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Mercator NovioTech

Science Meets Business Nijmegen

Radboud Rector Han van Krieken :

Social partners needed for valorization and innovation

Prof. Joris Knoben :

Quarterly Barometer Arnhem-Nijmegen

AIESEC and Nijmegen ICT Network :

Using enterprising students for innovative businesses

Radboudumc

Radboud University

GEMEENTE Nijmegen

November 2016: Month of the Smart City

Nijmegen: Smart City

The City of Nijmegen and Radboud University's Smart Emission project has won the award for the Dutch Smartest City Centre 2016.

For the project a network of sensors has been set up to monitor particulates and air quality. These sensors were installed in people's homes, hence increasing their commitment to the scheme. In addition, the measurements are available as open data.

Smart City.
Through clever use of sensors, data science and technology, the city is becoming more beautiful, healthier, safer, more efficient and a better place to live.

As Nijmegen is ambitious, it is organizing the Month of the Smart City during which a new topic will be discussed every week in lectures and workshops: health, sustainability, public space and industry. Ethics remain an important ongoing discussion point.

Given partners like Radboud University, Rabobank, RadboudUMC, various businesses and residents' organizations, this month the ambitions for the city will be established in concrete terms.

Participating organizations:
City of Nijmegen
Radboud University
RadboudUMC
Smartdatacity.org
De Correspondent
Dirkzwager Lawyers & Advocates
City of Eindhoven
City of The Hague
Parkmanagers
CityBeacon
Nobralux
Rabobank
Warmte.nu
GoAbout
Imagem
Ziut
KPN
and many others

CityBeacon installed in Eindhoven: a smart column with map and route information, advertising options, wifi and sound and motion sensors.

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Colophon

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Hallway of the renovated dentistry building on the Radboud campus (photo by Otto de Zoete)

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European Union
European Regional Development Fund
Investing in your future!

Investing in knowledge and innovation

2016 is a good year for investment in the knowledge infrastructure. We give numerous examples in the magazine you have before you, starting with both campus locations. On the Novio Tech Campus, building A came into use in November, three years after the opening of building M. NTC will be well on its way to 50 businesses and 1,000 jobs once the new building for testing machine company EPR has been completed next year. There are also businesses that originated at their large neighbour NXP such as Ampleon and Nexperia, and those that came from the Radboud campus like Lead Pharma, QM Diagnostics and TropIQ Health Sciences. There are numerous interactions between both campus locations, for instance at iLab Nijmegen, Business Generator Health & HighTech and a company such as Radio Semiconductor Corporation, which started at NXP and is now located in the Mercator Science Park. One temporary NTC tenant is the Dentistry Laboratory that will return to the entirely renovated dentistry building on the Radboud Campus in 2017. Other large building projects on the Radboud campus: the new building for the Nijmegen School of Management and HAN Sports and Exercise. Meanwhile, Radboudumc is continuing its multi-year building and renovation plan for the medical clinical and research facilities ensuring that Heyendaal remains a dynamic location for knowledge, health and innovation, providing the largest employment density in the region.
Jobs require housing. Investment in residential areas and hotels is focused elsewhere in the city, for instance in the Nijmegen railway zone and on both sides of the Waal. In the new Van der Valk Hotel Nijmegen, The Economic Board for the Arnhem-Nijmegen-Wageningen region was launched. At the event Radboud Professor Joris Knoben presented the first regional barometer, based on research into entrepreneurial prospects. Smart regions need a strong Triple Helix with top-level research and socially active knowledge institutes cooperating with government and innovative businesses. Regions need to take a broad view, including an international perspective. Nijmegen has an excellent position as the most southerly city of the east of the country and the most northerly city of the south, as well as being a centre for Dutch-German cooperation. In the years to come, cooperation will remain necessary between the campus locations, knowledge institutes, businesses and authorities in the region, with the aim of creating a dynamic knowledge economy. You can read more about this topic in this magazine.
We would like to wish you the compliments of the season and all the best for the new year.

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Radboud University Campus BV.

drs. Hein van der Pasch,
Mercator Incubator Nijmegen BV.

dr. John J. Schalken,
SMB-Life Sciences.

ir. Rikus Wolbers,
Novio Tech Campus.

Contents

Big Data: new ICT knowledge with major societal impact	4
New Quarterly Barometer: Arnhem-Nijmegen region scores well	6
The Economic Board as connector and driving force	8
ITEC and Nexperia: efficiency wins	10
The Success of 3 years Novio Tech Campus	12
Radboudumc valorization policy 'from idea to spin-off'	14
Microcentrum: sharing knowledge at Technology for Health 2016	15
Cooperation at a high level in Nijmegen	16
Successful 'Gelderland Valoriseert' projects	19
Renovation of dentistry building on Radboud campus	20
Nooteboom: importance of patents is self-evident	22
EYnovation helps innovative startups and scaleups	24
Herald increases its share in medical sector by acquisition Label Med	26
Sencio: Packaging RF innovation	29

Big Data: new IT knowledge with great social impact

The meeting on the theme of Big Data held by VNO NCW (Union of Dutch Entrepreneurs – Dutch Christian Entrepreneurs' Union) on 27 October at Radboud University proved to be a hit. Over a hundred people, including a mix of experienced entrepreneurs, university students and researchers, as well as young entrepreneurs from the Nijmegen ICT Network listened raptly for two hours to presentations and discussions at the Huygens building.

Marcel Hielkema, regional president of VNO NCW

In his opening speech, Marcel Hielkema, regional president of VNO NCW, referred to the recent launch of The Economic Board Arnhem-Nijmegen, already an important partner in discussions with the Ministry of Economic Affairs. Hielkema expressed his respect for the cooperation with Radboud University, not only for this meeting about Big Data, but also for the Quarterly Barometer, presented for the first time on 15 September, based on research by Radboud professor of economics Joris Knoben. In the coming period, entrepreneurs in the region will also be questioned about their economic plans and prospects, with Prof. Knoben performing the scientific analysis.

Machine Learning

Prof. Tom Heskes, professor of Artificial Intelligence at Radboud University, outlined recent developments resulting in the huge increase of data: computers are becoming ever more powerful and fast; the doubling of data-storage every year-and-a-half; continuing improvements in data analysis. Scientists such as specialists in Machine Learning are working on algorithms to detect patterns in Big Data. An example of this is Deep Learning, focusing on algorithms that are able to carry on evolving on their own. Whenever new data are added, the computer learns to recognize new patterns. Deep Learning makes it possible to train models to restructure data and present them reliably, and is used in voice applications, image recognition and text analysis. Other models include the Causal Discovery model that can demonstrate cause and effect. According to Heskes, the combination of the right models, large amounts of data and fast computers makes successful Machine Learning possible. Companies also use algorithmic models to make predictions based on historical data, for instance so they can customize their range for a specific customer. Large companies like Google already have a big lead in this field. Online shopping sites such as Amazon and Bol.com employ 'collaborative filtering' techniques to offer customers tailored information.

Big Data is also having a societal impact in health care. Tom Heskes cites a new Big Data research project involving his colleagues Prof. Bas Bloem and Thea van Kemenade, in which Verily, an American sister company of Google's, is collaborating with Radboudumc and Radboud University. In this project the data of 650 patients with Parkinson are collected and analyzed to gain insight into the progress of the disease and to offer personalized care. Heskes: "Within Radboud University we are working on Big Data in several places. We are going to cluster and consolidate our research in a Radboud Data Science Centre which will make Radboud University's reputation even stronger internationally. In a recent worldwide competition involving over 600 teams, Radboud University came as high as 11th

Prof. Tom Heskes, Professor of Artificial Intelligence at Radboud University

place by developing a model for analysis and pattern recognition for assessing the quality of eyesight in diabetics."

Big is relative

Are there risks involved with self-learning computers and artificial intelligence?
Tom Heskes: "The old paradigm assumed that computers were there to assist humans. Now we can see that in fact the computer needs help from humans; humans provide sets of data and labels to computers operating with the aid of machine learning. Still the question remains: how long will it take before the computer takes over all human tasks? Both experts and laymen have been saying since 1960, 'Within the next 20 years', and they're still saying it and probably will be for the next 20 years. Let us concentrate on things that are more dangerous such as drones which shoot down people on the basis of face recognition." To conclude, Heskes puts the matter into perspective: "As to Big Data, they are nothing more than Data. What we experience as 'Big' will be looked upon as small fry in a few years' time." However, it is clear that companies, both existing ones and start-ups, are rapidly starting to use data science techniques for the analysis of large amounts of data. Heskes gives several examples, Radboud spinoff companies among them.

Three Vs

Managing partner Guido van Gessel spoke on behalf of Nijmegen IT firm Isatis, Nijmegen Firm of the Year in 2015, listing their focal areas: Healthcare (e.g. applications for chemists and health insurers), Comparison (websites), Development (software) and Data Performance (online results, IT services, business solutions). Isatis founders included ex-Radboud University Information Science student Jack van Poll. Since 1986 it has grown from 30 to 130 employees, with particularly rapid growth in the last seven years. Guido van Gessel described Big Data as three Vs: Volume (large amounts of data), Variety (structured and unstructured data) and Velocity (increase in speed). "Many companies possess enormous quantities of data, but do not know what to do with them. The aim is to make data available in real time and analyse them. The problem with this is that much data is unstructured: Word or PDF documents, telephone data, click data, sensor data, etc. You can make it possible to compare them by using a relational database, that works like a beer crate with neat sections in which the standard bottles of the various brands fit nicely. The problem arises when you want to put a wine bottle or a flip top bottle in it. We have developed a methodology to process and analyse the unstructured data." As an example he describes Isatis' participation in the SMASH project (Smart Maintenance for Ships) with dredging company Boskalis, ship builder IHC Merwede and marine engine manufacturer Wärtsilä. The research project showed that, based on unstructured real-time data, maintenance can be predicted and hence the cost of keeping ships in dock can be reduced considerably. To do this no less than 12 different data sources are used, such as log data, weather predictions and ERP applications. This successful pilot offers opportunities for Smart Maintenance in other sectors.

Guido van Gessel, managing partner of Isatis

Social Impact

These two main speakers were followed by short presentations by **ICT Network Nijmegen** and **AIESEC**, mainly about their efforts to inform firms about Nijmegen students, giving top talent a head start on the trail of future employers. In his closing address Professor Han van Krieken, Rector of Radboud University, also pointed out the opportunities for companies in the region to attract well-educated students by means of traineeships and jobs. Radboud University is regarded as a welcome partner for businesses and other organizations. As the best general university in the Netherlands it participates in many projects, regionally, nationally and internationally. He used his medical expertise as a pathologist to tell about his experience in the use of data to arrive at reliable conclusions and assessments. The application of Big Data and new methods make it possible to structure and analyze data better. Big Data is of interest for scientific research and also for translating into social applications and innovations.

Professor Han van Krieken, Rector of Radboud University

Radboud University wants to play an important role in the acquisition and transmission of knowledge for the benefit of society. "We cannot do that on our own. The university needs partners for knowledge valorization and social impact, just as Radboud Innovation is collaborating with VNO NCW and the ICT Network for this meeting", says Rector Van Krieken, thanking the organizers and speakers. To conclude, he gave examples of valorization from various scientific fields, including the recent Hieronymus Bosch exhibition which drew over half a million visitors. Science also leads to new products, has an impact on society in various ways and contributes to a strong and dynamic region. Students and researchers want their knowledge to have a meaning for society. This, for instance, is proven by the fact that in the last 25 years, about 700 Radboud researchers and students have started new companies, creating well over 5,000 jobs and numerous innovations.
These spin-off firms, and many other innovations evolving from science, can be found both here in the Mercator buildings at the Radboud Campus as well as elsewhere in Nijmegen and the wider region. Valorization, innovations and spin-off firms make the societal impact of Radboud University ever more visible.

New Quarterly Barometer:

Arnhem-Nijmegen region scores well

During the opening event of The Economic Board, Prof. Dr. Joris Knoben presented the results of the new Quarterly Barometer on the economy in the Arnhem-Nijmegen region, developed by Radboud University in cooperation with VNO-NCW and The Economic Board.

Joris Knoben is Professor of Business Economics at the Nijmegen School of Management at Radboud University and coordinator of the English-language Bachelor in International Economics and Business. The Quarterly Barometer measures the area's business confidence, growth in employment, rate of innovation and export position. The Quarterly Barometer maps out the strengths and weaknesses of the region, so they can be put on the agenda of entrepreneurs and policymakers. "Initially we focused primarily on the key figures, so we could compare them with Dutch and European averages," says Joris Knoben. "We now want to use a benchmark to investigate how our region fares compared to other European regions. It is already clear that the Netherlands is one of the forerunners in Europe. In turn, the Arnhem-Nijmegen region is one of the best performing regions within the Netherlands."

Innovation scores exponentially

The results of the first Quarterly Barometer can be said to be extremely positive and demonstrate that the region has all it needs to enable strong growth. The region scores very highly in business confidence: 40%, compared to 10% nationally. Employment growth is 23%. Compared to the national rate (10%) this may be high, yet at national level, business confidence (10%) equals that of employment growth (10%), making it noticeable that the growth in employment lags so far behind business confidence in the Arnhem-Nijmegen region. For innovativeness, the region scores 'exponentially' with 55%; this is 37% at national level according to Statistics Netherlands (CBS). Given that the Netherlands is already among the leaders in Europe when it comes to innovation, then the Arnhem-Nijmegen region is exceptionally innovative. Furthermore, Arnhem's percentage of start-ups per 1,000 inhabitants takes third place within the Netherlands, ranking even higher than Eindhoven. However, neither the high scores for innovation nor the number of start-ups are reflected in the employment growth rate. 33% of entrepreneurs export, i.e. 5 times the European average and 3 times the national average. These exports account for only 20% of the revenue and are almost solely aimed at Germany.

Knoben continues: "In any case, entrepreneurs in the Arnhem-Nijmegen region have a head start in export experience and what matters now is to expand export opportunities to other European countries. There is scientific evidence that a region needs 'connectors' like The Economic Board to bring partners into contact with each other. Such 'connectors' can put a region on the map nationally and internationally, thus stimulating the regional economy."

You would expect entrepreneurs to use their export experience to intensify export to Germany and other countries. What is stopping them?

"In the next Quarterly Barometer we want to research what the bottlenecks are for export growth and employment growth. Removing all kinds of restrictive regulations and bureaucracy will certainly facilitate international business. Trade missions with smaller SMEs to neighbouring countries, such as those The Economic Board wants to initiate, would also work in favour of export growth. As I men-

tioned before, to attract success you need a connector to connect businesses and organizations, couple businesses with the right investment opportunities and guide them to the marketplace."

What is the explanation for the Arnhem-Nijmegen region's high scores for export and innovation in particular? According to Joris Knoben, "We are primarily a knowledge intensive region, with a well-educated population and good universities and colleges. Our region is also notable for the fact that we are able to retain highly educated people thanks to a pleasant living environment with good social and cultural facilities. Our favourable geographic position also provides export opportunities we could make even better use of. We fulfil a corridor function from the Randstad (the west of the Netherlands) to Germany. The Netherlands, Flanders and the Ruhr make up the so-called 'Tri-state city network', an enormous urban area with around 30 million inhabitants and about 150 billion Euros of internal trade. In that respect the Netherlands has a favourable position in Europe, with major airports and sea ports, excellent rail connections, motorways and waterways."

General purpose technology

Joris Knoben: "Innovation is often the result of cooperation, especially at regional level. Our region has excellent triple helix collaborations and knowledge ecosystems. We are also going to examine this cooperation in greater detail in the next barometer. In the past, regions would focus on one industry, the traditional specialization. These days you see that successful regions mainly focus on a social problem, where a central 'general purpose technology' can be applied in several sectors. This is how Silicon Valley is able to expand in all directions with ICT technology and find common ground everywhere. Our choice for Health, Food & Energy is a smart one, as the cluster can keep pace flexibly with all kinds of social and technological developments. Health has links with ICT; food production, as one of the largest energy consumers, requires sustainable energy solutions; this in turn is good for a healthy living environment. Hence all these technologies are inextricably linked. Similarly, universities are focusing on subjects such as Healthy Brain, where connections have been made between Food in Wageningen and Brain & Cognition at Nijmegen's Donders Institute, also of interest to ICT specializations. These issues should really receive even wider support from other faculties, so that Management Science, the Social Sciences, Law and the Arts can also get involved. Within the university a connector is needed to bring these parties together. The results of the Quarterly Barometer may also challenge other faculties to investigate how they can use their own research to contribute."

Innovation often results from cooperation, especially in the home region

The Arnhem-Nijmegen region is also attractive for foreign students, researchers, businesses and investors. "The Netherlands appeals to foreign enterprises thanks to ita favourable fiscal environment, location and knowledge infrastructure. But that is not all: procedures for setting up businesses are correct and relatively quick, we have a stable economy, a reliable government and we are justifiably 'the gateway to Europe', with an open attitude towards the rest of the world. Many Asian students consciously choose Wageningen in Food Valley or Nijmegen in Health Valley, and an increasing number of Asian investors are locating here through acquisitions in the region. This is good for the economy and for the employment rate. Apart from that, backsourcing is also a growing phenomenon, bringing back to the home country jobs previously outsourced to low-wage countries in Asia; technology-driven manufacturing is for a large part returning to Europe. Nevertheless, large groups of less well-educated people will face structural unemployment due to lack of skills and increasing automation or use of robots. Extra training can help create new opportunities. A region like Arnhem-Nijmegen with highly educated inhabitants is better equipped for this future, but life-long learning remains necessary."

Regional and international role

According to Knoben, Radboud University and Wageningen UR are in a somewhat ambiguous position. On the one hand they are aiming for a spot on the international scientific stage, but on the other hand they have to accept their responsibility to the region within the triple helix. "Universities who are only international-focused risk losing their regional roots and ties," emphasizes Knoben. "If you want to internationalize and specialize as a university, then just like in the business world, you need enough critical mass." With that kind of strength, universities are able to contribute more to their own region, but the region they impact has to be large enough. In this respect, it is a good thing that The Economic Board also includes Wageningen. Universities have to ensure that their strong international position and regional ties reinforce each other, rather than conflicting. All Dutch universities are excellent and are in the top 200, but they will never reach the top 10. That would only be possible if we were to present ourselves internationally as one Dutch University. Cooperation between universities is pretty good at a research level, but when it comes to education they act more as each other's competitors with similar bachelor studies. None of the current international top 10 universities have strong regional ties. After all, regional and international focus are difficult to combine for a leading university, especially if the region where you would like to make an impact is too small. I would advocate a compromise, where the available educational programmes are distributed more evenly between universities. In addition to this, each university could focus on specializations and niches. We should not compete with one another, but instead cooperate to promote ourselves more internationally and present the Netherlands as one big region, or a couple of larger regions the size of the South and the East of the Netherlands together. Radboud University and The Economic Board could fulfil a connecting role within the wider region, including neighbouring Flanders and North Rhine-Westphalia."

The Economic Board as connector and driving force

Thursday 15 September was the opening event of The Economic Board, innovation motor of the Arnhem-Nijmegen-Wageningen region. In her opening speech, Director Sigrid Helbig explained the aim of The Economic Board, which is to stimulate economic growth and employment in the region. The focus is on Food, Health and Energy and their crossovers. Other talks also gave some interesting examples.

Event

The potential of the Arnhem-Nijmegen-Wageningen region is immense. According to Sigrid Helbig, the region boasts excellent infrastructure with many innovative businesses and respected knowledge and health institutions. The Economic Board wants to connect these institutions, government, entrepreneurs and investors. The goal is to not just increase the visibility of this region and its expertise within the Netherlands, but also to promote it abroad. The central location in Europe offers extra opportunities for this, but it all boils down to optimal branding.

CEO Anja van Niersen gave a presentation on **Allego**, which is developing an infrastructure of charging solutions for electric vehicles. Starting in Arnhem, Allego wants to roll out a pan-European network following an open market model. According to Van Niersen, Arnhem has always been an energy-focused city and the birthplace of major innovative energy initiatives. This is why the region has the potential to take up a leading position in the field of energy. Allego joined forces with other partners for the Clean Mobility Center initiative, a 'European center for business innovation'. The Center aims to generate more economic value and innovative solutions in the sustainable mobility sector by bringing together business, research, education and government. The Clean Mobility Center was founded by Allego, CGI, DEKRA, DNV GL, EL-KW and IPKW and aims to become a prominent centre with a directing role in Europe for the efficient sharing and developing of knowledge and skills in sustainable mobility. The Municipality of Arnhem, HAN University of Applied Sciences, the kiEMT Foundation, Oost NV, ROC Rijn Ijssel, SEECE and SUEZ have joined the initiative.

The **Top Institute Food & Nutrition (TiFN)** is a public-private partnership between businesses and research institutes in the field of sustainable food and healthy food, conducting joint research. The organization finances a great deal of research at Wageningen UR.

Marian Geluk, Director of TiFN, emphasized in her talk that after the US, the Netherlands is the second largest agri-exporter in the world and has a world-class agrifood R&D ecosystem. She believes the excellent cooperation between science, government and business in Food Valley, the triple helix, strengthens the innovative power of the agrifood sector and is therefore one of the reasons for the success of the Top Sector Agri-food. TiFN's main focus is on the development of healthy food and sustainable food manufacture.

Joost Bouman, Director of Gelderland's Regional Centre for Technology (RCT), announced the winner of the innovation trip to Silicon Valley, **Tinybots**. This Nijmegen-based busi-

Joost Bouman (RCT Gelderland) and innovation trip winner Tinybots

Mayor Hubert Bruls and Sigrid Helbig next to the Pearl winners

ness developed a small talking robot to help people suffering from dementia and their families. RCT Gelderland matches queries about innovation from businesses to the available expertise at other companies and knowledge institutes in the Arnhem-Nijmegen-Rivierenland area.

The cooperatives CRV, Agrifirm and Friesland-Campina are working on an infrastructure for sharing available data on dairy cattle with dairy farmers and other institutes in the dairy sector. This cooperation is the next step in developments in the SmartDairyFarming project.

Roald van Noort, Chairman of the Board of CRV Holding, explained how 'big data' can be used to help exchange knowledge on subjects like animal health, life expectancy, sustainability and mineral efficiency. Various additional applications can assist dairy farmers in decision-making for their business operations.

Pearls of the Region

At the end of the event, **Hubert Bruls, mayor of Nijmegen and chair of The Economic Board** presented the Pearl awards to three 'Pearls of the region', regional businesses that excel.

The **Arnhem-based coffee refinery Peeze** received a Pearl for the development of innovative biodegradable coffee cups for espresso machines, filled with top-quality 100% certified coffee.
www.peeze.nl

The Nijmegen-based company TropIQ is developing drugs that prevent the transfer of malaria from mosquitoes to humans. 600,000 people die of malaria every year.
www.tropiq.nl

Plant-e from Wageningen were awarded a Pearl for their innovative and environmentally-conscious methods for generating electricity. The company makes products that allow electricity to be generated from living plants.
www.plant-e.com

ITEC and Nexperia: efficiency wins

For the ITEC (Industrial Technology and Engineering Centre), 2016 was a memorable year. As part of the business unit Standard Products, specialized in the design of assembly and testing systems, ITEC celebrated its 25th anniversary. Shortly before, in June, NXP had announced its agreement with two Chinese investors, Beijing Jianguang Asset Management Co., Ltd (JAC Capital) and Wise Road Capital LTD (Wise Road Capital) to sell the Standard Product business, and with it, ITEC. This transaction is expected to be concluded in the first quarter of 2017. Last year JAC Capital also acquired NXP's RF Power division, which continued under the name Ampleon.

Semiconductor

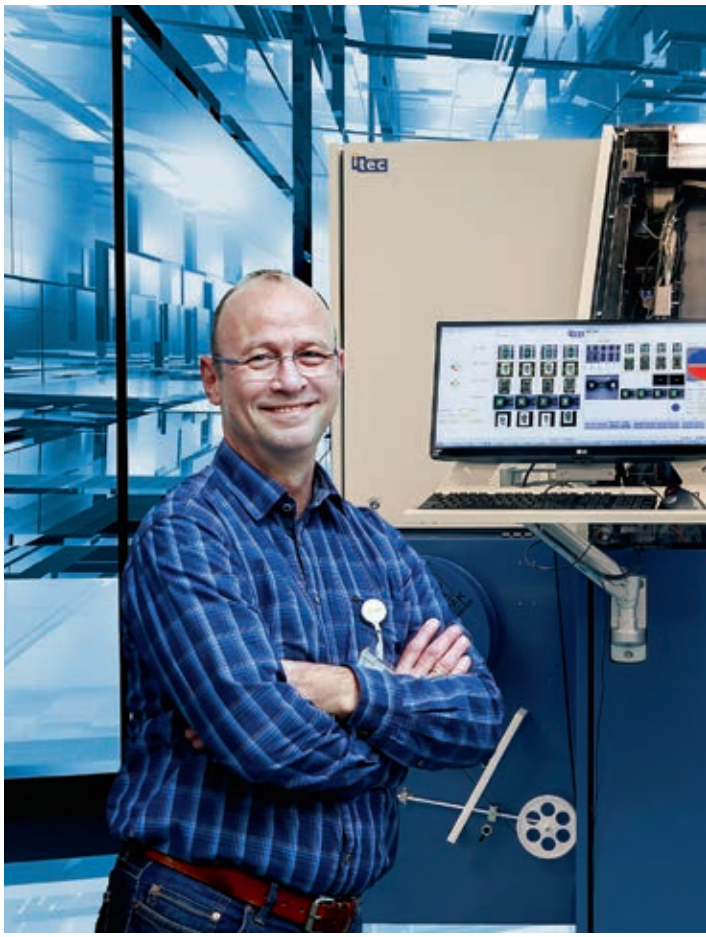
Standard Products is a profitable business unit within NXP and accounts for 11% of its revenue and 85% of total semiconductor sales. After the acquisition it will continue as the independent company Nexperia. Its head office and R&D activities will be located in Nijmegen on the Novio Tech Campus, close to NXP Semiconductors. Included in the takeover are the front-end wafer factories in Manchester and Hamburg and the back-end assembly factories in Guangdong (China), Seremban (Malaysia) and Cabuyao (Philippines). All relevant patents and IP related to the Standard Products business are also part of the deal. Worldwide this affects 11,000 employees, just over 100 of whom work in the Nijmegen Nexperia head office, 40 of those at ITEC.

70 billion products a year

Boud van Blokland has been with ITEC for 18 years. As Development Manager for Assembly he will remain responsible for the development of assembly equipment and development programmes at Nexperia. "Our business is mainly assembly machines for the manufacturing of so-called discrete semiconductors, our standard products in bulk. We are talking about an immense number of discrete semiconductors; no fewer than 70 billion products a year being manufactured 24/7 in the assembly plants. Our discrete semiconductors are supplied to the automotive, mobile, consumer, computer and communications industries, and are vital parts in cars, televisions and mobile phones. As a result of our comprehensive knowledge and experience, we have recently turned to the manufacture of more complex semiconductors." NXP is divesting the Standard Products business to allow it to focus more on the so-called High-Performance Mixed Signal business; more complex and sophisticated semiconductors with a higher margin.

Prototypes and repetitive manufacturing

Tom Kampschreur has been working here since 1978, and as Principal Electrical Engineer he is responsible for the electrical design of the assembly machines. He explains the process: "We design the machines that assemble the discrete components. The silicon wafers leave the wafer fab and are then sawn into pieces. Our machines pick up these pieces, place them on a chip carrier, attach wires and connect them to the pins. Next,



the machines encapsulate them in a moulding compound, test the packages and tape them, after which the end-product can be delivered to the customer. The place of our department in the overall production process is sandwiched between the wafer fab and PCB mounting, with us providing their input material. For us, silicon wafers are the input material and our end product consists of taped products. ITEC designs the machines in Nijmegen and builds the prototypes, cooperating with local partners to build these machines. One of our partners is the oldest machine-building factory in Almelo (NL), originally belonging to Philips, now VDL Enabling Technologies Group (VDL ETG), where repetitive manufacture takes place. Another important partner is EPR, who build our testers and will soon move into the new building on the Novio Tech campus."

The 4th generation ADAT3-XF

Upgrade company

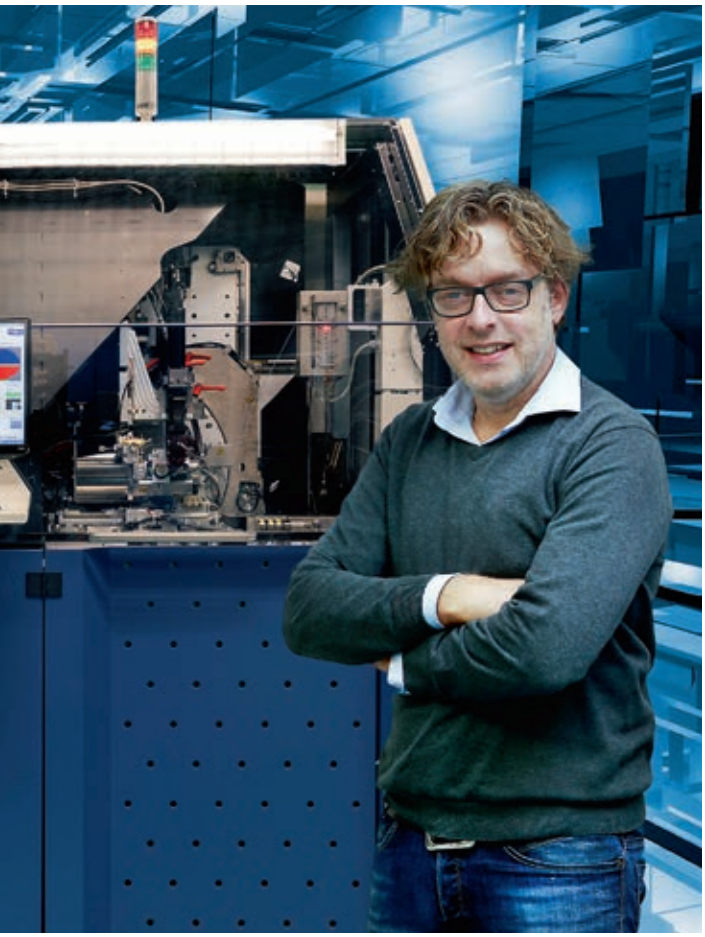
'Efficiency wins' is Nexperia's slogan. Boud van Blokland continues, "Our goal is to achieve increased efficiency, optimization of quality and cost reduction in the semiconductor manufacturing process. We describe ourselves as a real 'upgrade company'. Other machine suppliers would say, 'This model of ours is obsolete; in a year's time we will stop providing service and if you want new features, you will have to purchase a new model.' ITEC, however, ensures that we can continue to upgrade that machine, making it faster and hence prolonging its service life. This means that the assembly costs of the end products can be kept as low as possible. An assembly machine produced 15 years ago had a capacity of 8,000 items per hour. Thanks to our upgrades, that same machine is still fully operational and produces three times as much: 24,000 items!

Compare it to buying a car with a top speed of 120 km per hour and 15 years later, that same car is still going strong, but then at a speed of 360 km per hour."

Assembly AWACS

Tom Kampschreur nods. "What matters is the payback period. We have projects where an investment of half a million euros can be recovered within three to four months. Our competitors' machines have a comparable cost price, but they are two to three times slower so you have to invest two to three times as much to reach the same production levels as with our machines."

As well as wire bonders and die bonders, ITEC's product range includes testing systems. "We also design and build testing equipment, cooperating with EPR. Because we manufacture tens of billions of products each year, we have a great deal of experience with speedy testing. A short testing time means lower testing costs. All the knowledge and experience we have on permanently compressing the manufacturing process of standard products, we are also able to use for the manufacture of the more complex products that NXP wants to focus on. A totally different type of product is a vision system we have designed that checks if there are any holes in the moulding, scanning about 100,000 products an hour for errors. We have also developed AWACS, a big data application that connects to the machines and stores the testing data, registering all errors and downtime."



Tom Kampschreur (left), Principal Electrical Engineer and Boud van Blokland, Development Manager for Assembly

Nexperia will maintain a close customer relationship with NXP and not much will change apart from the move to the neighbouring building FT at the Novio Tech Campus. "We have a close collaboration with local businesses and direct lines to universities and institutes of higher professional education (HBO)," says Boud van Blokland. By separating from NXP, a number of openings for managing positions and service tasks have been created, but we are also actively looking for new colleagues for the R&D department The new Board of Directors wants to invest in Nexperia's ambitions for growth. We are already the global number one in our field. We will continue to focus even more closely on manufacturing optimization and our projects will still support NXP. Most employees come from the region and our roots are here. It may come as a surprise to many people to learn that Nijmegen is the birthplace of the semiconductor industry, so the decision to keep our head office in Nijmegen is a logical one."

Nils Roemen of Durftevragen (Dare To Ask) was one of the speakers

Three years of success for Novio Tech Campus

On 11 November another building was officially opened at Novio Tech Campus. Building A, the place where Philips' business activities in Nijmegen started in 1953, has been redeveloped by Kadans Science Partner. This is three years after completion of Building M, the first building on the campus, providing modern office spaces, lab facilities and cleanrooms. Both buildings are now suited to knowledge-intensive start-ups and scale-ups in life sciences, health and high tech. With the opening of Building A, Novio Tech Campus has expanded to four buildings in the course of three years. In addition to Buildings M and A, Ampleon and NXP are also located at the Novio Tech Campus. The fifth building is currently under construction and it will be occupied by EPR in the spring of 2017. Rikus Wolbers, Managing Director of Novio Tech Campus, welcomed with justifiable pride all those invited on the occasion of Novio Tech Campus' third anniversary celebration and the opening of Building A.

Event Impression

Opening of Building A

"Novio Tech Campus has been growing faster than anticipated," Rikus Wolbers said in his opening remarks. "At first we expected to develop a building every three years and to fill it with companies. We have found that Novio Tech Campus is extremely attractive to start-ups and developing firms, drawing them in from the Nijmegen area and far beyond. There are now 50 companies established here with a total of 400 employees. Together with Ampleon and NXP we are talking about around 1,000 people." Rikus Wolbers also specifically mentioned Rockstart Digital Health Accelerator, which set up on the campus two years ago and is located in Building A. "People fly in from no fewer than five continents to pitch to this unique Accelerator programme. Rockstart is an enormous asset, helping to increase the profile of the Nijmegen knowledge region internationally."

Building A, which ironically was nominated to be pulled down when the campus started, is now a hive of activity. One of the companies that moved here was sensor and chip assembly packaging company Sencio for whom Kadans Science Partner invested heavily in cleanroom facilities and infrastructure. "Novio Tech Campus is the classic example of how you can create momentum with a sound public-private partnership. With partners such as Radboud University, Radboud UMC and HAN Commercial, we have excellent collaboration. Starting next year we are going to combine our forces even more in a consortium called Business Generator Health & High Tech. Novio Tech Campus, where innovation works and innovations come to life."

Incubator for knowledge valorization

The second speaker was Jasper Wesseling, Director of Innovation and Knowledge at the Ministry of Economic Affairs. "Three years is a very short time in terms of campus development," he emphasized once more. "What an incredible result has been achieved here in just a few years!" He summed up a number of Novio Tech Campus' strong points: the presence and draw of NXP; the close relationship with Radboud University and Radboudumc with Novio Tech Campus acting as the incubator for the knowledge valorization; the clever combination of high tech and life sciences which presents an interesting proposition both nationally and internationally. Jasper Wesseling indicated the value of campuses for strengthening the position of the Netherlands as a land of innovation. "Campuses raise the profile of a country. When Novio Tech Campus started out, the government made a contribution from the Economic Structure Enhancing Fund (FES) as recognition of the value of this campus. Regional partners such as Oost NV have also offered financial support. Innovation is essential to maintaining a competitive international position. The Netherlands is currently the fourth most competitive economy in the world. In Europe it is in top position. In the ranking of the European Innovation Scoreboard (EIS) we have become innovator number one for the first time and we perform 20% better than comparable European countries. Our target is to invest around 2.5% of the national income in R&D in 2020, a growth of 0.5% or an extra 3 to 5 billion euro."

Rob Janssen, chairman for the day, conducted a short interview with Michiel Scheffer, Member of the Provincial Executive of Gelderland and Hubert Bruls, mayor of the city of Nijmegen. Mayor Bruls indicated that there had been plans to open up a technological business site years ago and that buildings had been purchased for the purpose back then. He complimented Novio Tech Campus on their dynamic approach in the last three years. Nevertheless, he remarked that Nijmegen as a centre of knowledge had some catching up to do. "We have excellent researchers and firms work together well, but we need to display to better advantage all that we have in our warehouse." Michiel Scheffer pointed out the exceptional importance of Nijmegen, Arnhem and Wageningen as centres of knowledge. In Nijmegen in particular he saw that four years of dedicated effort and investment have succeeded in transforming traditional industry into high-tech industry. At the root of all this is the cooperation between national Government, Province, Municipality, businesses and knowledge institutions.

Innovation hub

As Rikus Wolbers indicated, Novio Tech Campus is the innovation hub of the Nijmegen region. Key to this are the entrepreneurs. Three firms based at Novio Tech Campus explained how they turned their dreams into reality.

Ad van Gorp of Lead Pharma told about his personal motives for a cancer-free world and how he wants to achieve this. Lead Pharma is looking for solutions to prevent the formation of cancer stem cells.

Joost van Lammeren and Patrick Kilkens of EPR gave a presentation on the firm's strategic change of course, transforming it from a traditional manufacturing firm into one with a more leading role as a producer of high-end innovative solutions. For example, complex modules and systems from EPR are being used in the Mars satellite and in high-tech heart-lung machines. EPR is looking forward to moving its employees into the new building and the inspiring environment of Novio Tech Campus in February.

Koen Dechering of TropIQ concluded the round of presentations with a survey of the recent developments in their research into anti-malaria drugs. After successful animal experiments they expect to be allowed to carry out drug trials on humans within a year. Dechering also spoke about their conscious decision to settle on Novio Tech Campus itself, where various rewarding collaborations arose remarkably quickly, including one with pharmaceutical development company Avivia and Tokyo Future Style who want to launch the TropIQ product on the Japanese market.

The final speaker was Nils Roemen, one of the creators and founders of Durftevragen (Dare to Ask). "The most interesting people are those who know what they want to achieve, but are still trying to find out how; people who ask other people for help in achieving their goal. That is the same mindset I find at Novio Tech Campus: people with a goal who are working together with others in order to achieve it."

The grand finale was the official opening of Building A. After a biometric hand scan of all of those involved in the campus, Chiel van Dijen of Kadans Science Partners was the last in line and the building was officially declared open. A spectacular laser show took the spectators on a journey through time from 1953 to 2016. Afterwards everyone was given a tour around Building A to experience for themselves that Novio Tech Campus is the place where innovation works.

Mayor Bruls, Member of the Provincial Executive of Gelderland Scheffer and Novio Tech Campus Director Wolbers were among those impressed by the laser show.

Dr. Dirkjan Masman, Managing Director of Radboudumc Valorization

Radboudumc Valorization Policy ‘from idea to spin-off’

The Radboudumc Valorization department was opened in 2007 and has a team of 20 people making connections between research and business. The field of operation is large: support for acquiring (inter) national research funding, coordinating complex grant projects, patenting, licensing and supporting the founding of spin-off companies. Dirkjan Masman has been its Managing Director since 2013 and summarizes the mission of Radboudumc thus: Valorization: making an impact on healthcare.

“Valorization tries to link interested companies to researchers, but also to match scientists needing support with the business sector,” Dirkjan Masman begins. “We try to spot researchers’ innovations at the earliest possible phase in order to develop them into a promising product as well as stimulating the researchers themselves to bring their ideas to us. In this way we attempt to set in motion public-private collaboration. Additionally, we stay closely in touch with our colleagues at Radboud Innovation.”

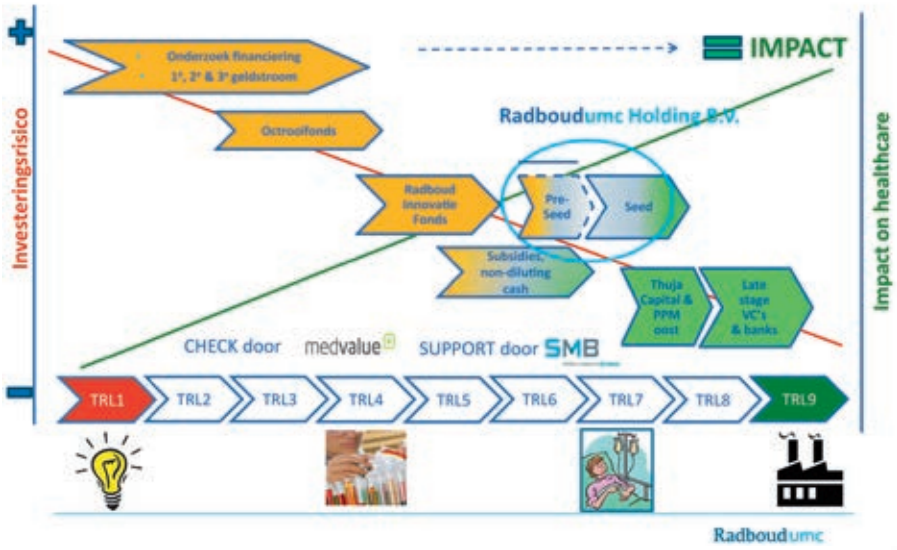
More outside-in

“An ‘outside-in’ approach is essential for valorization,” he continues. “In the past we used it far too little and stuck too rigidly to an ‘inside-out’ approach, in my opinion. In order to select the right innovations and to make interaction with the business world faster and more efficient we have set up MedValue. MedValue investigates whether an innovation is useful and relevant, makes healthcare cheaper and is marketable. So far 30 projects have been evaluated, half of which were not considered promising enough to go further with. MedValue can therefore prevent initial misinvestments, but can also safeguard entrepreneurs and investors against continuing to invest in a product that is doomed to fail. Hence we expect more investors to make use of the services of MedValue to assess their investment projects’ chances of success. MedValue can also introduce interesting innovations from the business world to Radboudumc so that we can carry out clinical studies and involve our physicians, resulting in a kind of ‘launching customer effect’. This is a new development for which we have high expectations and we want to support and develop it more. The inside-out approach mainly concerns in-house discoveries, patents we want to claim for them and the licences we want to issue to industry and business. In addition to various licences issued by us, our portfolio currently consists of 19 spin-offs in which we have shares, accounting for some 153 FTEs. These new companies have acquired 44 million euro in additional financing since 2007.”

Impact on healthcare and investment risks

Dirkjan Masman uses a diagram to describe the Radboudumc valorization policy ‘from idea to spin-off’. At the bottom of the diagram, nine ‘Technology Readiness Levels’

Radboudumc policy 'from idea to spin-off'



(TRL) are shown, ranging from idea to marketable end product. The rising green line indicates increasing impact on healthcare, the falling red line the degree of investment risk. The lines intersect around halfway (more or less at TRL5). As one gets closer to the end product and as impact on healthcare increases, investment risk decreases correspondingly. Dirkjan Masman explains that "By the 'scientific excitement' stage about an idea (TRL1), we want Valorization to be involved so we can investigate if we can help develop a product that will have an impact on healthcare (TRL9). So we always start at the left hand side of the graph, at a stage at which it is very difficult to get financing because then investments risk is at its highest. However, to create impact you have to be able to develop on through the next TRLs. Traditionally we finance this first phase with research funding, various types of financing from OCW (Ministry of Education), NWO (Netherlands Organization for Scientific Research) and charity funds and subsidy applications.

Since 2014 we have had a patent fund from which we can finance patents for researchers. As the investment risks gradually decline we see that so-called pre-seed funds are being created, in the most part to finance new companies. However, we would like to step in at a slightly earlier phase, the moment that promising ideas threaten to miss the boat simply due to lack of funding. This is why this year we have introduced the Radboudumc Innovation Fund, asking the market and venture capitalists what they need in order to invest at this stage. We can give the green light to researchers for a project of up to €100,000, supplying the project management ourselves and setting intermediate targets on a timeline. This is the reason the Radboudumc Innovation Fund was created to give further support to ideas that in themselves are promising, but are not yet mature enough and present too many risks for investors. For several years now we have also worked for SMB Lifesciences on the Novio Tech Campus, successfully providing start-ups with coaching and support, premises and networking, helping them on their way to the next level. Once they get to TRL6/7 we reach the outer limits of what we can provide. Normally we would never get that far, but we find that even at that stage, investors are still very hesitant. Our own department has financed some spin-offs because it happened to have funding for innovation. Innovations at other departments where funding is tighter may fail through lack of finance.

We are therefore in favour of a more centralized financial approach. To achieve this we are going to finance Radboudumc Holding, which has a share in our spin-offs, in such a way that we create a pre-seed fund that we can use to support a start-up for one year. The next step is a seed fund from which we can provide funding when the market is also in step. Furthermore we are going to participate with venture capitalists Thuja Capital and PPM Oost. From that moment on we will really have become more connected to the investment market. This approach is completely new to Radboudumc and we must now actively recruit to attract more financing. Using this new structure we hope to launch 4 to 5 promising spin-offs each year."

Successful spin-offs

Valorization pays off. This Dirkjan Masman demonstrates with the examples of some successful spin-offs such as TropIQ Health Sciences, which develops drugs to prevent the transfer of the malaria parasite. This is a problem occurring mainly in developing countries with few resources for medicines. TropIQ is thus a good example of social entrepreneurship. NovioGendix, now taken over by MDxHealth, developed a diagnostic test to establish a patient's stage of prostate cancer so that effective treatment can be started. Another successful invention is the Soteria robot, a more efficient way to perform a biopsy for prostate cancer inside an MRI scanner. Other examples are Thirona which develops algorithms to analyze medical imaging and also, of course, ScreenPoint Medical which developed software to analyze mammography images. Recently this company has received further funding of € 2 million to market their first product. Other successful Radboudumc spin-offs are Khondrion, which develops medicines for diseases of the energy metabolism and Oncodrone which developed a substance that slows down the transformation of certain cancer cells into dangerously mobile metastatic cells. This year three spin-offs that are being set up, together requiring total start-up funding of 10 million euros. This includes the development of a synthetic biocompatible prosthesis for the kneecap, delaying surgery for complete artificial knee replacement for years. Another example is contrasting fluid for multi-modal imaging and a haemostatic biochip in collaboration with NXP. A new but very promising project is a way of reducing or even preventing muscular pain as a side-effect of cholesterol-lowering medicines (statins). In addition to setting up these spin-offs, Valorization is also committed to impacting healthcare by licensing out promising technologies to existing companies for further development. This is often coupled to a research collaboration between the company and the research departments involved such as the collaboration with ProQR Therapeutics B.V. in the area of hereditary eye disease and with Illumina Inc. in diagnosis of lung and brain cancer."

High-level collaboration

Government, businesses and knowledge institutes are working together towards economic development. At local level the Economic Council Nijmegen (ERN) is active and at regional level The Economic Board Arnhem Nijmegen started up this spring.

The ERN has recently acquired a new structure and focus as a result of the start of The Economic Board. ERN involves representatives from the municipalities in the Rijk van Nijmegen area, innovative SMEs and the knowledge institutes Radboud University, Radboudumc and HAN University of Applied Sciences. Its main goal is to create a platform where partners can share information and exchange knowledge to promote local economic innovation.
ERN is also a monitor of possible threats, but mainly of opportunities. Is Nijmegen an attractive business location, are certain key aspects lacking or are there opportunities for attracting businesses in a particular sector? Sometimes the municipality will have to take the initiative, sometimes there will be a role for varying combinations of organizations such as the Economic Collective Nijmegen, Novio Tech Campus, Mercator Technology & Science Park, Oost NV, HealthValley, the Province of Gelderland, knowledge institutes and businesses.

The Economic Board Arnhem Nijmegen

Likewise, the Economic Board also consists of representatives such as CEOs, chairs of Executive Boards, etc. from government, businesses and knowledge institutes. It stimulates economic development and promotion of the Arnhem-Nijmegen-Wageningen area, as well as crossovers between regional Top Sectors. ERN and the Economic Board are therefore complementary.

www.theeconomicboard.com

Mercator II building at Mercator Technology & Science Park

StartUp Nijmegen supports young entrepreneurs

30 starters at Startup Nijmegen

Startup Nijmegen, the incubator for business services, currently houses about 30 start-ups. Startup Nijmegen also offers a range of activities for all starters who want to enhance their business skills. Specialists provide support in accountancy, intellectual property, marketing etc. to entrepreneurs, most of them young. Startup Nijmegen is one of the cornerstones for a better Nijmegen start-up ecosystem. Other important factors are the development of an informal investor network, establishing a network of entrepreneurs who want to provide support as coaches, and implementing platforms where starting entrepreneurs can test en develop their products. The municipality of Nijmegen also wants a more prominent role as the 'launching customer'.

StartUp Nijmegen is located opposite Nijmegen Central Station

Patrick Kilkens (EPR) gives a speech as the first brick is laid for EPR's new headquarters on Novio Tech Campus

The Start-up and Acquisition Approach is a concrete description of the Economic Innovation Agenda 2020, Nijmegen's vision for the enhancement of the knowledge economy.

Research into Parkinson's disease

A good example of the cooperation between knowledge institutes and businesses is the recent agreement between Radboudumc, Radboud University, ParkinsonNet and the American company Verily, a sister company of Google. Together they want to spend two years researching the symptoms and progression of the disease in 650 patients with Parkinson's disease.

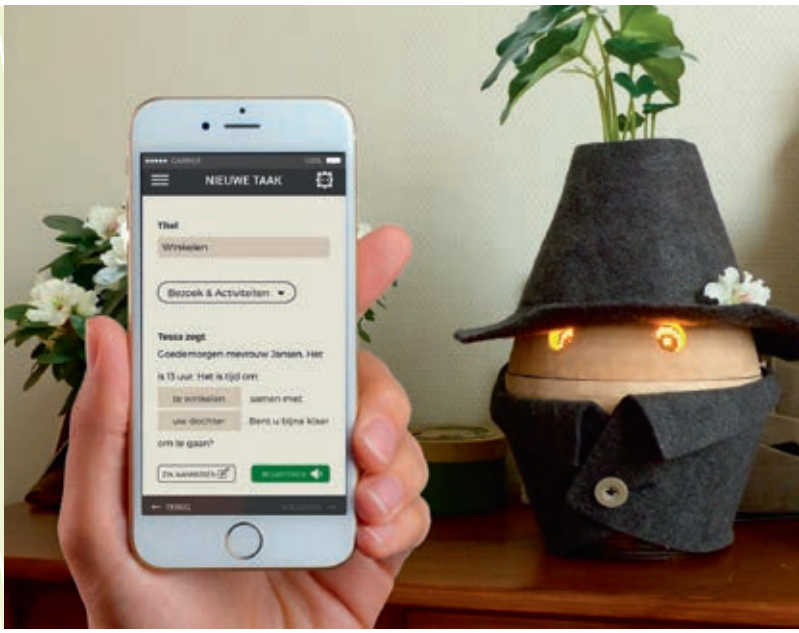
Impression of the EPR building

Semiconductor sector acquisition underway

The semiconductor industry in Nijmegen is changing rapidly. NXP only recently acquired the American Freescale, and will itself subsequently be taken over by Qualcomm. Ampleon and Nexperia are two recent spin-offs from NXP and will have their head offices in Nijmegen. Smaller businesses are now opting to join this cluster. EPR is building a new office on the Novio Tech Campus, for instance. It is a unique cluster of international semiconductor businesses with a large selection of research facilities and amenities and around 3,000 highly educated employees with specific skills.
The existing companies envisage opportunities on the campus for other companies such as suppliers. Incentive enough for the Novio Tech Campus, the Municipality of Nijmegen, the Business Cluster Semiconductors and Oost NV to begin with pro-active business acquisition. Using input from businesses already located on campus, a shortlist of national and international companies will be put together for the use of the acquisition teams. Cooperative acquisition has been entered into for a period of at least three years with a total budget available of €75,000.

Tinybots for people suffering from dementia

Graduates of the Rockstart programme, the start-up Tinybots, developed a robot that helps people suffering from dementia to remain at home as long as possible. The city of Nijmegen believes this is a promising innovation. Together with the Zorgalliantie (Care Alliance of Pleyade, Driestroom, Brabant Care, SWON, Municipality of Nijmegen, and HAN University of Applied Sciences), Tinybots has signed an agreement for a pilot test using 70 robots. This allows the business to implement any product improvements necessary for bringing the product to market. HAN is overseeing the pilot test and leading the research.



From idea to business!

Get off to a flying start with your own business

Gelderland Valorizes!

Innovation, stimulated by four knowledge institutes

starter vouchers
The launching pad for innovative start-ups

Starter vouchers worth €2,500 are available for setting up a new, innovative business for alumni, students and employees of HAN University of Applied Sciences, ArtEZ, Van Hall Larenstein and Radboud University. If spent wisely, the money does not have to be repaid. Have an innovative idea and want to set up a business? Talk first to your institution's contact person and if your plan has enough potential for growth, you can pitch it to the assessment committee.

starter loans
Three-tier booster for a flying start

Have you just set up as an entrepreneur in Gelderland with an innovative, scalable business plan? Are you looking for knowledge and support from one of the knowledge institutes below? And are you looking for funding for research, development, prototypes or market introduction? Apply for a **starter loan**! There are starter loans of €10,000, €25,000 and €50,000 that can be applied for in succession. Information on exact terms or how to apply from your institution's contact person.

starter training
Knowledge and coaching to fly even higher

Have you already received a starter voucher or starter loan? Then also apply for the **Startup Accelerator Gelderland**. This is an intensive programme where 12-18 young start-up entrepreneurs will be trained and coached on their business plan for 5 weeks. Plenary knowledge seminars by specialist teachers combined with specific assignments on business cases, supported by coaches. The study load is about 80 to 100 hours for research, meetings and writing your business plan. Starts early February 2017.

research & network
Know-how and know who!

There is a lot of knowledge available within the four knowledge institutes. Make use of this to take your innovation to the next level! Examples could be research done by lectureships, or a trainee or final year student working for your business. It is also possible to raise an issue at the **innovation bootcamp**.

Gelderland Valorizes has a network of specialists who give free advice on legal matters, intellectual property, funding and subsidies.

Gelderland Valorizes aims to strengthen the innovative capacities of the region. The programme is partly funded by the Province of Gelderland and the Ministry of Economic Affairs.

For more information, please go to www.gelderlandvaloriseert.nl and join the LinkedIn group 'Gelderland Valoriseert'.

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knowledge - funding - network

Successful Gelderland Valorizes projects

The incentive programmes KERN (Knowledge Exploitation Radboud Nijmegen) and Gelderland Valorizes are supporting dozens of starting knowledge-based enterprises with advice, networking and funding. If new plans for a combined fund come to fruition, innovative start-ups will be able to count on support for years to come. That is the intention of the partners involved who, as a result of their positive experiences, are working towards the continuation of this innovation policy.

"Gelderland Valorizes supports alumni, student staff and doctoral students starting a business, based in the four knowledge institutes in Gelderland: Radboud University, HAN University of Applied Sciences, Artez and Van Hall Larenstein," says Geert-Jan Sweers, programme manager of Gelderland Valorizes at the HAN. "As well as starters' vouchers worth €2,500 in the form of gifts, we offer start-up loans of up to €85,000, which can be added to other funding if needed. An important aspect of the support programme is 'Startup Accelerator Gelderland', a short intensive training for entrepreneurial skills using the knowledge institutes' own lecturers."

Drs. Geert-Jan Sweers, Programme Manager Gelderland Valorizes

Project examples

With the support of Gelderland Valorizes, several start-up enterprises were able to break through on the national and international market.

Slim Opgewekt (Smart Energy) is an energy project aimed at making schools sustainable, combining research, advice, equipment, implementation, management and education. Slim Opgewekt: "It is not just about putting up solar panels, we also want to trigger a process of awareness. In the development phase, advice from the PABO teaching college in Arnhem, part of the HAN, was a great help, and we worked closely together thanks to advice from Gelderland Valorizes." ***www.slimopgewekt.nl***

Slim Opgewekt has also been nominated for the 'Young Startup Award' at the 'Nederland Valoriseert' conference on 23 January 2017 in Enschede, in which Gelderland Valorizes is also participating.

One of Radboud University's successful projects is an innovation by GATT Technologies: the GATT-patch. These are 'mats' fitted with a synthetic polymer with blood-stemming properties for use during surgical procedures. "At Gelderland Valorizes they immediately saw the possibilities of our product," says Johan Bender of GATT Technologies. "We will soon be testing the GATT-Patch extensively on patients and we hope to have the product on the market by the end of 2017." ***www.gatt-tech.com***

A strong start-up that has become an international success with the support of Gelderland Valorizes is Novolanguage, which works on interactive and personalized language training and training in speaking skills. According to CEO Martijn Enter, "Novolanguage greatly benefited from the support of Gelderland Valorizes. We recently opened a sales & operations office in Singapore as our base for charting the South-East Asian market in more detail." ***www.novolanguage.com***

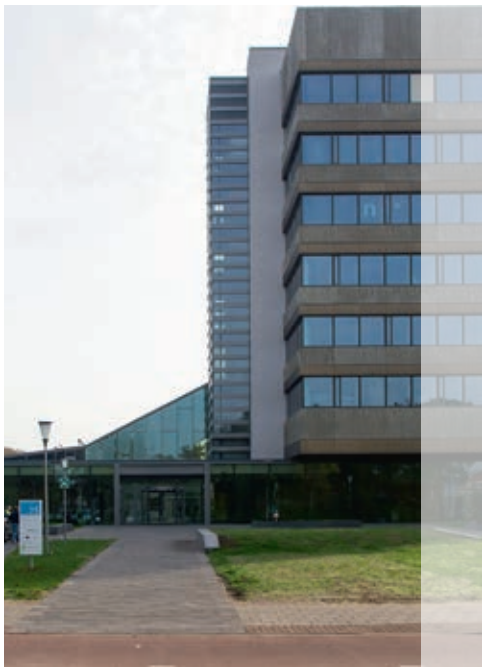
Gelderland Valorizes also granted a loan to the Nijmegen ICT business ReSnap, which develops photo album software that can be operated from various social media platforms and is therefore also entering the international market. "Gelderland Valorizes network was very useful and their name also works as a stamp of quality so it is easier to get funding elsewhere," comments co-founder Thomas Beguin. ***www.resnap.nl***

Hein van der Pasch, Radboud Innovation adviser and Director of Mercator Incubator, one of Gelderland Valorizes' partners tells us, "Scientific knowledge and the stimulation of entrepreneurial skills prove to result in wonderful innovations and valorization results. We would like to invite innovative starters with business ambitions to come to the next Startup Accelerator, starting in February 2017. For more information see ***www.gelderlandvaloriseert.nl***

Rob Wieggers from Slim Opgewekt (photo Hans Peter van Velthoven)

Johan Bender from GATT Technology (photo Hans Peter van Velthoven)

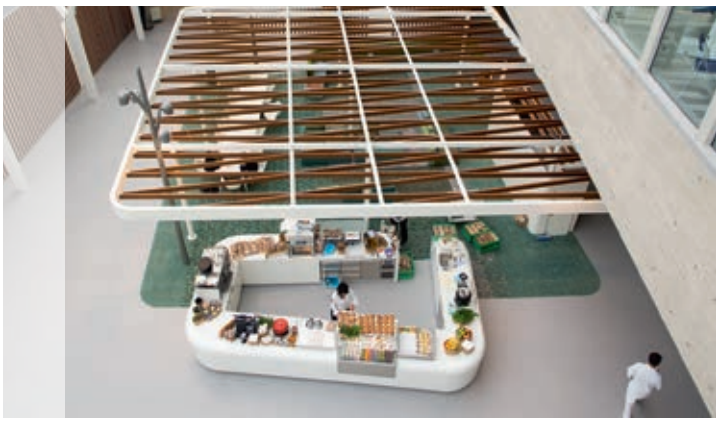
The building has been given a new facade in the interests of climate improvement, visual appeal and sustainability (triple glazing)

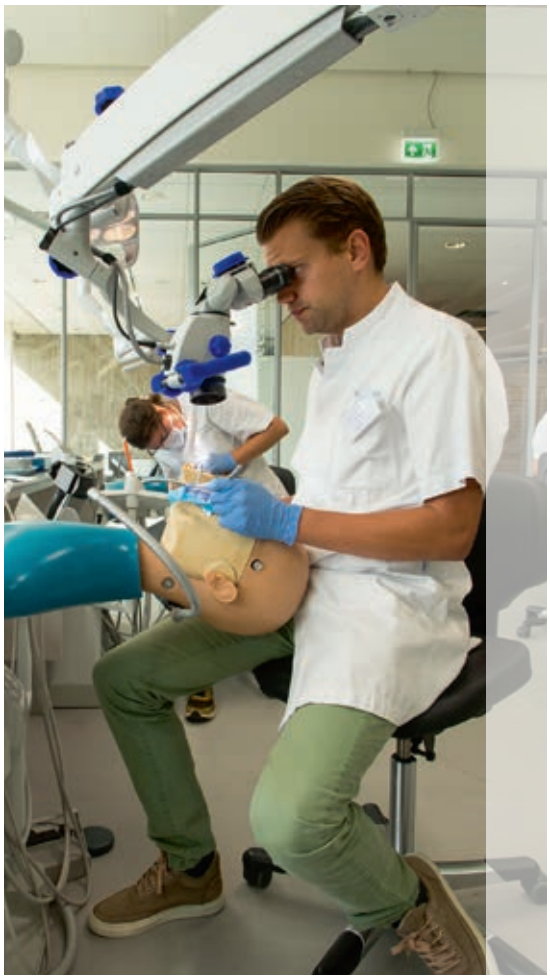


Renovation of the dentistry building

In 2014 the Executive Board of Radboud University and the Board of Directors of Radboudumc endorsed the Dentistry Renovation project. This renovation was begun in 2015. The build was planned in two phases so that one part of the building could remain in use for the Dentistry Department throughout. The first phase involved the ground floor, the first and second floors and the complete replacement of the facade. During the second phase the fourth, fifth and sixth floors will be tackled. On Saturday 19 November the first stage was finished and the Dentistry building opened its doors to interested visitors. With new facades, a new central atrium, well-thought-out routing and new equipment, a perfect combination of energy saving, increased comfort, flexible usage and modern appeal has been created. The new building measures 22,500 square metres and the total cost of investment amounts to about 48 million euro. This means that the renovation of the dentistry building is the largest project currently under construction for the University Real Estate Company (UVB).

Featuring a lot of glass with a high degree of heat and light reflectivity, including daylight-dependent lighting for treatment rooms on the south side





Total renovation of the interior with the most modern treatment equipment

New developments

Within the departments of Dentistry (Radboudumc/Nijmegen Radboud University), Oral Hygiene (HAN University of Applied Sciences) and JTV Oral Hygiene for Kids, units dealing with education, research and patient care have been combined. The building complex had aged considerably and was no longer up to current standards so it was decided to renovate it. The renovation of Dentistry yields important improvements for education and research, healthcare and common areas. The first impression one gets is the amount of light as well as the clear routing for visitors after entering past the reception desks at the entrance.

Nooteboom: the importance of patents is clear

The Super Wing Carrier for the transport of gigantic 65-metre wind turbine blades.

Nooteboom Trailers B.V., located in Wijchen (NL), is a leading international company in the niche market of abnormal transport. The company designs and builds trailers that are mostly client-specific with a load capacity between 20 and 200 tonnes. The business was founded in 1881, differentiates itself by ground-breaking innovations and has various patents to its name. We talked with Toon de Smit, Services & Operations Director, Gerrit Kooij, Manager of Engineering and Erik Bartelds, patent attorney at Arnold + Siedsma, about innovation policy and patent strategy.

Patent law

"We primarily target specific market sectors," begins Toon de Smit, "such as the transport of construction equipment, crane-loaded freight such as machinery and large beams, transport of wind turbine tower sections, rotor blades and turbines, as well as crane and ballast transportation. Nooteboom has an annual revenue of ca. 100 million euros and operates in 100 countries worldwide, with a focus on Europe. As well as its own offices in the Netherlands, the UK, Spain and Romania, Nooteboom has representatives in Belgium, Germany, France, Poland, Austria and Switzerland. In other countries we work with distributors. About 400 people work for us, divided between several operating companies: Nooteboom Trailers where development, manufacture and sales take place; Nooteboom Trailer Service for maintenance, overhaul and parts; Nooteboom Global Trailer Centre where we buy and sell all makes of used trucks and trailers specifically designed for special transport."

Nooteboom's innovation philosophy

Nooteboom has an international name as a real innovator in trailer manufacture. What are the focal points in their innovation policy? "Innovations have to matter and they have to have some advantage for the customer. No innovation for innovation's sake. The framework and criteria for our innovation policy are clear: the quality of construction of our products comes first. Our predecessors used to use one-liners like "you have to be able to throw a Nooteboom trailer from the top of the highest tower in the Netherlands." Ease of use is another vital claim: no matter the circumstances, easy and trouble-free operation, loading and unloading of our trailers must always be possible. Sustainability is also essential: our trailers must remain in trouble-free operation for years and be as easy to maintain as possible. In years gone corrosion may have been acceptable for this kind of intensively-used transport equipment, but our clients no longer find it acceptable, even for the smallest parts. So we have made big strides when it comes to surface treatment and metal preservation. All in all our trailers offer the best value for money due to the low total cost of ownership."

Protracted 10-year lawsuit

Gerrit Kooij is responsible for all engineering at Nooteboom, from product development to the approval of the vehicles. Nooteboom can depend on a number of innovations that can be considered ground-breaking in the sector, varying from the very ingeniously recessed Nooteboom tie down rings, a patented system for the user-friendly securing of loads, to the unique Mega Windmill Transporter that can transport large sections of wind turbine towers. It is clear how important it is to protect these inventions properly because, even in the trailer sector, copycat behaviour is not uncommon. Patents are a good method for protecting Intellectual Property. Patents and Trademarks bureau Arnold + Siedsma has been involved for dozens of years with all of Nooteboom's patent applications and trademark registrations. Recently a protracted 10-year legal battle was concluded success-

fully with Nooteboom winning an important European patent case concerning the Pendle-X Eurotrailer low-loader with deep excavator trough.

As Erik Bartelds explains, "We have been involved in this case since 2004. Central to the invention is the combined pendle axle and deep excavator trough, a trough that allows the boom of an excavator to be lowered into a trough in the load floor. Trailers with an excavator trough already existed, but they had a beam axle and trailers with independent suspension systems simply did not offer enough room for the excavator trough. Nooteboom came up with a clever solution to create that space and in 2005 we applied for a European patent. After six months, our competitors had already managed to copy our invention, after which we wrote to complain. They then attempted to thwart the patent application in every possible way and put forward objections. When the European patent was granted, it was opposed. The Board of Appeal of the European Patent Office eventually ruled that the combination of swing axle and excavator trough was indeed unique. Nooteboom is now the only manufacturer allowed to produce and market this product. The patent will be in force until 2025. Nooteboom is now considering how to use the European patent. They could continue litigation and claim royalties for the past ten years and/or they could enter into licensing agreements with fellow trailer manufacturers."

Innovation awards

Another recent innovation that has been granted a Dutch patent is the Manoovr, an easily-manoeuvrable semi low loader with an exceptionally low loading floor and pendle axles. Nooteboom received no fewer than three innovation awards for the Manoovr: the Special Vehicle Innovation Award 2015 (RAI), the Heavies Award in the UK (2016) and the most prestigious award in the European special transport and crane sector, the ESTA Award of Excellence. Another local company, CCC Projects & Engineering from Malden (NL) was also involved in the engineering. Gerrit Kooij describes the invention: "The Manoovr has special pendle axle technology. Normally the wheel suspension is characterized by a turntable or construction with bearings adding around 8-10 cm in height. Even though it was thought by everyone to be impossible, we found a solution for lowering the structure and with it the loading floor by 8-10 cm. The lower the loading floor, the more room for driving the load underneath bridges and viaducts. Other parties opted for independent suspension systems, but that results in more wear to the tires and higher maintenance costs. The Manoovr is also available with an excavator trough, retaining all its characteristic advantages such as the low loading floor and manoeuvrability. In our engineering we have a strong focus on customization and work closely with customers and other external partners or knowledge institutes such as HAN University for Applied Sciences."

The company slogan 'Nooteboom gets you there' highlights the focus on customization, i.e. a Nooteboom solution to every transport problem

Erik Bartelds continues, "We were also involved with the development of the Manoovr right from the start. Firstly we researched existing solutions and the extent to which the lowered pendle axle was new, then we applied for a Dutch patent. After 18 months a patent is granted and from then on you have the means to keep the competition at bay. In the end we also registered for a European patent, because Europe is Nooteboom's main market. The European Patent Office handles the application centrally and carries out a novelty search. Next comes the content-related evaluation of the distinguishing features of the invention. That European patent application is currently ongoing. Besides advice on patent law, we are also involved with the registration and protection of trademarks for various Nooteboom products."

"There is a limited number of manufacturers in our niche market," concludes Toon de Smit. "Up until now they have mostly operated on the principle of 'every man for himself', but one can't help wondering if it might not be better to collaborate to speed up innovation. The patent case we won recently could perhaps serve as a case study for researching the possibilities of licences. By doing do, we would be setting a trend towards finding ways to cooperate so that our customers can also gain the maximum profit from our innovations. Technological developments mean the speed of innovation is continually increasing. Conversely, the time left to 'enjoy' your innovative lead is getting proportionately shorter. This puts our engineering department under extra pressure and hence we also have to intensify our R&D programme. Innovation is in our DNA and we have ambitions of expansion. Cooperation can only improve the innovation climate in our market."

From left to right: Erik Bartelds (Arnold + Siedsma), Director Toon de Smit and Engineering Manager Gerrit Kooij (Nooteboom)

The EYnovation programme helps entrepreneurs in the start-up phase of their company in taking the right decisions, enabling them to grow rapidly and responsibly to market leadership, without losing their own identity. We spoke to several consultants from Gelderland's EYnovation team.

EYnovation helps innovative start-ups and scale-ups

PRESENTATION

EYnovation supports start-ups and scale-ups with a made-to-measure range of services relating to Accountancy, Tax, Legal and Finance. It is specifically not just aimed at keeping the administration or setting up a legal structure, but at supporting entrepreneurs in achieving their ambitions for growth. Hence EYnovation provides these entrepreneurs with easy access to relevant experience, for example, via a hotline for day-to-day questions. For start-ups and scale-ups EYnovation can provide opt-in subscription packages with attractive fixed prices per element, thus preventing unwelcome surprises. By making the international EY network accessible to start-ups and scale-ups with a one-stop helpdesk point, EY provides unique added value in the region. Niels van den Broek is Senior Managing Director of EY and responsible for EYnovation developments in Gelderland. "On a daily basis nationwide, around fifty colleagues provide tax and legal advice, financial expertise and company valuation, with a team of 8 consultants in total in the Gelderland region. The initiative for EYnovation arose some years ago around Eindhoven TU (Technical University) with the Start-up Bootcamp HighTech XL. There the programme was set up successfully and subsequently rolled out to other regions. EYnovation is involved in many programmes as a cofounder or partner. Recently the Gelderland EYnovation team also closed a contract with the HAN University of Applied Sciences."

Collaboration with HAN

Tax consultant Gert Tolboom maintains EYnovation's contacts with start-ups and scale-ups in Gelderland. "At HAN we have signed a collaboration contract with the Centre for Valorization and Entrepreneurship (CvVO) for the guidance of student entrepreneurs as part of the HAN Young in Business programme. This allows us to have an input at an early stage in developing entrepreneurship. We are going to guide some ten students who are required to bring a product to market during their study programme. Training in entrepreneurial skills is something else that we bring to the HAN project. In addition to this, we let successful start-ups from our network give a pitch, so that students can learn from their experiences and start-up problems. At the same time we support student entrepreneurs with all sorts of knowledge and we may be able to bring them into contact with interesting companies. It would be nice for us if there could be a new Uber or Airbnb among them! At that point you have created a successful win-win situation. We like working with young, enthusiastic entrepreneurs and that is why we also have a team of young consultants who speak the same language.

Tax consultant Noery Wauben is also part of the EYnovation team advising start-ups. "EYnovation is a made-to-measure programme that offers the services to start-ups that are relevant to their growth plans and fit their own business strategy. Because it is important to a starting entrepreneur not to be confronted with unexpected costs, we use a form of subscription with a fixed price. The subscription comprises some standard services, such as access to the EY network and an annual strategic session on a subject decided by the entrepreneur. In addition, the entrepreneur can use the 'day-to-day question' element in which we answer relatively simple questions free of charge. Furthermore, the subscription can entail services such as drawing up the annual financial statement or filling in a corporate tax return, payroll administration and similar matters. EYnovation provides access to a helpdesk that can answer many of the questions that may arise, not just

Gelderland's EYnovation Team

those concerning fiscal or accountancy-related questions, but also questions about IP rights, strategic questions, how potential funders or investors view a certain business structure and what criteria they might apply, etc. For additional services and specific non-standard advisory activities, we give a clear indication of price in advance so that people can take that into account."

Ambitions of growth

EYnovation is involved in multiple platforms in the Gelderland region and as such is also keeping in touch with Novio Tech Campus. "For a number of companies at the Novio Tech Campus, doing business internationally plays an important role in achieving their own ambitions of growth and we are able to form good contacts with our international network," says Niels van den Broek. "Together we are also exploring other ways we can provide added value to the Novio Tech Campus such as drop-in-hours or thematic sessions."

"EYnovation is not merely focused on other innovative companies; EY is itself an exceptionally innovative company so our other connections also benefit from refreshingly new ideas. How does a start-up view an existing business model from its specific angle? Where will the opportunities for growth lie in the future? Achieving ambitions for growth is an important common denominator. It is with good reason that we offer our business contacts the interactive experience of our EY Growth Navigator to discover why leading businesses worldwide successfully continue to achieve their ambitions of growth. This enables people to come up with a practical plan of action to follow up on their own ambitions of growth.

Our strategy is 'lean and mean'

Any interested start-ups can apply, or the EYnovation consultants can contact them proactively. Noery Wauben says that "The programme has met with success because it offers practical solutions to questions that entrepreneurs often struggle with. Time and time again we are surprised how much time and energy start-ups and scale-ups waste when getting their companies organized. We sometimes discover company structures that successfully-growing companies and large firms would never have opted for. Our strategy is 'lean and mean'; we advise a sturdy structure that allows freedom and remains flexible. Building a firm structure can be done in one afternoon. Pulling apart a bad structure causes a major waste of time, unnecessary costs and negative energy. Start-ups want to attract financing, but are often unaware of the way a financer or investor will look at their plans. We can help start-ups with this aspect too. Sometimes start-ups that are involved in a collaboration at an early stage may have given away too many of their shares or agreed upon restrictive conditions. It is useful to discuss these kind of matters beforehand with an expert in order to avoid any future difficulties."

Niels van den Broek concludes, "EY is certainly not only aimed at companies listed on the stock exchange. SME and family firms form the core of our business. We have many SME clients and we like to use them to support the growth of young entrepreneurs. Our service is made-to-measure and combines all the necessary ingredients for a successful start. EYnovation supports start-ups on their way to market leadership."

More information

www.ey.nl/eynovation

To make an appointment call:

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Director Jan-Pieter Brandwijk next to the ninth machine, the AB Graphics 530.

Herald increases market share in medical sector by acquisition of LabelMed

Herald Labels & Tags has recently acquired the medical label manufacturer LabelMed. Herald is a daughter company of Geostick in Uithoorn (NL) and specializes in the manufacturing of self-adhesive and non self-adhesive labels for a wide range of applications. LabelMed's activities and expertise will be integrated into Herald and customer contacts will be continued in the same service-oriented way. For the past few years, LabelMed has developed into a leading supplier of medical labels for health care and the pharmaceutical market.

Presentation

"We supply a complete range of products for various branches and sectors. For Herald, the acquisition of LabelMed is a big step, because it allows us to greatly expand our market share in the medical sector," says location manager Jan-Pieter Brandwijk. "This acquisition does require a substantial expansion by about 25% of our manufacturing capacity. To achieve this additional production, we are replacing part of our daytime working hours for shift work. We supply practically all the hospitals in the Netherlands, including the Nijmegen hospitals Radboudumc and CWZ. Our product range encompasses the entire medical chain, from simple labels for logistical use to specialized labels for high-end laboratories. The medical sector sets high standards for quality and our labels often have to withstand extreme conditions. To meet customer demands for high quality, we manufacture according to ISO/GMP standards. Besides a number of standard products, we also produce tailor-made products for various customers."

Autoclave labels

He continues: "The customer tells us what the labels will be used for, in which conditions and we look for the most suitable materials, glue and manufacturing process. One example is autoclave labels, labels that are used during the sterilization of medical instruments and glasswork in steam autoclaves. These labels not only demand materials, glue and printing that can withstand temperatures up to 150 degrees Celsius, but they are also provided with a special layer of ink that changes colour when the right sterilization temperature has been reached. This is a control tool to make sure the sterilization process has been successful and the equipment is ready to be used again. Our autoclave labels are of the so-called piggy-back type, meaning one label on top of another label with a double backing. The base label featuring pre-cut follow-up labels can be applied to autoclave baskets containing instruments to be sterilized, for instance. After the sterilization process the instruments are given a follow-up label removed from the base label so that each separate instrument is labelled to indicate which completed sterilization series it was part of."

"Labels for freezing or cooling of materials such as blood plasma bags have to be cold- or frostproof, but they also have to be able to withstand the temperature changes of the defrosting process. These labels are often made of plastic to prevent the migration of bacteria or the formation of moulds. The glue and coating play a particularly important role, because the printing and information has to stay visible for years under extreme storage conditions. For laboratories and research centres we supply labels for test tubes and other glasswork that require good adhesion and need to be solvent-proof yet washable. These labels can be given a special acid- or moisture resistant coating or dust-free backing to prevent the migration of bacteria. The labels ensure a safe identification of patients and specimens."

"We supply labels that have a unique sequential numbering and bar-coding," continues Jan-Pieter Brandwijk. "Our quality checks are extremely strict. Each individual barcode is scanned separately and if one number in the sequence is missing, the entire roll is rejected. Dimensions also have to be very precise. For one of our clients in the medical sector, for instance, we make a label in A5 size which is divided into dozens of smaller labels. The punch lines and dimensions of each sheet are checked on a light box before it is dispatched to the customer. We also supply packaging labels used for the transport of waste from operating rooms, for syringes, cytostatic waste, leftover drugs, disposable items, etc. These labels have to contain specific standard coding, with separate classification codes for each type of waste."

We have a lot of expertise in the field of unusual and more complex commissions.

Autoclave labels with a special layer of ink that changes colour when the right sterilization temperature has been reached.

Consistent quality

Especially for use in incubators, climate simulation cabinets and temperature test cabinets Herald produces labels that can withstand high temperatures and extreme climatic conditions. "The material, the glue and the printing sometimes have to be able to withstand temperatures of up to 400 degrees Celsius, hence the labels have a ceramic layer. At the other extreme is the cryo-label that has to remain intact in liquid nitrogen at extremely low temperatures. Each application brings with it specific requirements for materials, glue and printing. We have years of expertise in this field and that makes us a reliable partner who delivers consistent quality," explains Jan Pieter Brandwijk.

For pharmacies Herald supplies labels that can be given a unique barcode if necessary and that can include the instructions for use. "On request, we can give these labels all kinds of extra options such as Braille or a tactile warning label. As I mentioned before, we supply hospitals and pharmaceutical companies with a complete range of labels for all applications and circumstances. For the customer this means that they can do business with one partner, in other words giving them the option of one-stop shopping. This improves efficiency and speed, but also allows us to offer a good price thanks to the combined order volume."

Inexpensive production runs

"We expanded our warehouse with a special cold-storage room for storing materials for medical labels that have to be stored at temperatures between +15 to +18 degrees and at the precisely correct humidity due to the critical demands of their intended use. We can also store supplies for our customers and deliver on demand. Apart from an increase in manpower we have also invested in a new machine: the AB Graphics 530. The ABG 530 is our ninth machine! It involved a considerable investment, but not only have we achieved a substantial increase in our capacity by installing this high-tech machine, we have also made a leap in quality and efficiency. The machine is perfect for large inexpensive production runs and specialized applications due to its production width, fine-tuning, flexibility and speed. We have a great deal of expertise in the field of unusual and more complex commissions, so more and more businesses, especially those in the niche markets, find their way to us," concludes Jan-Pieter Brandwijk.

www.herald.nl

‘PNO Open’ on Novio Tech Campus

Ir. Lian van Amerongen, Senior Consultant for Life Science & Healthcare / PNO Consultants and Drs. Henk Gerards, Team Leader for High Tech Systems & Materials / PNO Consultants

PNO Consultants has started a monthly Open Consultation Hour on the Novio Tech Campus in Nijmegen. Do you want to bounce ideas off someone else about your business plan? Do you have a question about subsidies for your planned investments or are you looking for opportunities for collaboration in Europe? Then come and visit PNO Open!

With 275 consultants from 6 European countries, PNO Consultants has being offering financing solutions for innovation, research and investment for an international range of clients since 1976. During PNO Open, sector specialists Henk Gerards (High Tech Systems & Materials) and Lian van Amerongen (Life Sciences & Health) are available for questions and advice on the funding of your innovation plans. PNO Open, every first Tuesday of the month from 9.00 to 12.30 in Building M, room 0.27.

Henk Gerards:

“As well as extensive knowledge on funding and (EU) subsidy programmes, PNO Consultants has expert teams for specific sectors (Chemistry, Energy & Water, Life Sciences & Health, Transport and High Tech). With our national and international and specialist network we can help you find the right partners and assist in the development of your innovations and projects.”

Lian van Amerongen:

“The Life Sciences & Health sector is complex and diverse, so that proper cooperation and funding are crucial factors for success. We aim to help organizations in this sector to take their innovations to the next level by helping to arrange that cooperation or funding.”

More information:

www.pnoconsultants.nl
Or send an email to:
henk.gerards@pnoconsultants.com / lian.vanamerongen@pnoconsultants.com

Sencio's cleanroom

Packaging RF innovation

RF innovation is going through a major renaissance - from advances in low power radios and radar sensors to powering lights and induction cookers. Much of this innovation is happening in the Netherlands and specifically right here in Nijmegen. This was clearly on show at the recent Dutch RF Conference held at the Novio Tech Campus, where Oliver Maiwald from Sencio talked about some of the considerations that need to be taken into account when looking at System-in-Package options for RF applications.

RF has lead the way in multichip modules

Among the most complex of all electronic devices, RF modules have for some time integrated analog, digital and RF components into a single multichip module (MCM). This often brings numerous benefits in terms of size and performance. However, it can also incur additional challenges for package design and assembly. Many of these issues can be more easily addressed when packaging is part of the initial design decisions.
Aspects from PCB density, integration, performance, thermal and stress considerations as well as system cost and time to market are key decision points which need to be evaluated carefully before starting any development.
One way to address these challenges is using multichip package variants using over-molded plastic package options. By drawing on our experience of using MCM molding for a range of automotive qualified applications and our QFN map molding technology, Sencio has developed proven high quality solutions for RF power packages.

Pushing the boundaries of plastic packaging

A key technology driver in RF over recent years has been the move from ceramic to plastic packaging to effectively reduce system costs. Even applications where quality and reliability are the prime design considerations are looking to switch. This has led to the Horizon 2020 concept project PAMPA (Plastic Components for Advanced Microwave Equipment of Next Generation SatCom Payloads).
As part of the PAMPA team, Sencio have been helping develop a complete supply chain for the assembly of RF devices using QFN-packages for aerospace satellite applications. Thermal resistance of the QFN-package is one of the challenges. This has meant the team has had to evaluate different die attach adhesives and highly filled Ag-sintering glues. Demonstrator devices are currently being tested and benchmarked against existing commercially available plastic encapsulated microwave components.

*n*Capsulate innovation

However it is not just standard plastic packages that Sencio is investigating for RF applications. Along with partners from the Novio Tech Campus, we are also looking at how our *n*Capsulate freeform plastic encapsulation technology can extend System-in-Package thinking to cover the complete system. From simply adding horns or lenses to a standard package for improved beam forming to complete encapsulation of systems.
In today's applications where the density of electronic parts is continuously rising due to the increased appetite for new functionality, this provides an opportunity to reduce overall cost while enhancing performance especially in RF applications.
More information: www.sencio.nl

Sencio's management: COO John Pleumeekers (left) is responsible for the entire manufacturing process and CEO Oliver Maiwald is responsible for marketing, sales and development.

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