behind. The ICT sector has the most substantial growth, which means initiatives to implement new technologies into existing businesses have a serious chance to fall on the fertile soil.

The end game for Twente would be sustainability, huge strides towards green technology, and welfare for everyone. It is undoubtedly trending in the right direction.

If you want to know more about Investing in Twente you can reach out to:

[www.twenteboard.nl/contact](http://www.twenteboard.nl/contact) or  
[www.twente.com/twente-board/investeren-in-twente](http://www.twente.com/twente-board/investeren-in-twente) (information is in Dutch)



# GROLSCH

IS GETTING

# GREENER

**Royal Grolsch has always been strongly connected to the East Netherlands, with its origins in the Achterhoek and current location in Twente. The well water is still extracted from wells in Enschede and Hengelo and there are numerous initiatives with regional companies and institutions regarding sustainability in the broadest sense of the word. Grolsch will continue to strengthen its relationship with this region in the future.**

In addition to the focus on the environment, people and society are playing an increasingly important role within Grolsch's sustainability strategy. Susan Ladrak, Sustainability Manager at Grolsch, confirms their commitment to a sustainable living environment: "Besides the sustainable, responsible character of the brewery, the social aspect for the region is an important focus area for Grolsch. With the Grolsch Vakmanschap is Meesterschap Fund, we support projects, initiatives and associations in the region with a focus both on innovation and sustainability as well as on entrepreneurship." Every year, various initiatives are supported to promote the social and economic growth of the region, in which sustainability plays a central role. Sustainability is something that Grolsch also implements in its organisation by focusing on securing the availability of water and reducing its use, maximising reused material, and reducing CO<sub>2</sub> emissions of the brewery and throughout the entire value chain.

## Packaging

Last year, Grolsch implemented various innovations to reduce the use of plastic. An example of this is visible to the end-consumer, too: the use of TopClips. Susan Ladrak:

***"By not wrapping the six-packs entirely in plastic, but placing a cardboard holder over the top of the cans, we have achieved a significant reduction in the use of plastic."***

In applications for which replacing plastic is difficult, Grolsch works with reused materials as much as possible.

***"For plastic films around the pallets or trays with cans, we try to use as little virgin material as possible and focus on using recycled plastic."***



“About 80% of the pollution is filtered out of the water in our own water treatment plant.”

  
**Grolsch**





## Energy transition

In addition to the visible changes, they are also working on less visible reductions. For example, Royal Grolsch has set the goal of only using sustainable fuels in the brewery by 2025. This energy transition plan consists of several phases. The first phase was realised in 2020, using green electricity. The plan's second phase came into effect this year, obtaining the permits around heating from Twence. As a result, Grolsch will use three million Nm<sup>3</sup> less natural gas per year from 2023, and the brewery will save around 5500 tons of CO<sub>2</sub> emissions per year.

The hot water pipe that is now being built between Twence and the Grolsch brewery will be connected to an existing hot water pipe from Ennatuurlijk. The hot water from Twence will pass through a heat exchanger at Grolsch. The heat from that hot water is then used to heat Grolsch's own hot water system. In this way, natural gas is no longer needed to generate the heat required, for activities such as pasteurizing, rinsing the bottles, and warming the building. However, natural gas remains necessary to produce steam – which is used to boil the wort. Ladrak said:

***“In 2023, we’ll conduct an extensive study to see how we can convert our last bit of natural gas into a sustainable fuel so that we’re completely off the natural gas by 2025.”***

## The importance of water

The primary role that water plays within Grolsch's sustainability strategy has to do with the future. Due to climate change, we are increasingly confronted with periods of drought. The long-term expectation is that there may be a shortage of water in the Netherlands, so that the available water may not always be sufficient to supply the brewery with water.” At Grolsch, they investigate whether they can reuse part of the used water as process water so that less



fresh water needs to be extracted from the wells. In addition, Grolsch is working on more efficient use of raw materials to reduce the amount of water required: "Grolsch has started brewing more beer, which means that more water is needed. However, we have started to produce more efficiently, which means that we need less water per litre of beer." Although Grolsch has wells in Enschede and Hengelo, not all that water is used for brewing beer.

***"The water that ends up in the beer comes from our wells in Enschede. The water from the wells in Hengelo is mainly used as process water, for example in the bottle rinsing machines, pasteurisers and it evaporates on the condensers."***

About 80% of the pollution is filtered out of the water in our own water treatment plant. The effluent then goes, by pipe, to the municipal water treatment plant that further purifies the water. "The idea now is to investigate whether we can purify part of the water that is sent back to the municipal water treatment plant ourselves. By adding several extra purification steps to our process, we may get the water back at such a specification that we can reuse it again as process water in the brewery. This could save a huge amount of water because if you need less fresh water at the front, you ensure that you can always use fresh water." However, we do not have to worry that the beer will taste different.

***"We will continue brewing the beer with the water we get from our wells. The water in our beer will always be the water we pump from our wells."***

## Transport

In addition to making production and packaging more sustainable, logistics are also being looked at by the company. Grolsch aims



to reduce CO<sub>2</sub> emissions from transport by 30% by 2030 to eventually be completely CO<sub>2</sub> neutral throughout the entire chain by 2050. “An ambitious goal,” Ladrak said. “Transport is very complex. It is about the products we transport within the Netherlands and across the borders to America and Asia. In the Netherlands, most transport is truck transport. Last year we did tests with the use of HVO biodiesel. From January next year, in collaboration with Lean and Green, we will also look at how we can make pallet transport more sustainable.” For export transport, the container terminal in Hengelo is already widely used. Trucks drive from the brewery to Hengelo, after which the containers are shipped to Rotterdam by boat. This has a positive effect on truck movement and emissions within the Netherlands. After all, all beer that is transported by boat on inland waterways does not have to be transported by road.”

## Innovations

“Our core activity is brewing beer and bringing it to market. Nevertheless, we are always looking for processes to optimise this and make it more sustainable. “With the University of Twente in the backyard and Saxion University of Applied Sciences in the front garden, there is sufficient knowledge in the area to support this.

***“The next step we want to take is to predict the amount of water and energy that will be used for a certain process in a certain period so that the delivered volumes and performance can be weighed.”***

Grolsch is also working on a plan with AmperaPark to cover the parking lot with solar panels to generate green electricity. NXFiltration was also investigated whether the pumped-up well water can be obtained to the proper specifications using membrane technology. Alike this, numerous projects have been started to reduce water use and achieve the objectives for the coming years.





*“As a result, Grolsch will use three million Nm<sup>3</sup> less natural gas per year from 2023, and the brewery will save around 5500 tons of CO<sub>2</sub> emissions per year.”*





# BOLK

Innovating  
**transport, logistics**  
and **warehousing**

**24 hours a day, 7 days a week, and 365 days a year,**  
**Bolk Transport in Twente** is up and running. With  
subsidiaries throughout Europe and approximately 400  
employees, Bolk is an **innovative transport, logistics**  
and **warehousing partner** and as such fulfils an  
**essential role** within the manufacturing industry chain.





**B**olk, founded in Almelo in 1934, is an innovative international transport company. Being initially mainly concerned with the distribution of coal and drinks within the city, over the years Bolk has grown into the specialist in exceptional transport. In addition to offering all types and sizes of customised transport solutions, Bolk is the logistics partner of Salt Specialties, formerly part of AkzoNobel Hengelo, for which they have designed the entire warehousing and transport process in an innovative, data-driven way.

## Digitisation

As Business Engineers, Niek Tijink and Hein Langeveld are responsible for continuously mapping the needs, wishes, and requirements of their own organisation and their customers' and partners', in the field of Operations & Supply Chain Management, as well as making improvement proposals to optimise processes and directing their implementation. Hein:

***“Basically, we focus on improving and renewing processes. We see that IT, data, and technology are playing an increasingly important role within process optimisation. Due to the growing information need of customers and partners, we are increasingly focusing on the digital transformation of supporting processes, in order to improve and connect the supply chain.”***

The optimisation of their own processes also plays an important role. For example, Bolk has developed a real-time decision support system to support order pickers and shippers in daily decisions on the shop floor. By means of real-time information from the Warehouse Management System (WMS), employees are advised about decisions to be taken via screens in the warehouse.

Besides offering transport, storage, and trans-shipment services, Bolk tries to add customer value in various other ways. Niek:

***“For example, by using Business Intelligence, all goods are tracked via an in-house developed track and trace system, after they leave the warehouse. This system is filled with real-time information about outgoing freight from customers. In addition, Bolk has developed a quality control system in PowerApps with which containers, products, and equipment are inspected. Deviations are reported directly to managers, customers, and suppliers. The data collected with the app is visualised in a Power BI dashboard. This provides opportunities to discover trends and provides input for operational management discussions.”***

## **Partnership Salt Specialties**

An important partner of Bolk is Salt Specialties. Whoever arrives at the Bolk plant in Hengelo, walks by an impressive logistics operation with large containers and cranes, and directly into the warehouse where the salt from Salt Specialties is stored. This impressive warehouse offers space for 18,000 pallets full of salt for various purposes: bulk salt, process salt, and salt for the end consumer. Every week 7000 pallets are brought into the warehouse (24/7) and 7000 go out (16/5). A large-scale logistics operation, which Bolk Logistics has taken on entirely for Salt Specialties, formerly AkzoNobel Hengelo and now part of the Salins Group France, since September 2018.

***“As an innovative logistics specialist, Bolk has optimised the entire warehousing and transport process as much as possible, through digitisation and smart use of data”***

Niek continues: “An Electronic Data Interchange environment that electronically exchanges data between different systems has been developed. This ensures that the primary process can be sped up and the data exchange within the chain becomes more reliable. Another example of Bolk’s services for Salt Specialties contains setting up an extensive scanning process. This makes the track and trace process more accurate and more up-to-date data about the movements from, to and within the warehouse is available.” Hein adds:

***“The inbound process has also been optimised. On several production lines end products are made. The pallets with these products are transported via a driven roller conveyor to the loading station at the production site. From this point on, the pallets are automatically loaded into the Bolk Logistics chain conveyor trailer. After loading, the pallets are transported to the warehouse, where the trailer is connected to the unloading station. From the unloading station, we carry out the internal warehouse activities. During the put-away process, two pallets are scanned, as the forklift is equipped with a double fork board. When a pallet is scanned, the Warehouse Management System checks whether this pallet has been pre-announced. When this is the case, the new status is automatically registered. “***





*Driving on HVO diesel offers many advantages, such as a reduction in CO<sub>2</sub> emissions and other harmful substances such as particulate matter, hydrocarbons, nitrogen oxides, and carbon monoxide.*







This inbound process consists of **four phases**:

### Phase 1

- Getting the **operation under control** (start-up phase, getting to know the process)
- Deployment of **additional equipment, storage space** and **manpower**

### Phase 2

- **Optimising occupancy rate** and **labour productivity**
- Setting up **Power BI reporting platform**

### Phase 3

- Acting as **chain director**
- From **outbound logistics** at the factory to **inbound logistics** at the terminal
- Provides a lot of **data input** for **chain control, track and trace**, and **chain transparency**
- **Central point of information** in the chain
- **Adding customer value** through know-how

### Phase 4

- **Standardisation** and **stabilisation**
- **Lean Six Sigma**
- **Reduce transport movements** between factory, warehouse, and terminal
- **Reducing communication flow (RPA)**
- **Increase product quality** through quality control system
- **Photographing outbound container loads** (app-development)
- **Health, Safety, Environment, and Quality (HSEQ)**

## Sustainability

In addition to optimisation and digitisation, sustainability also plays a major role within Bolk. And just as many others, also this process is designed data-driven, with the aim of using data to operate more sustainably. Niek: "There are different ways in which we do this. An example of this is an even more sustainable

and efficient planning, so that as few cars as possible 'drive empty'. Another example is electric driving. Although difficult on the long distances, it is an option for city centres, to generate fewer emissions and bring the cargo to its destination in a sustainable way. We are also looking at the possibilities with alternative fuels, such as HVO diesel. Driving on HVO diesel offers many advantages, such as a reduction in CO<sub>2</sub> emissions and other harmful substances such as particulate matter, hydrocarbons, nitrogen oxides, and carbon monoxide."

People are also an important part of Bolk's sustainability policy. Hein: "Continuous learning is not an exception, but the norm. In this way, employees can continue to grow and develop themselves. New talent also plays an important role: there are close collaborations with the University of Twente and Saxion University of Applied Sciences, and there are always internship positions available.

## Future

For the future, Bolk aims to increasingly take on the role of chain director within the supply chain, by taking care of the entire logistics process for companies as much as possible. Hein: "An interesting development in this field that will come up, will be the use of predictive analyses for the partnership with Salt Specialties. Planning tools will be developed, with which the actual demand in the chain can be followed, without disruptions. This offers, among other things, advantages for production planning, because the expected stock level in the warehouse can be taken into account. "

Further technological challenges will be robotic process automation and the development of a communication platform that will not only be used internally, but can also be implemented at partner companies. Niek:

*"With these tools, we can make the chain more transparent in an innovative way, and improve and develop the mutual daily communication between the various departments and parties."*

# AMC

## ADVANCED MANUFACTURING CENTER

### ECOSYSTEM SUPPORTS DIGITAL REFORMATION MANUFACTURING INDUSTRY *EAST NETHERLANDS*

**M**anufacturing companies operate in a dynamic environment. On the one hand, consumers are demanding more tailor-made and personalised products, while on the other hand, global competition and the importance of sustainability continue to increase. These trends have led to a need for a greater variety of products, shorter production cycles, lower cost prices, and the ability to respond to the fluctuating supply and demand of the market more easily. To achieve this, production systems must ensure a high degree of flexibility. Digitisation and automation play a key role in this.

The industrial technologies for digitisation and automation continue to develop at a rapid pace. Terms such as Smart Industry and the Industrial Internet of Things (IIoT) refer to the technologies that can visualise production processes with the help of data and data processing. Correct implementation can lead to significant improvements in the entire value chain: in design and planning, and also, for example, in

shortening throughput times. Digital systems can create insight into the use of energy and resources and business models can be adjusted on this basis.

These developments thus have the potential of realising many advantages, but in practice they present entrepreneurs with an enormous challenge: to maintain their competitive edge and to meet the constantly changing requirements of the market, it is necessary for them to reinforce the digitisation of their production process. But where to start? Technological developments are moving so fast - it is difficult to estimate what are really meaningful applications and what training is needed for this.

To support SMEs in the manufacturing industry in their digital transition and innovation, the FPC@UT is, with support of the European contribution from REACT-EU, investing in the development of the Advanced Manufacturing Center (AMC): a test factory for the manufacturing industry. With this, the



existing initiative of the University of Twente and the Fraunhofer Institute for Production Technology IPT takes an important next step in their mission to support companies in their journey to Industry 4.0.

By inviting industrial companies, especially SMEs, to the Advanced Manufacturing Center, they get the chance to experience the latest technology in the field of industrial digitisation, according to the “test-before-invest” principle. The AMC, run and managed by the FPC@UT, will become a facility where industry can collaborate with researchers and other technical experts. Specific challenges of SMEs are investigated and there is help available for the application of possible solutions into their own production environment. Systematic development, demonstrations, trainings, and implementation support are provided. The importance of this is underlined by the Scientific Director of the Fraunhofer Project Center, Ian Gibson:

***“In the east of the Netherlands there is a great need for a facility where the industry can work together with researchers, engineers and other technical experts in the field of Advanced Manufacturing. With the REACT-EU funding, we can meet that need and contribute to the construction of a well-equipped test plant for Advanced Manufacturing, to support the region.”***

At the Fraunhofer Institute for Production Technology, they are also looking forward to this AMC Ecosystem. “At the Fraunhofer Institute for Production Technology IPT in Aachen, we are constantly working on innovations to optimise production efficiency, for example with flexible production systems. As a connector between essential theoretical research and practical industrial applications, our goal is to look at production processes holistically and optimise their performance. In the Advanced Manufacturing Center, we can bring our experience in the field of digitisation, process technology, and process chain analysis, to create operational added value in collaboration with the university and industrial companies,” says Dennis Meelkop, Project Manager at the Fraunhofer IPT.

The innovation ecosystem connects many stakeholders and initiatives within the Smart Industry, both regionally - through the Advanced Manufacturing Program (AMP), which is funded by the RegioDeal Twente, as well as the various innovation hubs and field labs in the east of the Netherlands, and at national and international level (the Fraunhofer-Gesellschaft and European Digital Innovation Hub), in order to guide the widest possible range of companies in taking the right steps towards a flexible, digital production environment.

The project receives a contribution from the European subsidy programme REACT-EU. With this programme, Europe is helping the provinces of Overijssel and Gelderland to invest in a rapid economic recovery after COVID-19.

# VMO

THE

## VITAL LINK

CONNECTING THE

# EAST NETHERLANDS'

MANUFACTURING INDUSTRY

### FUTURE-PROOF THROUGH COLLABORATION

The Verenigde Maakindustrie Oost (VMO) fulfil their promises: they unite and support the manufacturing industry in the east of the Netherlands in all areas related to manufacturing entrepreneurship. We spoke with Lucien Perizonius and Petra Deterink about the role and future of the VMO.



***“The strength of the VMO lies in working together with the companies instead of for them.”***

**– Petra Deterink  
Director at VMO**

**T**he constantly developing manufacturing industry in the east of the Netherlands is an economically and technologically strong sector. The industry is increasingly positioning itself on the international stage, while locally remaining strong and vibrant. Verenigde Maakindustrie Oost (VMO), a union for the East Netherlands' manufacturing industry, plays an important role, being committed to increasing professionalism, competitiveness, and visibility within the manufacturing industry. The aim of the VMO is to future-proof the local manufacturing industry and they achieve this by stimulating collaborations between companies. It has been proven that companies that are open to connection and cooperation with each other are more resilient, perform better, and achieve more. The entire industry benefits from these collaborations, becoming stronger in numerous ways.

How does this work in practice? Lucien Perizonius, Chairman of the Verenigde Maakindustrie Oost, explains:

***“In order to improve the professionalism and competitiveness of the East Netherlands' manufacturing companies, it is important that they remain at the forefront of developments such as automation and robotisation: trends that are clearly visible in the industry.”***

Furthermore, increasing external representation and generating awareness in Europe are important goals for the organisation. “This is done by visiting trade fairs in the Netherlands and in Germany, and via various channels such as social media and the VMO website. Moreover, we increase our reach by using the collaborations we have created with other associations in the region, thereby gaining more publicity,” says Petra Deterink, Director of the VMO.

The manufacturing industry is a dynamic sector: technological improvements and innovations follow each other in rapid succession. “The most important challenges in the manufacturing industry at the moment are digitisation, robotisation, and energy transitions arising from the climate goals and environmental regulations. Attracting and retaining staff and new talent are also crucial, because, in coming years, a lot of knowledge and experience will flow out in this region by the loss of who are reaching retirement age,” says Deterink. “Also,

we have recently been struggling with a scarcity of (raw) materials, which has caused some challenges.” Lucien adds: “Because of these developments, digitisation and automation are important themes to tackle. Labour productivity must increase, you must do more with fewer people. This process must be shaped.”

The VMO supports in this digitisation process. “We have our own digitisation programme. Experience has shown that people benefit from working in small groups with a personal focus, therefore, we have adopted this approach. The process starts with information; looking at where a company stands and determining which stage of the digitisation process they have reached. Then we look at how each team member can be individually guided to take the next step in this process. In the initial phase, the VMO takes care of this. In more advanced phases, expert VMO members join in. The most important aspect in this process involves the “doing”. If, after adopting the digitisation process, companies want to develop further, they can connect with knowledge institutions such as Saxion and the University of Twente, with whom we also have a collaboration.”

The VMO plays a connecting role in knowledge sharing. Moreover, being a member of Techniekpact Twente, the organisation trains, recruits and retains new talent. They also work closely with initiatives such as Techwise, to better align technical education with industry demands - thereby offering improved training for the talent for the future.

In short, the VMO forms the link between the East Netherlands’ manufacturing industry, education, the government, and advisory bodies such as OostNL and the Twente Board. It is because of these links that the manufacturing industry is sufficiently seen, heard, and prepared for the future. Offering a network for manufacturing companies to use among themselves is also a distinguishing factor. Petra states: “At the VMO, we find it very important to meet with people from within the industry, instead of mainly networking with consultants, accountants, or lawyers. It is important that we, as fellow manufacturing companies, learn from each other, so that we all may benefit.” “Experience shows that companies want to be connected within the industry,” Lucien adds.

*“We have the connections, we know where the bottlenecks are, and we respond to them by bringing in the necessary expertise.”*

– Lucien Perizonius  
Chairman at VMO



***“It seems as if technology is in the genes in this region!”***

**– Petra Deterink  
Director at VMO**

## **Business growth**

The VMO not only facilitates and guides taking the next step in automation and digitalisation; they happily offer support for business growth. Export, especially to Germany, is an important topic. In the context of the Go4Export programme, meetings are organised in Germany and advice is given on the business climate and business opportunities that exist there. Markets in other countries, such as Scandinavia and England, are also being investigated. Companies that would like to grow, but not necessarily outside the Netherlands, are also offered the required assistance. “I do this mainly in my role as Innovation Advisor at NovelT. This allows me to act quickly, using the expertise that is present at NovelT,” says Petra.

## **Eastern Netherlands**

The Verenigde Maakindustrie Oost, located in Hengelo, is committed to manufacturing companies in the east of the Netherlands, which is defined as Overijssel, Gelderland – mainly de Achterhoek -, a part of Flevoland and Drenthe. Are there differences between the east of the Netherlands and the rest of the Netherlands? “Surely,” Lucien begins.


“Historically, large companies such as Stork and Holec have played an important role in the development of the region, and many companies have emerged from this. At some point, that kind of gets into the culture. Moreover, the mentality of the people who live here plays an important role; the straightforwardness, the ‘go-getters-mentality’: this makes the manufacturing industry a natural fit with the mentality here.”

## **Future**

When asked what the future for the VMO looks like, Petra and Lucien are unanimous: an organisation like the VMO will continue to be needed and will therefore continue to grow. Providing a relevant network within the industry is the most important factor for growth. The VMO is still growing and can bring more companies together. “We can make the manufacturing industry future-proof by stimulating collaborations, developing it into a leading industry in the eastern Netherlands and Europe. For this, it is important to work smarter, increasing labour productivity so that we can do more with fewer people.” They hope to help their members get in the right direction and take that next step.

Lucien concludes:

***“Keep thinking together about how you can do more with fewer people. Go and look behind someone else’s scenes. Talk to each other. Give each other ideas and get started with them.”***



# **SMART MODEL BASED SYSTEMS ENGINEERING EXPLOITS DORMANT POTENTIAL**

New, advanced production technologies improve efficiency and decrease time-to-market: both aspects that strengthen your company's competitiveness. They can also help to find solutions to urgent challenges in machine construction, structural poverty in the labour market and new flexible work ethics.



In the widely accepted and widely adopted way of working with OEMs (Original Equipment Manufacturers: companies with their own product), the machine is completely 'customer order driven', being designed, produced and sold in accordance with the buyer's specifications. This was a solvent business model, but it has done our marketplace no favours. It goes too far to describe the process as 'bad', but there is certainly room for improvement.

If we zoom in on the business process part, 'Engineering', we can conclude that in this way of working the technicians are part of the primary chain. In other words: the pace at which the technicians can work out the end products ('developing' is too big a word – but more on that later) determines the total production volume.

## Herein lies the opportunity

When the end products have to be worked out under high working pressure within the aforementioned system, you get a specification set with a lot of 'room' for your own interpretation –euphemistically-speaking. In the past, that 'own interpretation' was left to men and women with years of experience determining the client's preferences and possessing enough working knowledge, gained over many years of learning from their mistakes, to make the product. But this luxury is rapidly disappearing.

Long-term employment is not an extravagance that has been spent on the generations that have recently entered or are now entering the labour market. 'New arrivals' have not been allowed time to grow into their employer's products and to develop into specialists in them. In addition, the exodus of employees due to ageing is greater than the growth of new talent. Our challenge, therefore, is to do more with the same (or fewer) people, while maintaining - or improving - the quality.

## Better design, more profit

A lot of research has been done into the effects of product design on the efficiency and effectiveness of a primary business process. For example, the 'engineering component' in the cost price of a product is only a few percent, while its effect on the cost price is about 70%. In other words: there is a lot of money to be made with a good product design.

The paradox is this... creating good design takes time. In the aforementioned classical way of working, there was no such time allocated. We base this observation on the logical deduction of facts and circumstances and on our long-standing experience. From the facts and circumstances we can also deduce that changing to a different way of working – let's call it a new or SMART way of working – requires a different way of thinking. This is precisely why SMART Industry initiatives are so difficult to get off the ground.

We took a deep dive into this conundrum, attempting to marry our way of thinking about Smart Systems Engineering with the current interpretive approach. We translated this into our Smart Model-Based Systems Engineering service.

## Smart Model-Based Systems Engineering

Quite some time ago, PhD research was conducted at Stockholm University on modular product development. The idea behind this was to be able to put together the end product, without needing to work out a variant every time. In other words: modular product development that takes the technicians out of the primary chain.

This is a most important finding. By putting together exactly the same variants of the same product families instead of having to work them out, you have the capacity needed to make good product design. However, the same paradox still exists. An investment in knowledge and time is needed to make this way of working possible.

## How do we do that?

We consider any end product that belongs to the same product family as a variant - a 'configuration' from the same library of finished products. In this family of end products - and there are often many - the same functions are repeated every time, each time in slightly different versions. In the current pool of product data, this information is 'hidden', therefore unnoticed. It is there, but not accessible and therefore not reusable. The knowledge is there, lying dormant, like a vein of gold that has yet to be mined.

We can do the mining by applying what is described in Erixon's thesis. First, we isolate the functions that are in the product. By 'the product' we now mean all variants of end products from one product family. We call this 'modular function development'. Based on the needs and requirements of the market that fit the product family, we design a modular product architecture.

To ensure that we make the architecture accurately fit the market need, we describe the variation within each function. For this we apply System Modeling Language - SysML. In practical terms, we describe each property - attribute - of the function with its different variants.

## Validate with the Stress Test

In the V-model, we already have the left leg in the picture, but in reality, we still have to validate it. To perform a validation between the left leg and the right leg of the V-model, we conduct our 'Stress Test'. Remember, we are working on the extraction of a gold vein and in this case, the 'gold' is the product information

that has already been generated over the years. In our stress test, we validate the newly designed product architecture. It is not yet geometry; it's simply a definition. We ask the question;

**"Can we also compile the previously delivered end products - variants - from the architecture that we have now defined?"**

The journey is still feasible - even though it may seem complex, - but there is now a more time-consuming job. We run into the challenge that the existing product information has a different product architecture. On a deeper level, CAD models are structured differently, in such a way that we have to rebuild each variant in CAD, taking into account the new architecture. In this way, we make the CAD models in a form that can be assembled.

## Doing more with less

Now that we have the CAD models - both electric and mechanical - and the software in our hands, it is a good time to revisit the premise that good product design can make a lot of money. We now set ourselves the challenge of making different function variants - which we already have to fit into the new architecture - from as few different parts as possible. Naturally, it should have the same number, or more, variation options. We do this with our Lean Product & Process Development method: a way of product design in which we 'serve' both market requirements and production restrictions.

After undertaking this process, we create a product platform, based on the library of previously delivered finished products within one product family. We have found the gold, at last! It has become a System. We can now answer the same market questions by putting together different variants of the different sub-functions.

**We call this configuring.**



We can now also purchase the parts in a different way, in supply chain management. In the classic way of working, this was only possible after the specifications were ready; now this can be accomplished well in advance. We can move to another 'Logistics Concept'. The idea of 'pulling production' is commonly known under the term 'Lean Manufacturing'. Our argument is that at the heart of Lean Manufacturing lies good product design. It is 'Design Intent'.

## Maintain and expand

Now that we have designed a system of mechatronic objects and 'filled' it with an appropriate design, it is important that we maintain and expand this system. This is perhaps the most crucial aspect of our story. The OEM must now further expand and maintain their modular product. Their technicians need to learn their way around the system of mechatronic objects. You

cannot just make an adjustment without evaluating the consequences, and there are always consequences. In such a system, maintaining the design requirements, the 'Design Constraints', is a crucial success factor. When an interface – the link between different variants of different sub-functions – changes, as a result of the change, a number of items suddenly no longer fit, and the system therefore becomes less effective. Ultimately, this leads to degeneration of the system, and this needs to be addressed.

## VIRO helps

VIRO acts as a vital instrument in this transition. For the transition, VIRO not only supplies engineers who are fully conversant in this different way of working, but also provides our wealth of knowledge in this field to help companies tackle this.

**We 'know-how'!**

Authors:

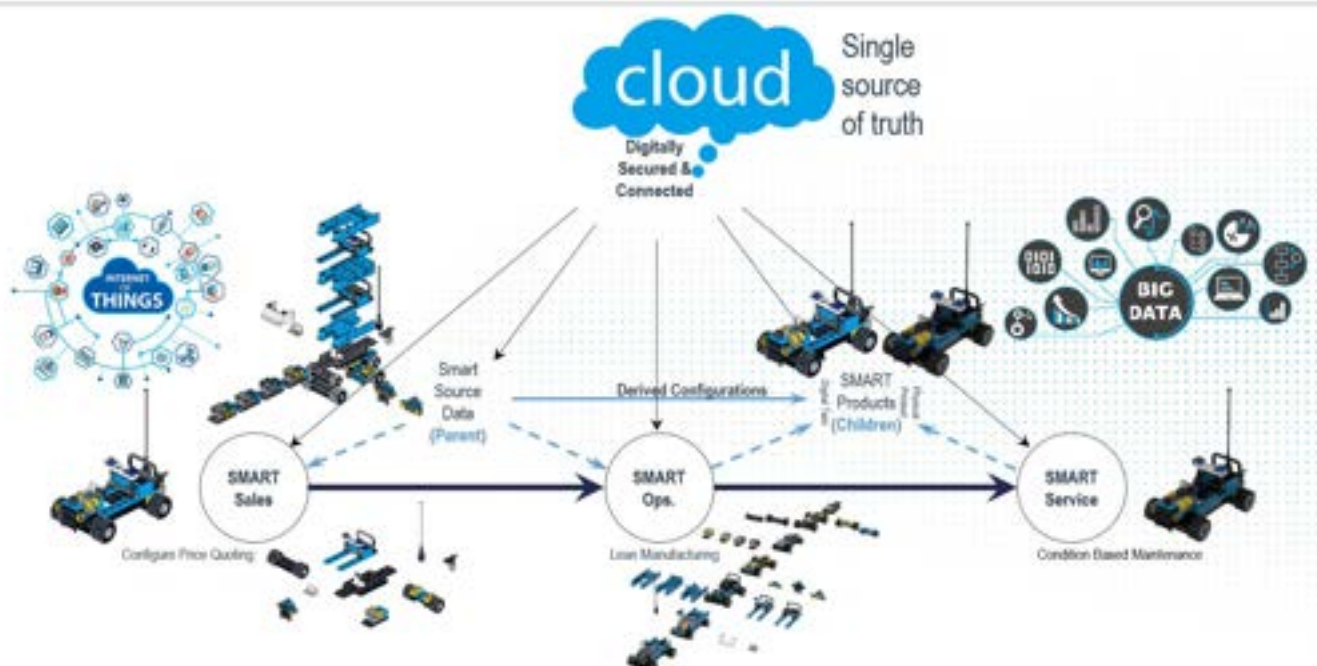
**Erwin van Zomeren**

Business Architect Smart Industry

**Sander Snellink**

Business Development Smart Industry

## SMART MODEL BASED SYSTEMS ENGINEERING



# EYES ON THE FUTURE.

THIS IS HOW YOUR  
BUSINESS STAYS AGILE IN A  
RAPIDLY CHANGING MARKET



# Novelty

**T**echnological developments keep moving faster and faster. Doing what you've always done, is not an option anymore. So how do you keep reinventing your business? How do you make sure to always be one step ahead of the rest? New business development manager Martin Olde Weghuis talks about how you stay future-proof with the support of Novel-T.

## Three types of entrepreneurs


The advisors at Novel-T are usually on the road. So is Olde Weghuis. "I prefer to take a look behind the scenes at the companies. That way, I get a feel for the company, and it allows me to see the daily course of events." Thanks to years of experience, he discovered that he could sort entrepreneurs into three categories. "There are entrepreneurs that struggle to keep their head above the water and who are losing clients. For them, it is a necessity to innovate. The second group consists of entrepreneurs who can still manage for now but foresee a future threat. Because of new trends or developments in the market, for example. The final category is

entrepreneurs who are currently thriving and have the opportunity to invest. For all these entrepreneurs, continuous innovation is the answer.

## Finding your course

So keep innovating and keep reinventing yourself. Easier said than done. It all starts with finding out in which direction you want to innovate. Before you enthusiastically start brainstorming on a new product, it is essential to take a moment to dwell on several matters. Because how you innovate differs per company. Olde Weghuis:

**"The first step is to return to the core of your business. Make sure you know your company from the inside as well as the outside. Know what your core values are. Only then are you able to innovate in such a way that fits your company."**



To get to know your company better and discover your starting point, you can use the Novel-T Innovation Scan as a tool. Just like Berry Rave of Nolek (specialist in leak testing solutions):

**“I was curious. What chances are there which we don’t know of?”**

The results of the Innovation Scan lead to processes being re-examined. They implemented a new CRM system and switched to a servitization business model.

**“The scan reveals more than you think and you get the insights clearly on paper. Only when you know where the opportunities lay can you continue growing.”**

## Explore your options

Subsequently, think of why you want to innovate. Olde Weghuis: “In which of the three categories of entrepreneurs do you fit? Is it a necessity, or are there currently opportunities to stay ahead of your competition? Make sure that innovation becomes a vital part of your strategy. This forces you to look at your company from a new perspective continuously.” With this knowledge in your back pocket, you can research different areas on which you can innovate. Are you going to develop or optimize a product, for example? Or will you look at your business organization? Or maybe it's your business model that needs updating. During this process, dare to look over the fence at other entrepreneurs.

Filling out the Business Model Canvas enables you to focus on your innovation. ESPS from Almelo did this together with experts of Novel-T during an innovation session. Sophie LeNoble of ESPS says:

**“Those sessions brought depth to our discussions and helped us tremendously in bringing our solution to the market.”**





Photographs by **Lizet Beek** and **Corey Martin**

## Ask for help

Once you have an idea of how to innovate, it's time to get to work. How do you translate your vision into concrete steps? Novel-T helps you with that in the Innovate GO program. During 18 weeks, you work with your team one day a week on your innovation. Every three weeks, you zoom in on another hypothesis you have on your innovation. At the end of the program, you have the right skill set to market your innovation.







Grootgroener is one of the companies that participated in Innovate GO to focus on their innovation. They developed a machine that, with the help of AI and machine learning, detects weeds on sports fields and subsequently eradicates them. Job Dekker:

**“You get easily carried away by the day-to-day operations of your business. We worked on our innovation every Tuesday during this program and were coached adequately. Clearing out your schedule to work on innovation is especially important. That’s why we stick to the methodology of the program from now on.”**

Novel-T guides you through the entire innovation cycle, from A to Z. At every moment in your process, you can reach out to them with your question.

**Could your innovation process use a boost?**

Go to [novelt.com/mkb](https://novelt.com/mkb) and reach out.

Photographs by **Lizet Beek** and **Corey Martin**

A woman with blonde hair, wearing a dark blazer over a green turtleneck and blue jeans, stands next to a man with grey hair, wearing a dark blazer over a light blue button-down shirt and dark trousers. They are both smiling and standing in a modern office hallway with brick walls and dark doors in the background.

# NovelT

## **WHAT ARE THE OPPORTUNITIES FOR YOUR COMPANY?**

## **PLAN A 30 MINUTE INNOVATION SESSION.**

Novel-T is the innovation office for SMEs that offers inspiration, programs and one-on-one support from innovation experts during every phase of your company's development. With our support, we help SMEs make the right moves at the right time. With our central role in the innovation ecosystem, we provide access to knowledge, talent and capital.

Novel-T is an independent non-profit organization founded by Twente Board, the University of Twente, Saxion University of Applied Sciences, the province of Overijssel and the municipality of Enschede. Our goal is to secure the future of SMEs.

**[NOVELT.COM/INNOVATIONSESSION](https://NOVELT.COM/INNOVATIONSESSION)**



## Steps of an audit:

1

### Industry 4.0 Quick Scan

A brief investigation to develop an understanding of your specific needs, goals, and expected challenges to scope a tailored audit approach

2

### Current State Analysis

Receive an expert breakdown of your current processes and Industry 4.0 competencies.

3

### Benchmark & Gap Analysis

Identify your competitive environment, your position within the industry, and potential gaps.

4

### Road Map Development

Create a custom implementation and action plan based on your vision and goals

5

### Follow Up Support

If desired, implementation support and workshops are available

## The 4<sup>th</sup> Industrial Revolution isn't 'on its way' - it's already here.

Want to **stay ahead of the curve** &  
**solve tomorrow's problems**  
before they occur?

**An Industry 4.0 Audit can help.**

- Road Map Development
- Understand (and unlock) your full potential
- Explore new digital transformation opportunities
- Identify operational gaps and weaknesses
- Adopt new technology before your competitors
- Create a custom blueprint for continued success

Ready to get started? Call +31 (0)53 489 1817 to  
**schedule your FREE, no-obligation Industry 4.0 Quick Scan today.**

