BELGIUM MADE DIFFERENT
INDUSTRY 4.0

Belgian
Foreign Trade Agency

MADE DIFFERENT

ENABLING FACTORIES OF THE FUTURE

The Belgian transformation program created by Agoria & Sirris - www.agoria.be - www.sirris.be

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PRESENTATION
OF THE SECTOR

SECTION 1

INDUSTRY 4.0

1.1 Concept and definition

The German Engineering Federation was the first to coin the term "Industry 4.0" at the Hannover Fair (Industrial Technology Fair) in 2011. Several countries such as the United States, Japan and South Korea swiftly followed suit. The term "Smart Manufacturing" or other expressions such as "Smart Factory", "Intelligent Manufacturing", "Advanced Manufacturing", "Integrated Industry" and "Smart Industry" are also in use.

Industry 4.0 is the next step in decades of technological evolution. Earlier technological leaps were the introduction of the steam engine during the 19th century, mass production, assembly lines and electricity in the 20th century and finally the era of computers, robotization and industrial automation of production starting in the 1970s.

This "fourth industrial revolution" has the potential to completely transform the economic landscape. In a fully applied Industry 4.0 environment, production will no longer be based on economies of scale but on flexibility and the geographical proximity to demand. Businesses will be working in a context of mass customisation, in which the product and production processes need to factor in flexibility and personalisation. The new industrial system will be better at making predictions and self-correcting, so it entails less trial-and-error testing.

Moreover, digitalisation entails automated decision-making and faster operations, as well as robot assistance, shorter production processes via shorter supply chains, optimised vertical integration using smart sensors in manufacturing execution systems and even real-time production, in addition to horizontal optimisation of value chains by using product tracking to reduce logistical timeframes and improve inventory controls.

A survey by the Boston Consulting Group published in 2016 projected that, by 2020, big data, advanced robotics, the Internet of Things and AR/VR will be the highest-valued products on the global market. In this picture, the Internet of Things will be by far the most predominant feature, with a value of more than 1,900 billion EUR.

In chapter two of this publication special focus will be on five niches within the Industry 4.0 in which Belgian companies have a clear comparative advantage:

- Additive manufacturing
- Augmented and virtual reality
- Artificial intelligence
- Data capturing and processing
- Smart solutions and robotics

Effects of Industry 4.0 on selected indicators for an automotive supplier (in %)
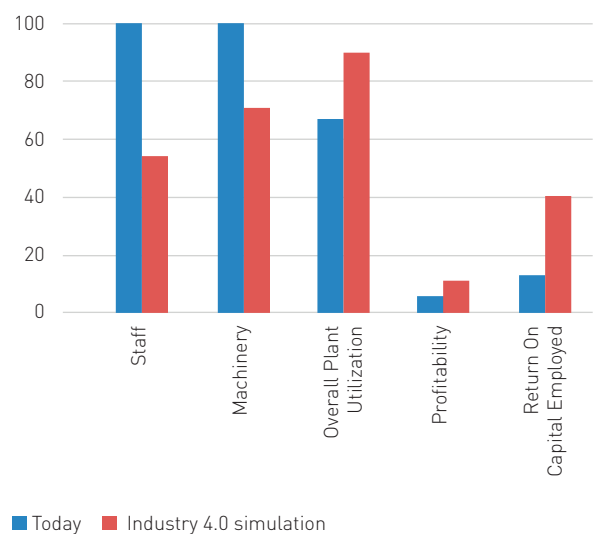
Source: Roland Berger: The Industry 4.0 Transition Quantified

1.2 The gains

Even more so than increasing revenue, Industry 4.0 will enable companies to cut costs. In a simulation made by the consultant Roland Berger for a typical automotive company undergoing transition to Industry 4.0, the return on capital employed increases by 25 percentage points. To reach the same output, fewer staff and less machinery would be needed, while the remainder becomes more efficient. As a result, profitability would more than double.

Other studies had the same outcome.

A survey among American business by Boston Consulting Group found that 89% view Industry 4.0 as an opportunity to improve productivity. The companies could picture themselves increasing value by cutting down on industrial costs (47%) and improving product quality (43%), rather than improving revenue (28%).

The consultant PwC surveyed over 2,000 companies for its study "Industry 4.0: Building the digital enterprise". When implementing Industry 4.0 principles, these companies expect a bonus annual digital revenue increase of 2,9%. But foremost, they expect cost reductions of 3.6% per year and think efficiency will increase by 4.1% every year.

1.3 Investment

No less than 907 billion USD worth of annual investments in Industry 4.0 are projected by the industrial sector according to research by PwC. These investments affect every industrial sector, from aerospace to chemicals and manufacturing.

Most investments will be in digital technology such as sensors and connected objects. Investment is also required in in-house structures since, according to PwC, recruiting qualified staff is one of the major challenges Industry 4.0 is facing.

Expected investment in Industry 4.0, 2016 - 2020 (in % of annual revenue and bn USD)
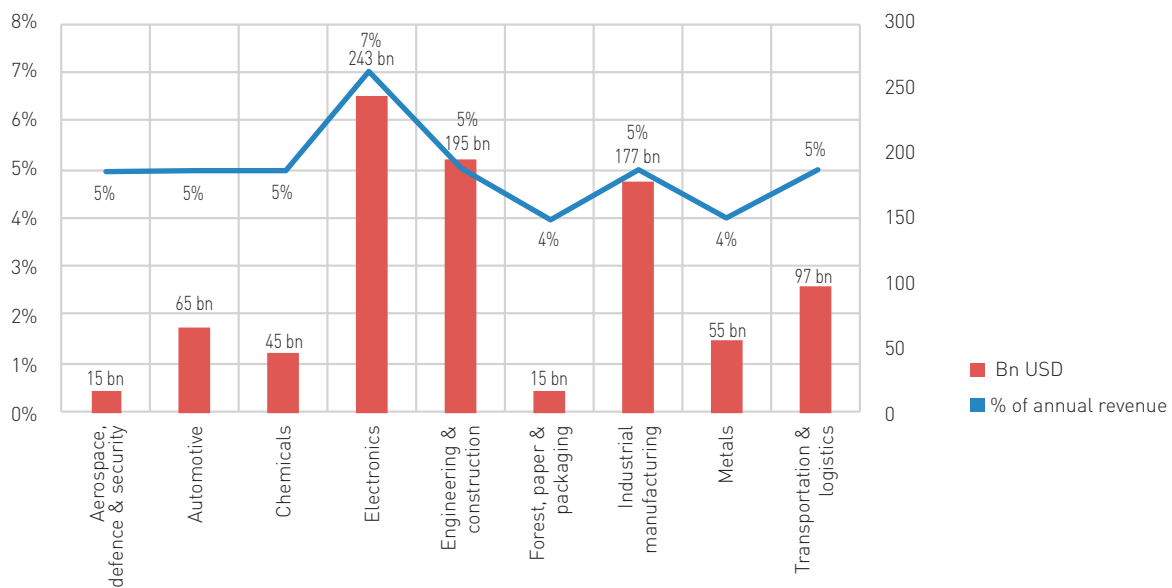
Source : PwC : Industry 4.0: Building the digital enterprise

SECTION 2

INDUSTRY 4.0 IN BELGIUM

2.1 A strong and growing industry...

It is important to note that Belgium has a strong industrial heritage and a history of being an early adopter. Belgium was second only to the UK in introducing the steam engine and thus start the industrial revolution. Belgium became the second most important industrial country in the world.

A) Strong momentum

Manufacturing remained of essential importance but lost momentum in the 1970s. Belgium could not escape the trend of globalization and the switch to a service industry. In the last decades, added value of the manufacturing industry to the Belgian GDP continued to slip.

However, 2017 was the strongest year since 2010 as far as manufacturing added value is concerned.

According to the latest OECD data, Belgium's manufacturing is still picking up with rising production. As a result, Belgium is one of the strongest growers of industrial manufacturing output when compared to the EU-28 and G20.

With 2017 as a benchmark, Belgium is only outperformed by Turkey, Indonesia and India. By contrast, none of the developed countries, including Germany, France, the United Kingdom and the United States, nor the EU-28 as a whole saw an increase in manufacturing output as high as Belgium.

Added value of the manufacturing industry to the Belgian GDP, 1995 – 2017 (in %)
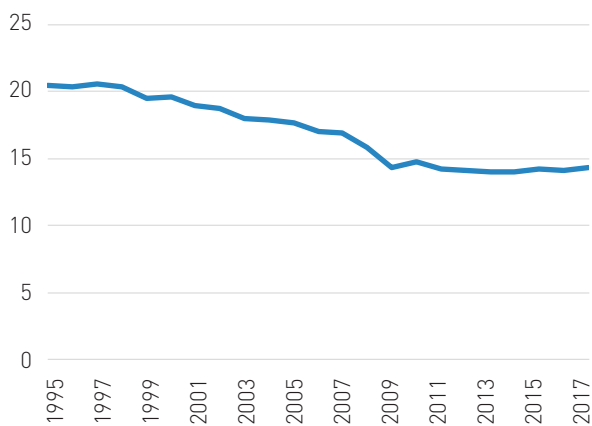
Source : OECD

Evolution of Belgian industrial manufacturing production, 2015 – Q3 of 2018 (compared to 2015 = 100)
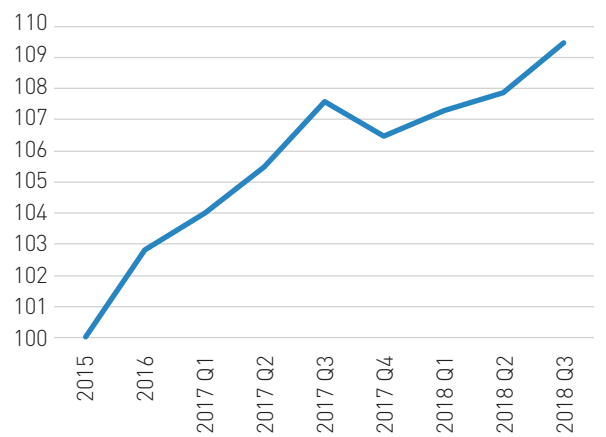
Source: OECD

Size of the industrial manufacturing production in selected countries in 2017 (compared to 2015 = 100)
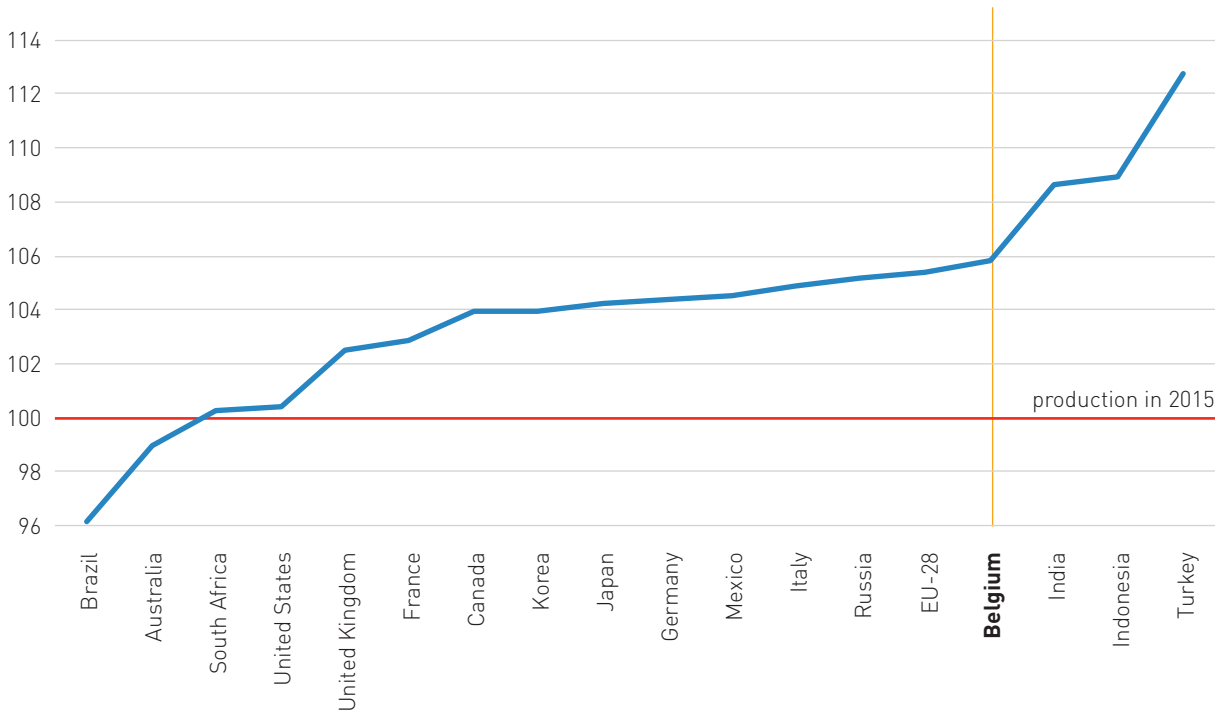
Source: OECD

B) Focus on high-technology manufacturing

One of the reasons for this resurrection is the switch of Belgian manufacturing towards Industry 4.0. An analysis made by the Belgian Science Policy Office based on Eurostat figures shows that the high-technology manufacturing sector in Belgium is a frontrunner in Europe. In 2016, 2.16% of the total added value in Belgium derived from this type of manufacturing, while the EU-28 average is almost 30% lower. The % share in Belgium is almost twice that of neighbouring countries such as the Netherlands and France.

These strong results in high-technology manufacturing would not have been possible without the input of valuable human capital. According to the European Innovation Scoreboard 2018, the employment share of Belgium in manufacturing is 12.7%. This is below the EU average of 15.5%. But the gap is much smaller when looking specifically at the employment in the high-technology manufacturing sector.

Value added by the high-technology manufacturing sector, 2012 – 2017 (% of total value added)
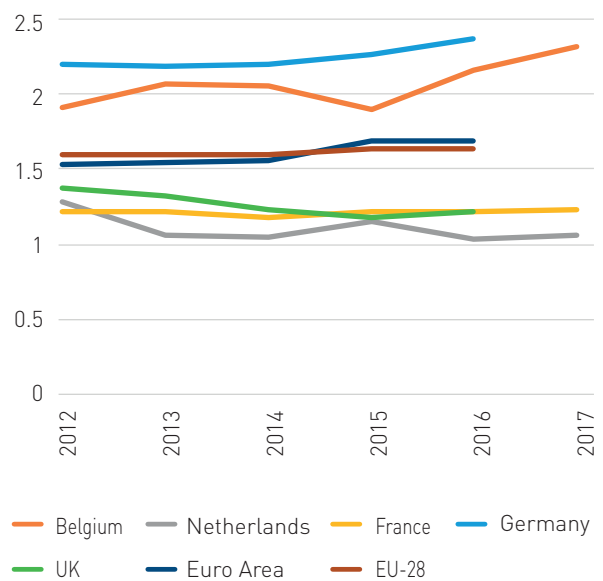
Source: Belgian Science Policy Office

Employment in high-technology manufacturing sector, 2012 – 2017 (% of total employment)
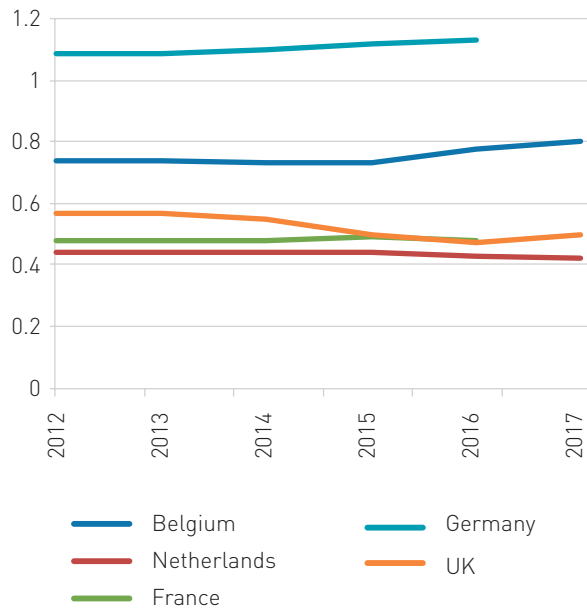
Source: Belgian Science Policy Office

About 0.8% of total employment in Belgium in 2017 was situated in high-technology manufacturing. This is comparable to the EU average (0.74% in 2015) but well ahead of most neighbouring countries except for Germany.

C) High productivity

As important as the number of persons employed in manufacturing is their output. The Belgian workforce is internationally renowned for being among the most productive in the world.

Based on data provided by Eurostat, GDP in purchasing power standard (PPS) per hour worked is among the highest in the world. In Europe, Belgium comes in 4th, behind Ireland, Luxembourg and Norway.

Moreover, according to "Growth and Productivity in Belgium", an analysis made by the Federal Planning Bureau based on Eurostat data between 2000 and 2015, Belgium had the highest growth rate of labour productivity in manufacturing when compared to its neighbours Germany, France and the Netherlands.

From 2000 up to 2007, Belgian manufacturing reached the highest productivity growth on annual average (3.9%) of all four countries. In the period ensuing the

GDP in PPS per hour worked, 2010 – 2017 (EU-28 = 100)
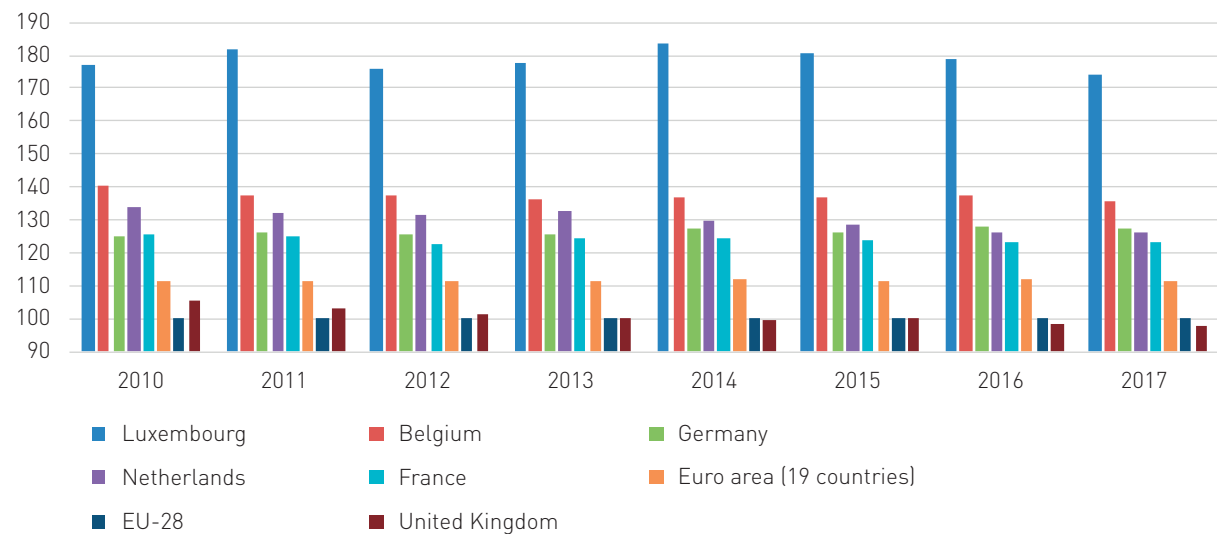
Source: Eurostat

economic crisis, labour productivity growth of manufacturing accelerated even further to 4.2% in Belgium, while, at the same time, this labour productivity growth decelerated in the neigbouring countries.

D) Innovation and R&D

Belgian manufacturing is not only very productive, it is also one of the most innovative in the world according to OECD data.

Among the main drivers of productivity and innovation in the Belgian manufacturing sector is the strong Belgian focus on Research & Development. Belgium scores higher than the EU-28 average when it comes to new PhD graduates, R&D personnel and researchers.

Average annual growth rate of labour productivity in manufacturing, 2009 – 2015 (in %)
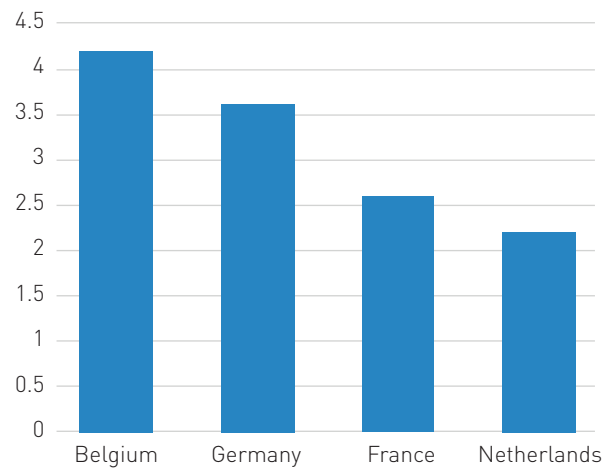
Source: Federal Planning Bureau

Innovative firms in manufacturing, 2017 (as % of total firms in manufacturing)

1	Switzerland	78.6
2	Brazil	72.5
3	Germany	68.2
4	Belgium	68
5	Ireland	67.2
6	Luxembourg	63.4
7	Austria	63.3
8	United Kingdom	60.8
9	Finland	58.7
10	France	57
11	Iceland	56.5
12	Australia	56.1
13	Netherlands	55.8
14	Norway	54.9
15	Sweden	54.6
16	Greece	52.9
17	Portugal	52.4
18	Turkey	51.7
..		
36	Mexico	11.1

Source: OECD

Product innovative manufacturing firms with innovations that were new to the firm's market, 2017 (as % of total firms in manufacturing)

1	Ireland	30.7
2	Austria	28.1
3	Belgium	25.4
4	Finland	24.5
5	Luxembourg	23.9
6	Netherlands	23.3
7	Norway	23
8	France	21.3
9	Slovenia	21.2
10	Switzerland	19.6
11	Sweden	18.9
12	Germany	18.8
13	Australia	18
14	Italy	17.8
15	Greece	17.3
16	Turkey	16.9
17	Czech Republic	16.6
18	Portugal	14.4
...		
34	Estonia	0.6

Source: OECD

Expenditure on R&D, 2000 - 2016 (as % of GDP)
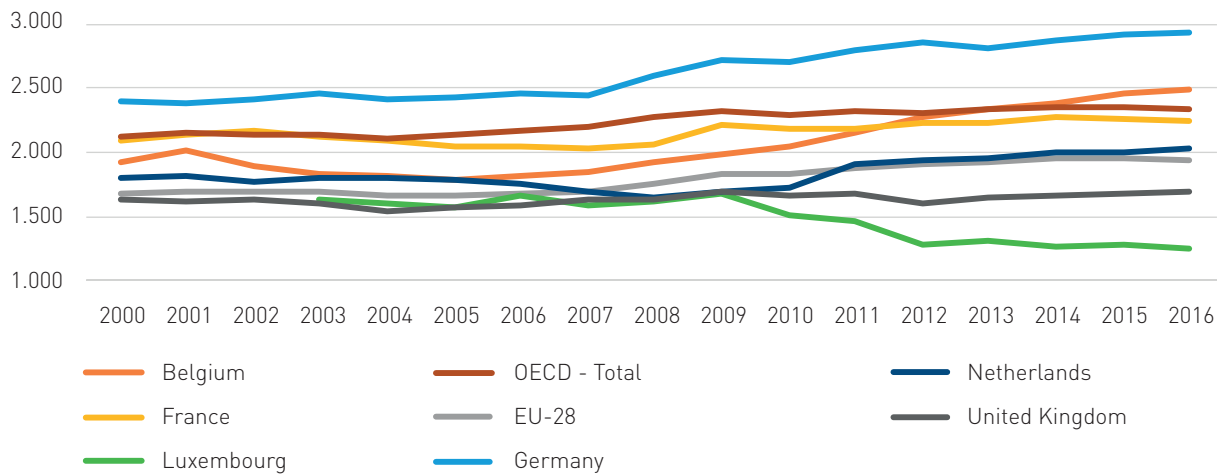
Source: OECD

When taking R&D intensity into account, Belgium scores higher than all its neighbouring countries but Germany, while also outperforming the OECD and EU-28 averages.

Numerous auditing firms made an overview of the R&D incentives given by Belgium. These include measures by the federal government as well as additional incentives by Flanders, Wallonia and the Brussels-Capital Region. According to OECD data in 2016, Belgium ranks third in direct government funding and tax support for business investment in R&D (as a % of GDP). As such, the R&D investments help funding Industry 4.0 policy in Belgium.

E) Evidence from the field

A survey by the consultant PwC Belgium and Flanders Make confirms the trends of innovation and R&D outlined above. According to their analysis of 30 companies in Belgium (Flanders) called "Industry 4.0: hype or reality?"; 93% of the respondents say that Industry 4.0 implies a significant transformation of their business and can help them achieve better results. 83% of the respondents are actively looking at how to implement the Industry 4.0 concept in their business and operational strategy. In another analysis called "Économie par le numérique", the consultant Roland Berger discovered most companies in Wallonia adopted Industry 4.0 principles in order to remain competitive, while it found that big companies are the most advanced and the most innovative in this field.

See the full studies on: www.pwc.be/en/documents/20170322-industry-4.0-hype-or-reality.pdf www.sogepa.be/assets/df2e6d8f-b522-4ef2-ad61-5053a2e0a594/sogepa-economieparlenumeriquepdf.pdf

Furthermore, Pwc Belgium interviewed 30 start-ups and scale-ups in Belgium offering solutions to help industrial companies embrace the benefits of their digital transformation. Most of those companies focused on Internet of Things (53%), data analytics (50%) and artificial intelligence (50%). According to the same study, they mainly added value to manufacturing

PwC Belgium Survey To which industries is your startup aiming to add value? (in % of companies)
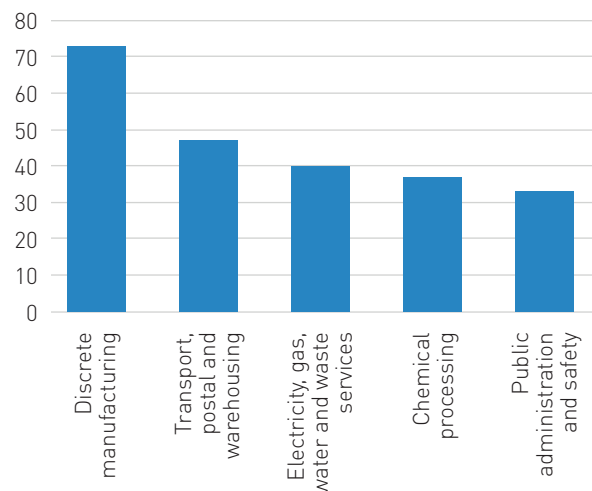
Source : PwC Belgium : Industry 4.0
The perspective of start-ups and scale-ups in Belgium

2.2 ... shining in international rankings

Belgium is one of the leading countries in the world when it comes to the development of Industry 4.0. This is made evident by several international rankings such as the European Innovation Scoreboard 2018 or EIS (8th out of 28 countries), the European Digital Economy and Society Index 2018 Report or DESI (8th out of 28 countries), The global Competitiveness Index 4.0 2018 or GCI (21st out of 140 countries), the Global Innovation Index 2018 or GII (25th out of 126 countries) and the Readiness for the Future of Production Assessment 2018 or RFPA (24th out of 100 countries for Structure of Production and 17th out of 100 countries for Drivers of Production).

These five rankings are related to the development of industry 4.0 and assesses all actors of the economic system. As far as business and academic institutions are concerned, Belgium is among the top performers. Public institutions and households on the other hand still need to make the switch to full digitalisation. Belgian federal and regional governments started with a strong reform agenda. More information can be found in section 2.3: "... and supported by a focused policy".

The outcomes related to the public institutions and households contrast sharply with the performances of the Belgian businesses and academic institutions. As primary actors when it comes to the outroll of Industry 4.0, they consistently are among the top performers in Europe and even the world. Particularly when taking into account three key indicators:

- Expertise: Skills (16th out of 140 countries in GCI), Education (10th out of 126 countries in GII), Knowledge workers (6th out of 126 countries in GII), Knowledge-intensive employment (9th out of 100 countries in RFPA), ICT specialists (6th out of 28 countries in DESI), Quality of maths and science education (7th out of 100 countries in RFPA), Knowledge creation (14th out of 126 countries in GII)

- Collaboration: Linkages (1st out of 28 countries in EIS), university/industry research collaboration (9th out of 126 countries in GII), Electronic Information Sharing as % enterprises (1st out of 28 countries in DESI), Multi-stakeholder collaboration (13th out of 100 countries in RFPA)

- Innovation: innovation (2nd out of 28 countries in EIS), International co-inventions (8th out of 140 countries in GC), Scientific publications (13th out of 140 countries in GCI), Patent applications (17th out of 140 countries in GCI), R&D expenditures (12th out of 140 countries in GCI), Impact of ICT on new services and products (16th out of 100 countries in RFPA)

A) Readiness for the Future of Production Report 2018

The data-driven Readiness for the Future of Production Assessment 2018 analyses how well-positioned countries are today to shape and benefit from the changing nature of production in the future. Readiness is generally regarded as the ability to capitalize on future production opportunities, mitigate risks and challenges, and be resilient and agile in responding to unknown future shocks

The assessment is based on two main components: Structure of Production, or a country's current baseline of production, and Drivers of Production, or the key enablers that position a country to capitalize on the Fourth Industrial Revolution to transform production systems. The assessment is comprised of 59 indicators across the Drivers of Production and Structure of Production components.

Belgium is among the 25 leading countries who have both the potential and the legacy to be prepared for Industry 4.0. While Belgium is in the top quarter when it comes to the structure of production (24th out of 100 countries), its high scores are on the key enablers that position it to capitalize on the Fourth Industrial Revolution (17th out of 100 countries).

Of the 8 main drivers, Belgium appears 7 times in the top quartile, with "Scale" being the only exception. Human capital (15th), Institutional Framework (18th) Technology & Innovation (19th) and Complexity (19th) are the main drivers. Belgium ranks in the top 10 in several individual indicators.

Belgian position per indicator, 2018 (ranking on 100 countries)	
LTE mobile network coverage	1
School life expectancy	2
Logistics performance	5
CH4 intensity level	6
Quality of math and science education	7
On-the-job training	8
Trade	8
Extent of market dominance	8
Knowledge-intensive employment	9

Source: Readiness for the Future of Production Report

More information:
www3.weforum.org/docs/FOP_Readiness_Report_2018.pdf

B) European Innovation Scoreboard 2018

The annual European Innovation Scoreboard (EIS) provides a comparative assessment of the research and innovation performance of the EU member states and the relative strengths and weaknesses of their research and innovation systems. It helps them assess areas in which they need to concentrate their efforts in order to boost their innovation performance.

In its scoreboard, ten innovation dimensions are compared between countries. Those innovation dimensions are Human resources, Attractive research systems, Innovation-friendly environment, Finance and support, Firm investments, Innovators, Linkages, Intellectual assets, Employment impacts and Sales impacts. In total, those capture 27 indicators.

Globally, Belgium ranks 8th and is described as a strong innovator. In this category, it is right behind Germany. For Belgium, performance compared to 2010 increased by 6.8 percentage points thanks to annual performance increases since 2014 and a strong improvement in 2016.

The three dimensions where Belgium has the most competitive edge relative to the EU average in 2017 are 'Attractive research systems', 'Linkages' and 'Innovators'. Belgium has the highest rank of all countries when it comes to the 'Linkages'. That is mainly due to one of its indicators, 'International scientific co-publications'. Belgium obtains a score of no less than 301,6. Other high scores at indicator level are achieved at 'Innovative SME's

Performance European Innovation Scoreboard, 2010 – 2017 (relative to the EU average 100)
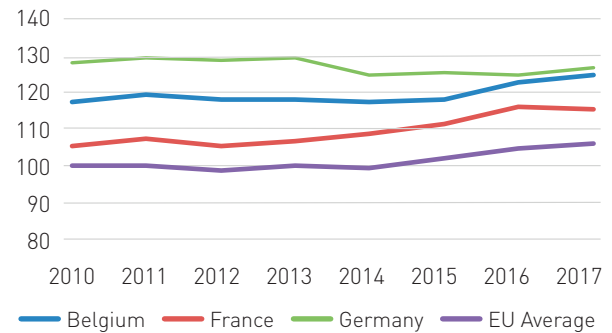
Source: European Innovation Scoreboard

collaborating with others' (216,3) and 'SME product/process innovations' (191,3).

During the 2010-2017 period, performances have improved most strongly in 'Attractive research systems', 'Firm investments' and 'Human resources'.

Belgian score relative to the EU, 2017 (relative to the EU average = 100)
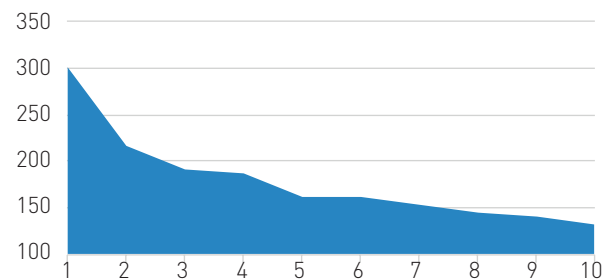
1 International scientific co-publications
2 Innovative SME's collaborating with others
3 SME product/process innovations
4 Enterprises providing ICT-training
5 Broadband penetration
6 Foreign doctorate students
7 SME innovating in-house
8 Population with tertiary education
9 Public-private co-publications
10 R&D investment in the business sector

Source: European Innovation Scoreboard

More information: www.ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en

C) European Digital Economy and Society Index 2018 Report

The DESI report tracks the progress made by member states in terms of their digitisation. It is structured around five chapters:
- Connectivity: Fixed broadband, mobile broadband and prices
- Human Capital: Internet use, basic and advanced digital skills
- Use of Internet Services: Citizens' use of content, communication and online transactions
- Integration of Digital Technology: Business digitisation and E-commerce
- Digital Public Services: E-Government and E-Health.

Belgium ranks 8th out of the 28 EU member states in DESI 2018. While its absolute performance improved in all DESI domains, its ranking slightly slipped compared to 2017. Belgium belongs to the high-performing cluster of countries, together with Denmark, Sweden, Finland, the Netherlands, Luxembourg, Ireland, UK and Estonia.

The report concludes that, when it comes to the integration of digital technology by companies, Belgium is doing well. Stimulating the adoption of digital technologies combined with a workforce able to use these technologies could further underpin productivity growth. In view of this potential, the digitisation of businesses and industry is a priority in the digitisation agendas both at the federal level and in all three Belgian regions, according to DESI.

Score on the Digital Economy and Society Index, 2014 – 2017 (on 100)
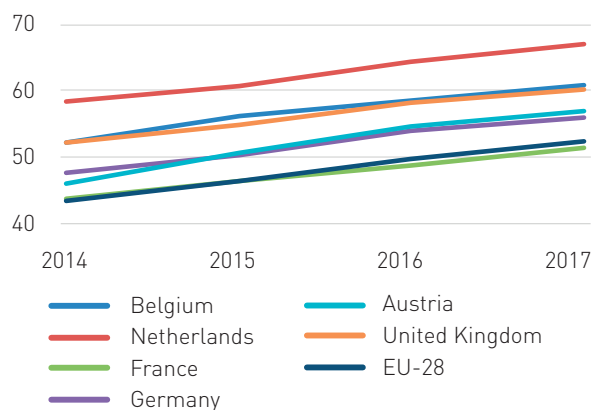
Source: Belgian Science Policy Office

More information:
www.ec.europa.eu/digital-single-market/en/desi

D) The Global Competitiveness Index 4.0 2018 Rankings

After having conceptualized the Fourth Industrial Revolution, the World Economic Forum is contributing to global thinking and policy-making by integrating the notion of the Industry 4.0 into the definition of competitiveness. The index integrates well-established aspects with new and emerging levers that drive productivity and growth. It emphasizes the role of human capital, innovation, resilience and agility, not only as drivers but as defining features of economic success in Industry 4.0.

The GCI 4.0 index encompasses a total of 98 indicators organized into 12 pillars, reflecting the extent and complexity of the drivers of productivity and the competitiveness ecosystem. These pillars are: Institutions, Infrastructure, ICT adoption, Macroeconomic stability, Health, Skills, Product market, Labour market, Financial system, Market size, Business dynamism and Innovation capability.

Belgium occupies the 21st place in the overall ranking, but not all indicators are relevant to understand Belgium's position in Industry 4.0. Less weight is given below to for example Health (28th place) or even macro-economic stability (1st place).

More relevant are the Belgian results on 'ICT adoption' (40th), 'Skills' (16th), 'Business dynamism' (18th) and 'Innovation capability' (17th). Some of the most relevant indicators to explain the adoption of Industry 4.0 in Belgium are listed in the figure "Belgian position by indicator".

Belgian position per indicator, 2018 (ranking on 140 countries)		
1	International co-inventions applications/million pop.	8
2	R&D expenditures % GDP	12
3	Scientific publications H Index	13
4	Trademark applications applications/million pop.	15
5	State of cluster development	17
6	Patent applications applications/million pop.	17
7	Multi-stakeholder collaboration	17
8	Buyer sophistication	20
9	Quality of research institutions	24
10	Companies embracing disruptive ideas	26

Source: World Economic Forum

More information: www3.weforum.org/docs/GCR2018/05FullReport TheGlobalCompetitivenessReport2018.pdf

E) The Global Innovation Index 2018

The report covers 126 economies around the world and uses 80 indicators to measure innovation performance. Belgium obtains a score of 50.5 (on a scale of 100) and a 25th position. This means an improvement of two places compared to the 2017 edition.

The Global Innovation Index is calculated as the average of two sub-indices: the Innovation Input Sub-Index and the Innovation Output Sub-Index.

The Input Sub-Index is composed of five input pillars determining innovation activities within the economy. In this index, Belgium has a a score of 59.5, making it the 21st country out of 126. The pillars are:

- Institutions (20th place)
- Human capital and research (13th place)
- Infrastructure (30th place)
- Market sophistication (42nd place)
- Business sophistication (17th place)

The Output Sub-Index measures the results of innovative activities within the economy. In this index, Belgium occupies the 23rd place with a score of 41.5. There are two output pillars:

- Knowledge and technology outputs (20th place)
- Creative outputs (27th place)

The strongest performances are reached in 'Human capital & research' (13th) and 'Business sophistication' (20th). The list of top 5 indicators for Belgium is little surprising.

Belgian top rankings, 2018 (ranking on 126 countries)		
1	Knowledge workers	6
2	Business environment	9
3	Education	10
4	Creative goods & services	10
5	Knowledge creation	14

Source: The Global Innovation Index

More information:
www.globalinnovationindex.org/gii-2018-report

2.3 ... and supported by a focused policy

Belgium's position as a leader in Industry 4.0 can also be attributed to several governmental initiatives supporting the industry and academics, both at a federal and a regional level.

A) Made Different

One of the programs is Made Different, initiated by Sirris and Agoria. The name of this publication – "Belgium Made Different – Industry 4.0" – is a testimony to this initiative.

The overall objective of Made Different is to strengthen the Belgian manufacturing industry, foster its move towards Industry 4.0 and notably to support the digital transformation of its production processes. Made Different is mainly an industry-driven programme with a very flexible structure which follows a bottom-up approach.

Its main activities involve the organisation of awareness-raising events, the provision of tailored and long-term guidance services to companies willing to transform their production processes (i.e. up to around two years). Also, The ´Factory of the Future Award´ ceremonies are organised every year in order to distinguish companies that successfully achieved their transformation.

The ´Factory of the Future´ model, clearly defined by the programme, includes seven key dimensions related to both technological and social innovation. Those are: world-class manufacturing technologies; end-to-end engineering (integrated design approach); digital factory (digitising operational processes); human-centred production; production network (optimal eco-system); eco-production (sustainability standards); smart production systems (smart interconnection).

More information: www.madedifferent.be

B) Digital Belgium (federal level)

'Digital Belgium' is an initiative of the Belgian Federal Government, launched in April 2015, to boost the digital economy and expand prospects for growth and jobs. The initiative is supported by 'Digital Minds for Belgium', a steering committee comprising CEO's from digital companies, entrepreneurs, investors and academics. The ambition of the initiative is to help Belgium make it to the top three of the DESI index by 2020, and to create 1,000 new start-ups and 50.000 new jobs in different sectors. Recent tax reform (Summer 2017) will benefit more private investments.

The Digital Belgium Action Plan has 5 pillars, each with 3 to 6 projects dealing with actions that fall within the federal competences:

- Digital infrastructure
  "Digital Belgium" is focussing on a state-of-the-art network infrastructure, which is ready to fully exploit the "internet of things" and "big data". This includes a stimulus for ultra-fast internet, dynamic postal & telecommunications markets and a digital hub for business.

- Digital confidence and digital security
  This means tackling illegal content and practices, a safe and privacy-friendly online environment and cyber security.

- Digital government
  Both citizens and businesses need to be able to conduct all communication with the government digitally by 2020 and to do so using a user-friendly channel. Digital government also includes initiatives involving next-generation open data and operational efficience.

- Digital economy
  "Digital Belgium" supports an approach, which boosts the digital economy and expands the prospect of job creation and growth. It focuses on start-ups, a digital-friendly legislation, an e-commerce platform, e-invoicing, e-signature & e-archiving and a project involving healthcare called digital health valley.

- Digital skills and jobs
  Belgium is setting up "DigitalChampions.be". This is an alliance bringing together stakeholders from various governments, education and the private sector so that all citizens are given the opportunity to strengthen their digital skills. Other projects will centre on digital inclusion as well, and on mobile internet for everyone.

More information: www.digitalbelgium.be

C) Vision 2050 (Flanders region)

The digital transformation is part of a general transition strategy 'Vision 2050', driven by major societal challenges: 'Making the leap to Industry 4.0', is one of the seven transitions.

In 2017 a working programme is developed for Industrie 4.0 along 5 axes:

- Sustain a platform: organizing a central information hub for all stakeholders concerning Industry 4.0 and its implications; raising awareness and promotion through events; stakeholder discussion and input to policy making.

- Strengthen the knowledge base: additional research in the domains supporting the transition towards Industry 4.0 and the dissemination of the knowledge; networking of present actions; support of Imec, Flanders Make and other institutes.

- Accelerate application: supporting the transition of individual companies, SMEs in particular; promotion of support instruments; demonstration units and pilots; collaboration with spearhead clusters, etc.

- Relate to framework conditions and society: connecting with policies on learning and competences, legal consequences, EU standardisation, …; inventory of actions to be taken; study of impact on worker competences and labour organisation.

- Support international cooperation: representation in EU policy initiatives; supporting the participation in the programmes and projects of the European Commission and stimulating internationalisation in general (e.g. through international fairs and events).

More information:
www.industrie40.vlaanderen
www.vlaanderen.be/nl/nbwa-news-message-document/document/09013557801c6224 (Dutch)

D) Digital Wallonia (Wallonia Region)

Digital Wallonia is a strategy adopted by the Walloon Government. It sets the priorities and goals for public policies and the support framework for private initiatives to promote the digital transformation. But it is also a platform that provides services and support to public and private players engaged in implementing the digital strategy, and it thirdly serves as a brand, which guarantees visibility and unites initiatives implemented within the framework of the digital strategy.

Five priorities have been defined:

- Digital sector
  Enable businesses in the digital sector to grow in size and value by stimulating the development of cross-disciplinary and specialist skills in order to focus on the most promising links in the value chain (production, data capture, utilisation) and thus create a competitive advantage for Wallonia.

- Digital economy
  Make the digital transformation a driver of growth and a powerful tool for industrial deployment by focusing on industry 4.0 and the development of ecosystems to stimulate interaction between what the digital sector can offer and what other sectors of the economy require.

- Skills & jobs
  Train Wallonia's citizens in digital technologies, their use and the new digital jobs, at school, at work and in organizations.

- Open public services
  Transform the public services through innovations and opportunities offered by digital technologies: user-oriented online services, cultural shift, system sharing and cross-disciplinarity, open data, collaboration and co-development with partners and citizens, digital training for public sector workers, etc. Public services of the future will be digital, agile and open.

- Smart & connected territory
  Implement a digital infrastructure policy for Wallonia guaranteeing access to high-speed broadband throughout the region and ultra high speed in certain priority zones, in order to increase the use of digital technology by businesses and citizens and make Wallonia a "Giga" Region.

More information: www.digitalwallonia.be/en

E) bedigital.brussels (Brussels-Capital Region)

The Brussels-Capital Region wants to overcome the challenges of urban development through technology by stimulating innovation and the participation of citizens, businesses and academia.

Boasting 700 Information and Communication Technologies (ICT) startups, Brussels has a dynamic ecosystem and aims to become one of the leading digital reference centres in Europe.

bedigital is the reference portal for all digital initiatives in Brussels. At present, the government has set up the following three tools, to promote its territory's digital ecosystems :

• 'Smart City Brussels', started in 2015 sets the trajectories for the digital and Smart City priorities for the Region. It is based on the priorities linked to the European digital agenda (DESI index) and identifies other priorities linked to the Smart City context (transversality, pooling and reuse, digital inclusion, European dimension, governance and performance measurement).

• The 'Regional Innovation Plan 2016-20', was adopted in July 2016, after a broad consultation of more than 200 stakeholders from different sectors. It is the reference framework for the research and innovation policy and a lever for socio-economic development to improve the well-being of Brussels residents. In the plan, particular attention is paid to three strategic areas of activity that reflect the region's strengths: health, environment and ICT. The research and innovation agency Innoviris is in charge of implementation.

• The Plan 'Nexttech.Brussels 2017-2020', finalised in January 2017, is a plan of the Ministry of economy, largely conceived by the ICT sector itself to benefit the ICT sector, with the objective of growing employment in ICT and professional reconversion to ICT jobs. It contains 20 measures to promote ICT entrepreneurship in coordination with the business community, research organisations and public authorities. Three key technological sectors are involved: the Internet of Things, virtual reality, Big Data management and artificial intelligence.

More information: www.bedigital.brussels

F) More information

The European Directorate-General for Communications Networks, Content and Technology (DG CONNECT) published an analysis, produced by Jan Larosse (Vanguard Initiatives Consult&Creation), of Belgian initiatives on digitising European industry.

More information: www.ec.europa.eu/futurium/en/system/files/ged/be_country_analysis.pdf.
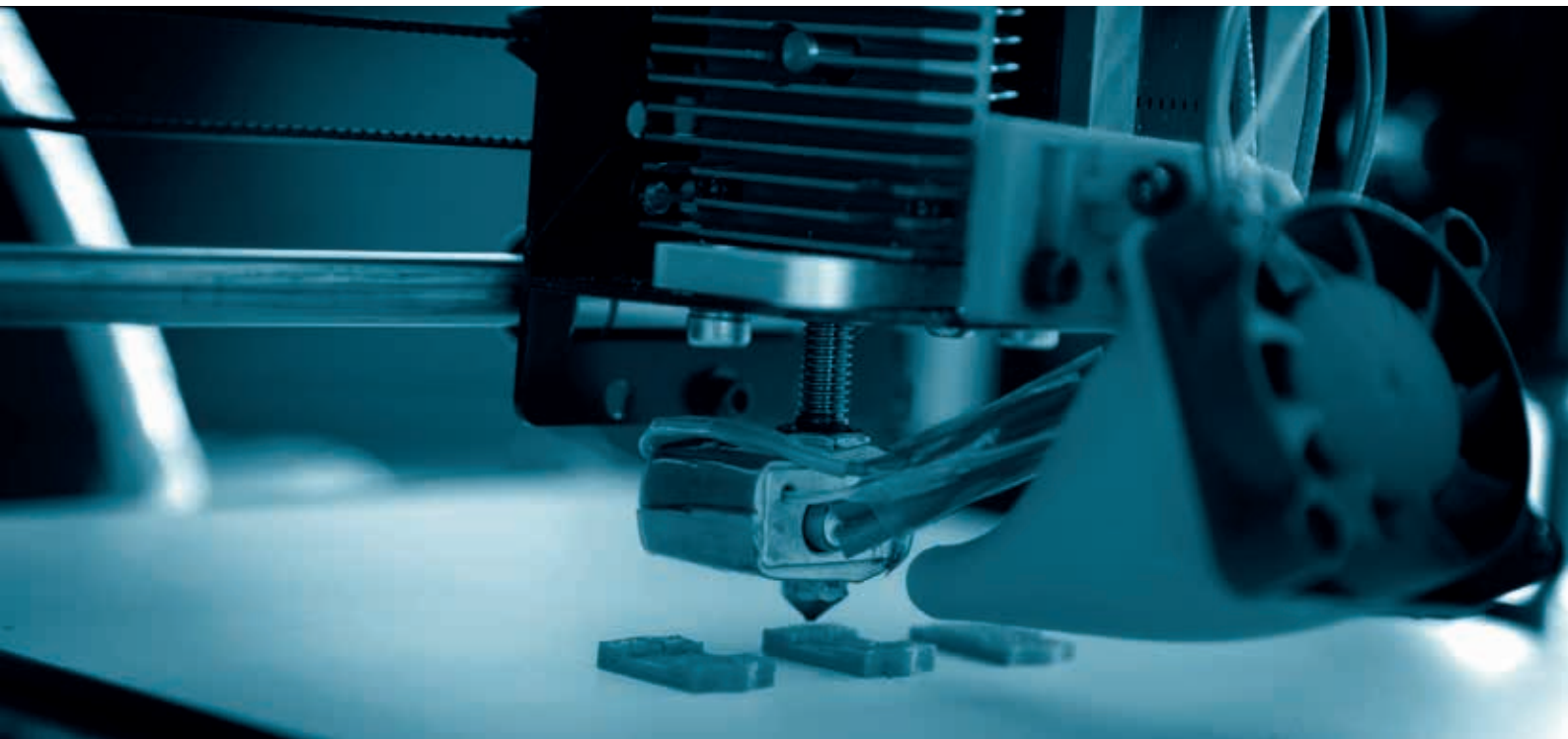
SECTION 3

STAKEHOLDERS

1 ›› OFFICIAL PARTNERS

FPS Foreign Affairs

The promotion and defense of Belgian economic interests abroad is a top priority of the Federal Public Service (FPS) Foreign Affairs. This is done in a number of ways. FPS Foreign Affairs coordinates Belgium's ambitious trade and investment protection policy, it monitors market access problems and it provides diplomatic support to Belgian companies abroad. Moreover, FPS Foreign Affairs supports Belgian businesses in their international activities by coordinating the economic missions of HRH Princess Astrid, as representative of His Majesty the King, and through the State visits led by His Majesty the King.

FPS Foreign Affairs also actively promotes Belgium's international image as a good place to do business, by participating in international forums, such as the International Expositions and the World Economic Forum, by organizing bilateral visits and by ensuring Belgium's multilateral action in the relevant international organizations.

diplomatie.belgium.be/en

KINGDOM OF BELGIUM
Foreign Affairs,
Foreign Trade and
Development Cooperation

These activities are closely coordinated with other federal and federated stakeholders, and in particular Belgium's three regional authorities that are competent for export and investment promotion: Flanders Investment & Trade, Wallonia Export-Investment Agency (AWEX) and Brussels Invest & Export (hub.brussels). The regional agencies perform three main tasks:

- To support exporters
- To inform, prospect for and advise potential foreign investors
- To promote their respective region abroad

The regions also grant companies significant financial incentives for recruitment, training, R&D, investment, consultancy and environmental protection.

Flanders Investment & Trade

Flanders Investment & Trade (FIT) promotes international entrepreneurship in Flanders in a sustainable way as a key factor in the social and economic development of our region. FIT does so by supporting the international activities of Flemish companies and by attracting foreign investors to Flanders. FIT assists, supports and stimulates companies in international business. FIT offers tailored advice and guidance. Companies can call on its networks of contacts both at home and abroad. And FIT provides financial support and information on a wide range of financial incentives.

Flanders has many assets for ambitious Flemish enterprises and SMEs as well as for interested international companies. For Flemish companies, its region acts as a perfect gateway to global markets. For them, FIT tries to lower the threshold to doing business abroad. FIT promotes its services, provides information and knowledge about export and offers networking opportunities between entrepreneurs and brings them into contact with potential partners abroad.

Flanders is a pole of attraction for foreign companies: thanks to its central location in Europe, its strongly developed infrastructure, its innovative clusters and numerous other strengths. FIT tries to offer them worldwide publicity. FIT adopts a tailored approach to potential investors and convinces them of the opportunities for their company in Flanders. Furthermore, FIT focus on existing investors in Flanders planning to expand their businesses locally. Innovative clusters are of key importance to Flanders as a knowledge region. FIT assists these clusters in their internationalization process and tries to attract foreign investors capable of strengthening the cluster to grow into a major international player.

www.flandersinvestmentandtrade.com

Wallonia Export-Investment Agency

The Wallonia Export - Investment Agency (AWEX) offers general expertise in international economic relations. This expertise ranges from promoting Walloon exports through to seeking foreign investment (helping find suitable sites, explaining support measures and tax rules, and providing information on recruitment and staff training, project funding, etc). AWEX also provides a range of services to all Walloon businesses seeking to operate at international level. However it is also the partner of choice for all buyers, importers and foreign prospects who are looking for a partner in Wallonia and wanting to find products, equipment, technologies or services in the area.

Outside of Belgium, AWEX can rely on an international network of 93 trade and Investment counselors, covering more than 120 markets and some 20 international organisations. These counselors are the key contacts locally for any business or public body wishing to develop a business or a partnership relationship with Wallonia or simply wanting to find out about the economic potential of such a relationship.

At Walloon level, AWEX's main partners are the competitiveness and technological clusters in particular.

www.awex-export.be & www.investinwallonia.be

Brussels Invest & Export
by hub.brussels

As of 1 January 2018, Brussels Invest & Export has merged with Atrium and Impulse to form a single Brussels agency for business support: hub.brussels. A central aim of hub. brussels is to help Brussels businesses to export and to provide foreign investors with assistance in establishing their business in Europe's capital. Our trump cards to help you? A network of 90 economic and commercial attachés all over the world and a tailor-made support : missions, fairs, information about foreign markets and free disposal of a work space for a period of three months.

www.invest-export.brussels & www.investinbrussels.com

2›››
INDUSTRY 4.0 PARTNERS

Agoria

Agoria means progress through technology. We pave the way for all technology-inspired companies in Belgium which increase our quality of life through the development and application of technological innovations. Furthermore, these companies represent no fewer than 300,000 employees. "Improving quality of life", that is our mission.

Agoria's unique position, special know-how and extensive network form the basis on which we help create the context to strengthen a marriage made in heaven, that between entrepreneurial drive and technology.

Agoria's services to its 1850+ member companies, are built on three pillars: consultancy services to entrepreneurs, business development and the creation of an optimal business environment.

You will find more information on how Agoria can help accelerate your digital manufacturing transformation journey on www.agoria.be & #ManufacturingCommunity and https://twitter.com/agoriafr.

Follow us on: **twitter.com/agoriafr.**

Be.digital

bedigital is a project led by the Brussels-Capital Region, through three of its plans: Brussels Smart City, The Regional Innovation Plan and NextTech. It aims to be the reference portal for all digital initiatives in Brussels.

Follow us on: **www.bedigital.brussels**

Cenaero

Cenaero is an applied research center assisting technological industries in the development of innovative products, services and processes with its numerical simulation, optimization and data exploitation methods and tools.

Mainly active in Aerospace, Cenaero ambition is to be internationally recognized as a key technology leader in all types of transport, manufacturing, biomedical, energy and smart cities industries. It aims to be a strategic partner of large-scale companies as a real support to innovative SME, implying Cenaero is performing technology transfer to industries on a day-to-day basis and is building a strong expertise in long-term R&D projects.

Cenaero operates a High Performance Computing infrastructure and experimental facilities in composite manufacturing and prototyping. Its 60 people team is specialized in metallic, polymer and composite structures, manufacturing processes, in-service performance, computational fluid dynamics, energy, applied mathematics. Our headquarters are located in Gosselies (Belgium) with a subsidiary office close to Paris (France).

Follow us on: **www.cenaero.be**

Cetic

As an applied research centre in the field of ICT, CETIC's mission is to support economic development by transferring the results of the most innovative research in ICT to companies, particularly SMEs. CETIC helps companies integrate these technological breakthroughs into their products, processes and services, enabling them to innovate faster, save time and money and develop new markets.

CETIC develops its expertise in key technologies, including Big Data, Cloud Computing, the Internet of Things, software quality, and trust and security of IT systems.

These innovations are applied in domains of primary importance to society, such as health, smart mobility, energy and industry. This expertise is continuously supplemented through CETIC's active involvement in European and regional projects.

Follow us on: **www.cetic.be**

Digital Wallonia

Wallonia's digital strategy, platform and brand, Digital Wallonia sets the framework for all of the Walloon Government's actions in terms of Wallonia's digital transformation. Two of its major themes are:
- Enable businesses in the digital sector to grow and create a competitive advantage for Wallonia.
- Make the digital transformation a driver of growth and a powerful tool for industrial deployment by focusing on industry 4.0.

Agence du Numérique is the legal entity which contributes to the implementation and the monitoring of Digital Wallonia.

Follow us on: **www.digitalwallonia.be**

DSP Valley

DSP Valley is a cluster organisation in the domain of smart electronic systems, with offices in Leuven (BE) and Eindhoven (NL). The cluster consists of 100+ member organizations: universities, research institutes and companies, ranging from small start-ups and SMEs to large international groups with a local R&D activity.
DSP Valley supports the creation of new value chains by identifying new opportunities and linking technology providers with integrators and product developers in the fields of Smart Health, Smart Cities, Smart Vehicles and Smart Industries.

DSP Valley offers its members a networking and matchmaking platform, allowing them to explore each other's areas of expertise and stimulating innovation by taking advantage of complementary skills, tools and objectives.
With its extensive offer of high-quality services, DSP Valley is one of the top clusters in Europe in the area of smart electronic systems, offering support for internationalization, in partnership with other leading European networks.

Follow us on: **www.dspvalley.com**

FLAM3D (a division of SIM, Strategic Initiative Materials Flanders)

Additive Manufacturing challenge? Looking for partners or contacts?
Contact Flam3D! We are the entry-level portal for 3D-printing - also commonly known as Additive Manufacturing. Flam3D is the independent not-for-profit platform for all stakeholders in the domain of 3D printing. We unite, represent and support companies, research institutions, governments and other stakeholders.

We don't sell, we don't produce, we don't carry out research. Our members do.
That is how we guarantee impartiality. Founded back in 2015, Flam3D now boasts over 90 organizations active in 3D printing among its affiliates, representing the entire 3D printing ecosystem: suppliers, manufacturers, service providers, companies that apply additive or hybrid manufacturing, schools and research institutes.

Referral comes for free.
As we are looking to strengthen value chains both inside and outside our organization, all companies and organizations with an interest in 3D-printing and Additive Manufacturing applications can contact us for referral. Within our network, we will definitely be able to point you towards relevant contacts to assist you with any of your 3D printing challenges.

Follow us on: **www.flam3d.be**

Flanders Innovation and Entrepeneurship (VLAIO)

Flanders Innovation & Entrepreneurship (VLAIO) is the contact point for entrepreneurs in Flanders. We encourage and support innovation and entrepreneurship, and contribute to a favourable business climate. We do so in close collaboration with local actors and supported by our international commitments in EUREKA, E.E.N. and H2020. We focus on:

- Stimulating growth and innovation
  We support businesses through grants enabling them to continue to grow, transform and innovate. Examples include the SME growth subsidy, SME innovation- and R&D-projects;
- Promoting entrepreneurship
  We work together with strong partners that assist SMEs through start, growth and takeover. We also encourage networking focused on growth companies;
- Supporting clusters
  We support organisations that catalyse cooperation and dynamics within a group of enterprises and knowledge institutions;
- Improving environmental factors
  We facilitate the development of industrial areas.

By acting as a one-stop-shop, we build a bridge towards stronger entrepreneurship.

VLAIO is also responsible for the strategic transition towards the Industry 4.0 project in the context of Vision2050, the Flemish Government's long-term strategic policy vision. This includes policy development, international representation and coordination of support actions, aiming at a sustainable industrial production in the future.

Follow us on: **www.vlaio.be**

Flanders Make

Flanders Make is the strategic research centre for the manufacturing industry. We bring together companies and research institutions and help realise concrete product and production innovations in the vehicle industry, mechanical engineering and production environments. From our sites all over Flanders, we also provide support for the digital transformation associated with Industry 4.0.

New technologies, such as artificial intelligence and augmented or virtual reality are emerging at an ever-increasing pace. It is also widely assumed that next-generation machines will be cyber-physical systems, integrating the digital and real (or physical) world. In concrete terms, a machine and its digital twin will operate in parallel with one another and exchange information to improve machine performance and servitisation.

We bring companies together in an ecosystem in order to work on solutions to shared technological challenges. This concerns among others pre-competitive research, which, subsequently, can be extensively tested and validated in our own high-tech research infrastructure, which will eventually lead up to a new technology or application.

Once a project has been completed, every company can start working with the results and translate them into a specific product or production innovation, a service provided by us to both large and small businesses with a passion for innovation.

In addition, we attach great importance to international cooperation in the field of innovation and to participation in European research projects.

Today Flanders Make counts 500 researchers who work full-time as a unique research community on a joint industrial research agenda.

Follow us on: **www.flandersmake.be**

Imec

Imec is the world-leading research and innovation hub in nanoelectronics and digital technologies. The combination of our widely acclaimed leadership in microchip technology and profound software and ICT expertise is what makes us unique. By leveraging our world-class infrastructure and local and global ecosystem of partners across a multitude of industries, we create groundbreaking innovation in application domains such as healthcare, smart cities and mobility, logistics and manufacturing, energy and education.

As a trusted partner for companies, start-ups and universities we bring together close to 3,500 brilliant minds from over 75 nationalities. Imec is headquartered in Leuven, Belgium and also has distributed R&D groups at a number of Flemish universities, in the Netherlands, Taiwan, USA, China, and offices in India and Japan. Further information on imec can be found at www.imec-int.com.

To get a grasp of facets of the Industry 4.0 transition, imec is currently involved in several living labs in Flanders, some of them are in close collaboration with Flanders Make, the strategic research center for the manufacturing industry. Within these living labs, we also

explore aspects such as connectivity (tags, drones and other technologies for indoor locali-zation and process optimization), co-bot operations (e.g. looking for an optimum in the oper-ators' cognitive load during his cooperation with industrial robots), energy (e.g. how to find a balance between the massive amounts of data that can be generated and the increasing energy demand of large data centers), computing (e.g. clever selection of data and distribu-tion over edge versus cloud computing) and challenges for smart maintenance and circular economy (e.g. recycling, reuse and other end-of life scenario's). Living Lab settings such as these will increasingly become important to also prototype the new collaboration- and part-nership structures that come along with the Industry 4.0 transition. And also to detect and filter out the directions that are not only sustainable, but also bring economic value.

Follow us on: **www.imec-int.com**

INFOPOLE Cluster TIC

« INFOPOLE Cluster TIC is the business cluster that brings together and unites profession-als from Information and Communication Technologies (ICT) in order to promote business and innovation through partnership.

Several application areas are the foundation of our actions : Industry 4.0, health (eHealth), intelligent transports, Internet of Things (IoT), Serious Game, Big Data, Open Data, Transme-dia, Cyber Security, Web, ecommerce.

Through its network of more than 130 companies, INFOPOLE can help you to find the ideal partner whatever your IT project!"

Follow us on: **clusters.wallonie.be/infopole-fr**

Multitel

The mission of Multitel consists, as a priority, in helping Walloon companies to integrate ef-fectively new technologies in their products, processes and services, in order to improve their competiveness and to reach a sustainable economic prosperity.

Furthermore, with the passing years, Multitel develops and integrates emerging technolo-gies into the industrial fabric at the regional and international levels in order to help compa-nies to take up technological challenges.

Answering specific requests of companies and accompanying them in their innovation ap-proach, through different kinds of services:

- Technology watch and guidance
- Technical tests
- Feasibility study
- Prototyping and small series
- Design and implementation of innovative technological solutions
- Technology transfer
- Trainings (from our catalogue or customized)

Follow us on: www.**multitel.eu**

Screen.brussels

In a highly diversified market, in terms of company size as well as in terms of traditional and innovative fields of activity (such as film, TV, gaming, transmedia, series, web series), not to mention expertise (such as production, post-production, virtual reality, funding, distribution, etc.), the Brussels-Capital Region has set up a coherent support structure tailored to all links in the value creation chain, namely producers, post-producers, distributors, screenwriters and more.

Follow us on: **www.screen.brussels**

Sirris

Sirris is the collective center of the Belgian technological industry. Its goal is to strengthen the competitiveness of companies.

The technical support provided to its members is mainly focused on product, process and business model innovation:

- extensive experience in a wide range of companies;
- "High Tech" infrastructure and accredited laboratories throughout the country;
- large network of partners (academic, industrial, research centers, etc. in Belgium and abroad)

Facts and figures: 2500 members, 8 locations, 150 experts, 216 collective research projects, more than 3000 industrial interventions including more than 2000 projects.

Sirris is active in 3 major fields:

- Business of the future
- Product of the future
- Factory of the future

In addition to the technological skills available in the center and through its network, Sirris offers support for the definition of innovative projects, reinforced by internal technological watch and patent support capabilities (Patlib).

Follow us on: **www.sirris.be**

Software.brussels

The Cluster is an initiative of hub.brussels supported by the Brussels Minister of Economy, Export, Employment and Research. The objective is to facilitate and reinforce drastically the economic development and the competitiveness of the Brussels-Capital region. We provide a unique business-oriented platform where members can share knowledge and best practices. We create opportunities to foster local and international collaborations in which members can simultaneously find specific answers to their business needs and technological challenges.

Follow us on: **www.software.brussels**
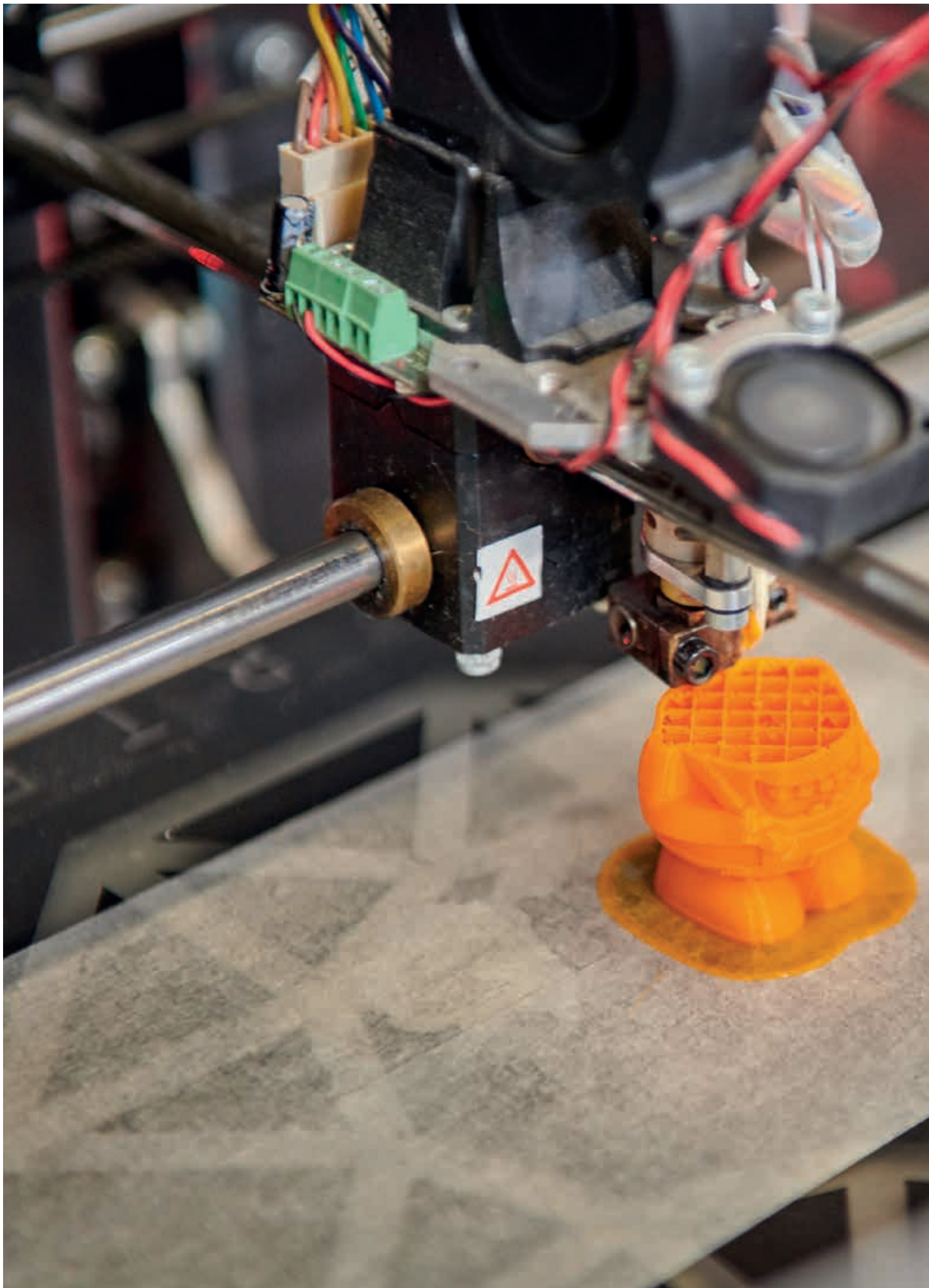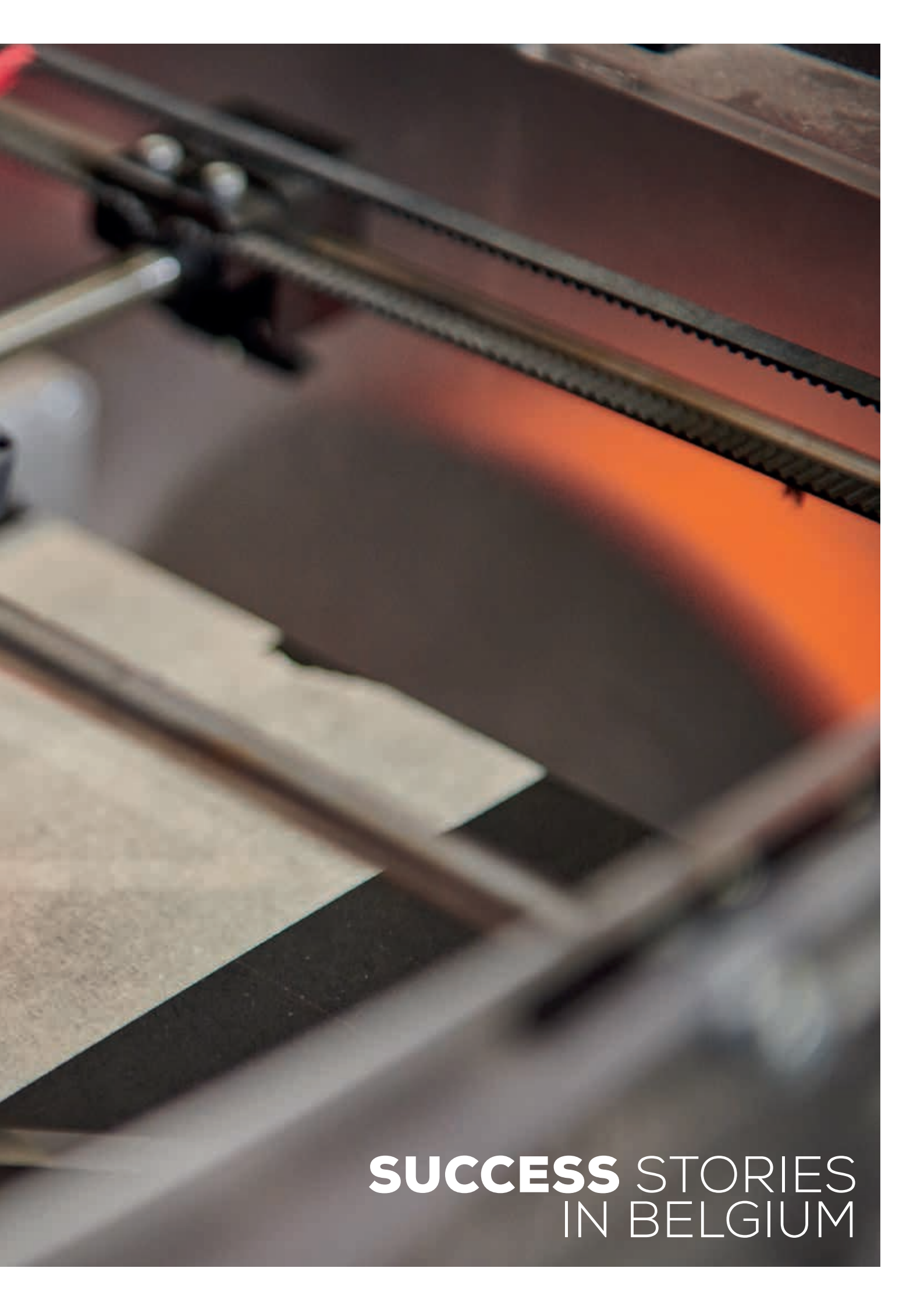
SUCCESS STORIES
IN BELGIUM

INTERVIEW WITH
Bertrand Herry, *CEO*

ADDITIVE MANUFACTURING

COMPANY
Any-Shape

REGION
Wallonia

Founded: 2015

Location: Flémalle

Number of employees: 8 to 9

Turnover: 1 million EUR (2017)

Growth: approx. 30% (2017)

Investment: 2.5 million EUR (2017)

Export share: 40%

Website: www.any-shape.com

Any-Shape
additive technologies for industry

Any-Shape is a leading additive manufacturer for industry. Its customers get an end-to-end service that covers every point in the value chain:

- the "Design for Additive Manufacturing" engineering department offers a service in the design and engineering phase;
- the production and post-production capabilities with state-of-the-art equipments to deliver manufactured items (this being Any-Shape's core business);
- metrology and metallography inspection laboratories, testing facilities and quality and traceability monitoring.

Any-Shape is thus positioned to meet its customers' needs during both the prototyping phase and serial production. "Any-Shape manufactures high-added-value metal and plastic items for companies working in aerospace engineering, defence, motorsports and all kinds of transport. For these sectors, demands around items' mechanical quality, tolerances, finishing and traceability needs are very high, as high as conventional technology. Our major clients include Safran, Airbus, Zodiac Aerospace, PSA Peugeot Citroën, Volvo, SNCF, Valeo and Daimler," explains Bertrand Herry, the CEO.

"We can respond to customers' needs very quickly by making initial prototypes that can be tested during the design phase and potentially modified without generating any financial burdens."

The additive manufacturing technology Any-Shape is operating for end structural pieces is called Selective Laser Melting (SLM) when applied to metal, and Selective Laser Sintering (SLS) for plastic. It entails layering a few dozen microns of plastic or metal powder. This powder is then exposed to a laser which uses 3D geometrical information to fuse the powder together, so that material is built up where it is needed.

"What makes this technology specific – and difficult – is that you have to manufacture the material and the item simultaneously. One of its advantages is that it enables us to make very complex geometric shapes which would not be achievable using conventional technology. This opens up the possibility of making items that offer greater added value. For instance,

aeronautical and motorsports companies are looking for ways to obtain more added value through lower weight, as this has an effect on how competitive they are and how much energy they need to use. This is also particularly relevant to the space sector, where every reduced gram can bring financially advantageous added value," Bertrand Herry explains.

"Production lead-time and the fact we do not have to get together any sets of tools are still one of the reasons why people are turning to this technology. As a result, we can respond to customers' needs very quickly by making initial prototypes that can be tested during the design phase and potentially modified without generating any financial burdens. This cuts down the time it takes to develop products and to get them onto the market," the CEO adds.

Last but not least, this technology is better for the environment than conventional manufacturing. It does not involve waste material, and the plastic or metal powder that was not processed can be recycled and reused. "Additive manufacturing's positive environmental impact represents a lot of added value and is an important reason why people choose it," Bertrand Herry confirms.

THE COMPETITIVE ADVANTAGE OF KNOW-HOW

The market Any-Shape is working in is still maturing, so the company has to offer its customers unique, stand-out capabilities. "30% of our activities is devoted to research & development, which focuses a lot on managing and improving the manufacturing process so that we can make better-quality items. Central to our specific exper-

tise is the way we develop new laser exposure parameters so that we end up with the right product for the customer's specifications, with a minimal amount of post-production work required. We are also working hard to develop an increasingly wide range of materials. That's a crucial part of Any-Shape's strategy," says Bertrand.

BELGIAN SUPPORT FOR RESEARCH PROJECTS

Any-Shape was founded with the constructive aim of responding to an increasingly pressing industrial need in the Wallonia region. It has positioned itself from the start as a leading industrial operator which is able to capitalise on the skills developed in re-

"30% of our activities is devoted to research & development, which focuses a lot on managing and improving the manufacturing process so that we can make better-quality items."

search centres over a period of several years with financial support from the Region. "Any-Shape coordinates research projects that involve all Wallonia's additive manufacturing operators. We also get support for these projects from the Region, as well as investment aid packages, of course. The dynamic ecosystem around AWEX (Agence Wallonne à l'Exportation et aux Investissements Etrangers) is also very important to us," Bertrand adds.

FUTURE INVESTMENT AND A GROWING EXPORT BUSINESS

Any-Shape has already completed two investment rounds and has others in the pipeline. As Bertrand puts it, "we intend to develop our business wisely and profitably, while maintaining our double-figure annual growth target".
As proof of its dynamism and expertise, Any-Shape has already built up a considerable export business operating mainly in Europe. Over the very short term, the aim is that exports will make up 50% of the company's work. France, Germany, the UK and Italy are currently its biggest markets outside Belgium.

INTERVIEW WITH
Gauthier de Valensart, *Founder*

COMPANY

Filaments.directory

REGION

Brussels

Founded: 2018

Location: Brussels

Number of employees: 3

Export share: 100%

Awards and recognition:
selected for the FABulous Acceleration Program for 3D printing projects

Website: www.filaments.directory

Filaments.directory focuses on Fused Deposition Modeling (FDM) technology. Its founder, Gauthier de Valensart, discovered 3D printing during a trip to the United States in 2012. Not long after his travels, he became interested in the ways in which this new technology could change businesses and the lives of ordinary people.

The startup was launched in response to the difficulties businesses and individuals might encounter when trying to find the right materials for their needs. "It was clear that there were many manufacturers around the world, but all focused exclusively on their own market. There was a need for customers to be able to find the right materials to give their printed items the properties they were after," explains Gauthier de Valensart.

Filaments.directory collects information about printing parameters from companies that use 3D printer filaments. "The main problem is that each machine uses different parameters. There are too many potential combinations of materials and machines for producers to be able to supply the right parameters every time. We resolve this problem by giving users the opportuntity to share what they have done by displaying the parameters that work well on the machine in question. This saves time and money for companies that might be interested in this information," says Gauthier de Valensart.

"Customers needed to find the right materials to give their printed items the properties they were after."

There are currently 80 brands on Filaments.directory's platform, including major names such as Solvay and Mitsubishi, and it is free to use. The company now offers materials producers the possibility of paying for plans that will boost their visibility on the website. The startup has also set up a whole series of partnerships with out-

side apps so that it can gather thousands of pieces of information for big data-style analysis.

Filaments.directory has won the support of the European Commission via a program entitled FABulous, The 3D Printing European Accelerator.

SETTING THE BENCHMARK FOR MACHINES AND MATERIALS WITH FDM TECHNOLOGY

"It is interesting how to combine machine and materials, because you can potentially get multi-material pieces with one solid, rigid section, making them more technical in nature. For our visitors, the added value we provide is that we can help them find the right materials for their applications," explains the director.

Gauthier has provided consultancy services for a Belgian waffle mould maker. "Previously, clients had to make a metal mould to determine the shape of their waffle. Now they can print 3D prototypes to test and approve their moulds. Thanks to the advice and parameters from Filaments.directory, the client was able to print 3D prototypes for their waffle shapes in about two hours. This meant that feedback came quicker and the projects could be significantly accelerated," he says.

"As well as saving time, our services limit the risk of a print failing due to the use of inappropriate material. As a result, less waste is generated. We are the leading company for 3D printing materials in terms of both research and how these materials are used in FDM technology. Another objective of ours is to be able to cover every material used for 3D printing," de Valensart adds.

At the moment, the company mainly works in Europe and the United States. The rest of the world accounts for 20% of its online visitors.

MULTIPLE PROJECTS IN THE PIPELINE

Gauthier explains that "our short-term goal is to convert the brands we already have on the website into paying customers. On top of that, our objectives are to increase the number of partnerships with either external apps or other businesses. Our constant aim is to gather as many valid printing parameters as we can so that we can share a maximal amount of information and generate more value for our project."

"As well as saving time, our services limit the risk of a print failing due to the use of inappropriate material."

In 2019, Filaments.directory is going to launch a resin printing project. "The sector's leading manufacturer is going to lend us a machine so that we can get this ambitious idea off the ground. We are also looking towards a market research project, because we have information about supply as well as demand," Gauthier says.

According to Filaments.directory's director, because industry 4.0 is essentially built on a variety of complementary technology, those businesses that use this technology in the most advanced and finely customised ways will be the ones to win a competitive edge. He goes on to explain how, since production requires a considerable

amount of plastic, 3D printing has a lot to offer industry 4.0 in that it allows users to manufacture locally using a file stocked with all the necessary information. "That helps to cut down on transport costs, for instance, and it is more acceptable from an environmental point of view so long as other conditions, such as the type of polymer selected, are also tested and approved," Gauthier de Valensart concludes.

INTERVIEW WITH
Bart Van der Schueren, *CTO*

ADDITIVE MANUFACTURING

COMPANY

Materialise

REGION

Flanders

Founded: 1990

Location HQ: Leuven

Number of employees:
1,951 FTE (August 2018)

Revenue: 143 million EUR (2017)

Growth: 24.5% in revenue, 60% in EBITDA
(2016/2017)

Patents/licenses: 242 patents +
195 pending (May 2018)

Awards and recognition:
• Silmo d'Or award for excellence in optical
  innovation (2015, 2018)
• Trends Gazelle Award (2002, 2007,
  2008, 2011, 2017)
• AMUG Innovators Award (2017)
• Red Dot Design Award (2005, 2006,
  2007, 2010, 2011)
• TCT 3D Print Hall of Fame (2017)

Website: www.materialise.com

The name Materialise is instantly recognisable in the world of 3D printing. Even when the internet was in its infancy in the 1990s and most web shops did not yet exist, customers of this Leuven company could submit data online from which 3D models were printed. Today, Materialise is still at the forefront, benefiting from an R&D department receiving reinvestment to the tune of 20% of all revenue. "There is no other company like Materialise," says Bart Van der Schueren, Materialise CTO.

According to Van der Schueren, Materialise's unique nature is thanks to a combination of elaborate application development hardware and support software. Together, these solutions constitute the backbone of the company's 3D printing operations undertaken in various sectors roughly subdivided into two groups: patient-specific medical applications and other applications. Automotive, industrial, aerospace and other companies can be found in the 'other applications' category.

A WIDE RANGE OF SOLUTIONS

Certain Materialise customers prefer to print their own products. Materialise supplies such customers with a full software application suite to facilitate printing and

"In principle, anyone requiring a prototype is a potential customer."

ensure smooth progress. "A new application our company developed and commercialised facilitates the conversion of medical data – such as CT or MR images – into anatomical 3D data", adds Van der Schueren as an example. "These packages are used in many academic hospitals. Once our customers have this software, it becomes easier for them to proceed towards Independent printing."

But some companies may want to have their products printed. Materialise offers a wide range of technological and material solutions to such companies too. Typical customers include companies wishing to produce limited batches of highly technical products. "They come in many shapes and sizes," says Van der Schueren. "In principle, anyone requiring a prototype is a potential customer."

Mass customisation is a unique 3D printing application. In this field, Materialise is the outright leader when it comes to marketing patient-specific instruments used during orthopaedic surgery. The Materi-

**materialise**
innovators you can count cn

alise CTO also waxes lyrical about the eye-wear revolution being instigated by his company. Following a quick facial scan and a choice of frame, customers receive fully customised spectacles thanks to collaboration between Materialise and a lens maker.

MAKING 3D PRINTING FIT INSIDE THE BIGGER INDUSTRY-OF-THE-FUTURE PICTURE

The above example typifies the strong focus placed by Materialise on application development. "Of course, printing technology and software is readily available. But one of the greatest challenges involves converting these resources into applications and thus creating value. We've become application developers because we co-create. We're known for our willingness to develop products in conjunction with our customers. We provide input on specificities surrounding additive manufacture, while our customers offer industry- and product-specific input. This allows us to come up with transformative innovations," adds Van der Schueren.

> *"We want to be the backbone of the 3D printing industry."*

These transformative innovations differ radically from how progress generally manifests itself in the industry. This usually happens on an incremental basis. 3D printing is also considered a different part of the production process. Materialise intends to move forward and, for this purpose, supplies tools to make the 3D printing mini-ecosystem fit inside the bigger industry-of-the-future picture. "We want to be the backbone of the 3D printing industry," emphasises Van der Schueren. Consequently, Materialise software is available as part of e.g. CAD software (as
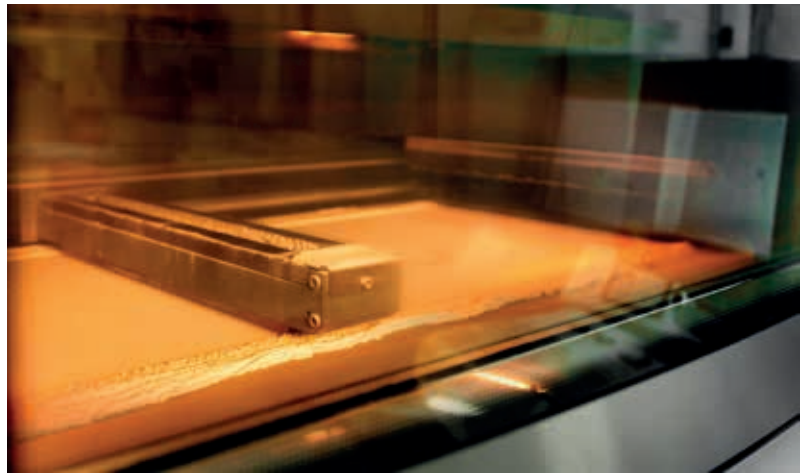
used by Siemens) or is linkable to SAP and Manufacturing Operational Management systems. "Once your digital environment is in place, the application of 3D printing becomes more straightforward and easy."

Data has not always been as readily available as it is now. When Materialise was established in 1990, many designs were not available in digital form. The company was the first in Belgium and one of the first in the world to focus attention on 3D printing. Over the years, Materialise has supported the industry and has been fortunate to receive backing from support organisations like VLAIO and Flanders Make, with the company itself being a founding father of Flam3D.

However, according to Van der Schueren, Belgium has benefitted the most from the company's collaboration with universities. Materialise came about as a reverse spin-off of the KULeuven (Catholic University of Leuven) and still maintains close ties with this and other Belgian universities. According to the CTO, this represents increased publicity and a greater inflow of talent.

GLOBAL TALENT

"Our approach of establishing close to universities has remained unaltered for all our green field investments, having started off in the United States. Here, we kicked off with the aim of globalising our software. It didn't take long for us to establish additional sales offices in the UK, France, Germany, etc. Over time, we moved part of our manufacturing operation offshore to Ukraine – yet again in

close proximity to a university. This is how we started globalising both our sales and our R&D operations," explains Van der Schueren.

Materialise currently maintains a physical presence in 18 countries, with around a dozen branches manned by between 30 and 300 employees. This supports the flow of talent towards the Leuven head office, staffed by more than 600 employees from more than 40 countries. Europe remains the largest market and generates approximately half of all revenue, followed by North America and Asia. But the Latin American market is growing rapidly. "Our footprint covers most of the industrialised world," says Van der Schueren. "Throughout this expansion, the facilitating support provided by Flanders Investment & Trade has been invaluable," adds the Materialise CTO.

Further expansion of the company is in the pipeline. "We have great faith in the potential of 3D printing. Digital data is becoming more and more commonplace, while companies are sure to embrace additive manufacturing. This will demand a change in mentality which, in turn, will take time. But we're sure that the 3D revolution will arrive. There are already signs that reshoring is being facilitated by 3D printing and Industry 4.0 in general. It makes more sense, even from an environmental perspective, to ship bulk raw materials instead of finished products if production costs are roughly the same, regardless of where products are made. This means that the future of our company looks rosy," concludes Van der Schueren.

INTERVIEW WITH
Nicolas and Laurent Monnoyer,
Founders

AUGMENTED REALITY & VIRTUAL REALITY

COMPANY

Big Bad Wolf

REGION

Wallonia

Founded: 2012

Location: Genval

Number of employees: 18

Turnover: 1.5 million EUR (2017)

Growth: 23.5% (2017)

Investments: 400,000 EUR in R&D (2017)

Website: www.bigbadwolf.be

Big Bad Wolf's mission is to guide businesses through successful digital transformation and brand image development drives. According to Big Bad Wolf's founders, brothers Nicolas and Laurent Monnoyer, the role of a modern-day digital studio is to roll out all the technological and strategic options available so that its customers can achieve their vision.

Nicolas Monnoyer explains that "we have to reinvent the way consumers experience a brand. They are now looking for authenticity, they want brands that are committed to delivering on the promises they make in their advertising. Competition between brands is fierce, but customers' loyalty is never enhanced more effectively than when they see products and services being constantly improved." This belief, says Laurent Monnoyer, forms the heart of Big Bad Wolf's positioning: "we help innovative brands to identify technological opportunities which will impact on their image, of course, but also on their products and services." As for Big Bad Wolf's skillset, Nicolas Monnoyer explains that "we provide our clients with a consultancy and analysis service that helps them foster new ideas to boost their business. That is not all we do, however. In fact, because our aim is to support clients over the long term, we lay the foundations for the transformation they will then undergo, in particular by creating, testing and approving prototype software solutions or digital platforms that will bring real added value to the company."

The studio has also built up considerable capabilities around issues that never fail to appear in strategic roadmaps, namely AR and VR, supported wherever possible by AI. These new technological resources for organising the way we perceive computer information and "natural" interfaces present a host of opportunities to the business world.

SERVICE AND SOFTWARE

"What we are talking about is a fourth industrial revolution, and this new interface between man and machine could become a decisive survival factor for those businesses that need to constantly find the means to operate at the highest standard. This is rele-

vant to both B2B and B2C companies, across everything they do, from product development to production and marketing," point out the brothers.

"Making profound changes to a client's business can sometimes generate a little resistance within its ranks, but that is a natural reaction in that people are sometimes worried about their profession's future. This is why our background in communications, combined with our immersive technology, can play a decisive role in customers' projects," adds Laurent Monnoyer. "In some cases we help our clients and their teams to engage in their change management process by using virtual reality, for example, to represent the company's vision and help them envision a new reality. As when we are producing a film, we can tell the story behind this vision, while also bringing it to life as part of an immersive experience."

Big Bad Wolf's strategy is to simultaneously develop a service, on the one hand, and software solutions for businesses on the other. "Because the service we provide means we are always conversing with our clients, we are able to pick up on those needs which keep occurring in a sector and come up with software solutions for them. The service element of our work gives us an antenna, if you like, that picks up on a sector's needs," explains Laurent Monnoyer. "In concrete terms, our strategy involves developing each software solution within its own spin-off company and funding it as required. We use a similar model to that of startup studios'," says Nicolas Monnoyer.

Big Bad Wolf's most recent project is a piece of software that uses mixed reality to enable businesses to interactively present 3D models of their prod-

ucts to help gain efficiency in sales and marketing. These businesses can therefore demonstrate the value they are able to bring to the table through an immersive, interactive experience using augmented and virtual reality. This solution has uses throughout a product's lifecycle. Viewed from this perspective, the software becomes a tool for giving the go-ahead to innovations, provides sales teams with a supportive solution and, once a sale has been agreed upon, serves as a guide during handovers by virtually demonstrating all a product's features, especially for products that are large in size or sold prior to manufacture.

> "We provide our clients with a consultancy and analysis service that helps them foster new ideas to boost their business."

"Selling a technological industrial product is always complicated because there are whole different sets of people you need to convince. You need to bring a specially tailored narrative and argument to the discussions you have with each one of them. Our solution allows you to do just this, because the pitch presented in the product can be adapted to suit each different role involved in the sales process, from engineers to salespeople, technicians and so on," says Laurent Monnoyer. But the story does not end there. Technology changes fast, and Big Bad Wolf is already planning to add new features to its platform. The studio would like the product experience they offer to include as much virtual reality as it does augmented reality, given that these interface technologies will

very likely converge in the near future. "That is why we are working to embed a mixed reality maintenance help tool which, when it is combined with artificial intelligence, will allow us to detect particular faults by running comparisons with a reference model called Digital Twin," explain the Monnoyer brothers.

BELGIUM'S SUPPORT FOR THE BUSINESS' DEVELOPMENT

"Lots of aid and guidance is available in Belgium, for instance from AWEX (Agence Wallonne à l'Exportation et aux Investissements Etrangers), Digital Attraxion and the funding provided by Wallimage Entreprise," confirms Nicolas Monnoyer.
Laurent Monnoyer points out that, "because the market we are operating in is small, support like this enables us to structure our company and to establish a name and a presence for ourselves internationally. It plays an essential role in keeping us up to speed with the competition from the other side of the Atlantic."
"The advantage of being in Belgium is that you have a multicultural society all around you, and a test market too. On top of that, Belgian schemes encourage different countries, major companies, universities and research centres to interact with one another. It is a real benefit," says Nicolas Monnoyer.

AN EXPORT-ORIENTED FUTURE

"After we have completed our capital-raising drive for the platform in 2019, our ambition is to set up sales offices abroad. Production will stay in Genval, where the startup first began," confirm the brothers in life and partners in business.

INTERVIEW WITH
Leen Segers, *Co-founder*

AUGMENTED REALITY & VIRTUAL REALITY

COMPANY

LucidWeb

REGION

Brussels

Founded: 2016

Location: Brussels

Number of employees: 7

Export share: 100%

Awards and recognition:

- One of 10 finalists at Start-up Germany's Techrally in Berlin (June 2017)
- One of 8 finalists at Rockstar VR/AR Paris (December 2017)
- One of 10 start-ups awarded at DIGITAL4HER, a contest run by the European Commission to identify and support female-led European technology start-ups (July 2018)
- Winner Pitch@Vlerick (July 2018)

Website: www.lucidweb.io

LucidWeb is an ambitious company making waves in the field of web-based Augmented Reality (AR) and Virtual Reality (VR) applications. "Accessibility," says company cofounder Leen Segers, "is what LucidWeb offers." "AR and VR applications are traditionally built and distributed via an application. The industry and associated standards are constantly changing, requiring significant investment by publishers in terms of both money and time. From a consumer perspective, such apps are so large that they threaten to instantly exceed smartphone storage capacity," she explains. "This makes a browser-based application approach far more accessible."

THOUGHT LEADER

Companies can distribute or display VR and AR on all devices via browser using the WebXR standard, which LucidWeb did not develop itself but instead played the role of 'thought leader'. "If the technology necessary for browser-based experiences is in place, why develop another expensive and inaccessible app?" asks Leen Segers.

Just because the technology is in place does not mean that everyone who handles content possesses the knowledge required to publish AR or VR experiences to the browser via the

"The platform is so outside-the-box, intuitive and easy to use that our customers will see its value for themselves. Accessibility is key."

WebXR standard. This process still requires developers, designers and - often - UX experts. For this reason, LucidWeb is looking to offer a WebXR-based platform that is intuitive to such a degree that the technology becomes accessible to everyone. "A standard web team that does not necessarily have great technical know-how, but uses our platform, can create and distribute interactive content in as little as one hour," the cofounder adds.

"To be specific, the LucidWeb platform generates code that can easily be implemented to a website. We also offer tools, such as an editor, for adding interactivity to content. Clients remain responsible for uploading their own material and for all their assets, meaning that they still retain full ownership," explains Leen Segers. This approach mainly appeals to medium-to-large online publishers, to which interactivity is becoming more and more important. In addition, companies that use video

for the training and instruction of staff form a second major target audience. As an example, LucidWeb – in conjunction with the University Hospital of Nantes – has developed a prototype that displays operating theatre footage during important surgery. People who experience the practical aspect are bound to learn much faster. A third type of client can be found in the retail sector. Coca-Cola has, for instance, used LucidWeb to make a video accessible in interactive form in a browser when a barcode was scanned.

GLOBAL MINDSET FROM BRUSSELS

With its platform, LucidWeb is setting its sights on A-brands and intends to use a number of vertical partnerships to launch the platform. On that basis, it wants to further explore the market. As a consequence, expansion of the company – by definition – concentrates on the international market. "Our starting point is our own European home front", says Leen Segers, who goes on to describe LucidWeb as a European company based in Brussels. "Then we want to expand quickly, both east- and westwards. We intend to open an office in the United States and another in Asia, the exact location of which will be pinpointed at a later stage. We're definitely considering China, a country that's essential to the future of consumer web AR and VR thanks to its pioneering 5G activities.

According to Segers, LucidWeb's setting in Brussels is a great trump card. "Major cities like Amsterdam, London, Paris, Cologne, etc. are all nearby. The large number of professionals passing through, or staying in, Brussels on EU-related business offers an enormous networking boost. And its European link also gives Brussels additional credibility."

Leen Segers lived in London prior to putting LucidWeb on the map in Brussels. Upon returning to Belgium, what surprised her most was the vibrancy of the AR and VR community. It did not lag behind London, neither in quantity nor quality. And Belgian companies were also very advanced in comparison to those in other countries.

A plausible reason might be support from organisations like hub.brussels and screen.brussels. "These governmental organizations have always supported us. Hub.brussels has even introduced us to a co-founder and current advisor." And accelerators like imec.istart and Start it @KBC also support the growth of Belgian start-ups. "I want to prove that it's possible to develop first-class AR and VR companies right here in Brussels without any need to be based in London or Paris."

UNIQUE SELLING POINT

Leen Segers is confident about the future. The platform should be operational by the summer of 2019. By may-2019, login- and introductory customers will be able to test the platform and give feedback. The sales team will also be expanded in 2019, but Segers emphasises the fact that the technology will – for the most part – sell itself. "The platform is so outside-the-box, intuitive and easy to use that our customers will see its value for themselves. Accessibility is key. And, the amount of time we've spent working on WebXR browser-based experiences has given us a one-of-a-kind status in the industry."

Also quite unique is Leen Segers' position in an area still dominated by a male workforce. As cofounder of Women in Immersive Tech Europe, a non-profit organisation established in Brussels, she intends to shift diversity and ethical design thinking boundaries too over the coming years. Considerations here include diverse recruitment policies as well as the responsible handling of data. Finally, LucidWeb also wants to play a pioneering role in the field of creative applications. "We're going to take the leap from WebXR "thought leader" to 'technology leader'," she confirms.

INTERVIEW WITH
Jonathan Berte, *Founder and CEO*

AUGMENTED REALITY & VIRTUAL REALITY

COMPANY

Robovision

REGION

Flanders

Founded: 2012

Location: Ghent

Number of employees: 33

Turnover: 2 million EUR (2017)

Export share: 70%

Awards and recognition: Rising Star Award 2018

Website: www.robovision.be

Robovision is specialized in the application of artificial intelligence to image information. To this end, it developed a software stack based on neural networks, also known as "deep learning". Once enough images are labelled by domain experts, Robovision's software can subsequently detect situations in a fully automated process.

WORLD LEADER

"Moreover, we also built the first versions of robots capable of operating on our software," adds Jonathan Berte, the company's founder and CEO. The further deployment of the hardware takes place via licensed integrators and partnerships." For example, Robovision built the first version of a machine that plants tulip bulbs in an optimal way, whereupon a hardware company scaled it up further."

"Agriculture is our most mature vertical.", says Berte. "After labelling, we can recognize all components of a plant and thus allow a robot to safely

"We are in pole position to fundamentally disrupt various sectors."

grasp it, manipulate it, prune it, insert it into the ground, sample it to conduct further DNA analysis, etcetera." Robovision's knowledge is therefore used in various contexts such as picking up stems on a conveyor belt, measuring strawberries to predict how much they weigh and what their quality is or automatically cutting rose bushes.

Applications of Robovision's deep learning technology are almost endless, and not limited to agriculture. "We are in pole position to fundamentally disrupt various sectors," says Jonathan Berte. "For example, think of Smart Cities. Thanks to our technology, cameras can analyse behaviour patterns, recognize vulnerable individuals, detect terror threats and much more. Cities such as Antwerp and Amsterdam are among our cus-

tomers. We also see many opportunities in the manufacturing and process industries. Our technology is used, for example, to detect and pick up things. Or to scan whether all the necessary components are present in let's say a toolkit."

DEMOCRATIZATION OF HUMAN EXPERTISE

In the previously referred to cases, Robovision's expertise is used to supplement or even replace labour, a crucial component which can be very expensive or difficult to find in some countries. "But the democratization of human expertise is our real business model", says Berte.

Robovision therefore also applies its technology to the medical sector where "deep learning" is used on patient scans to detect specific pathologies. "What is needed most, are domain experts who can analyse information and act accordingly. Many

"You immediately attract interest from all over the world if you focus on a very complex problem".

places all over the world lack people who have this specific knowledge. With our AI technology, we can make this domain knowledge accessible to everyone.

For Robovision, export has been essential from the very start. "You immediately attract interest from all over the world if you focus on a very complex problem", says Berte. "Customers find us via trade fairs, integrators and even thanks to documentaries. With our AI technology and cameras, we were the first in the world to succeed in picking up plants and inserting them into the ground. As a result, we instantly found customers in the entire world, from Australia to Japan."

UNIQUE PROGRAMMES

According to Berte, a country like Belgium has many strengths in its favour. "We have chosen to settle in Belgium because it is a country with a democratic university landscape where talent is given many opportunities. Belgians have a stronger sense than others that not everything revolves around financial gain. Talented people are more inclined to make a home here than 10 years ago, because Belgium has many things running smoothly, such as healthcare and education."

"In addition, Belgium boasts many companies willing to invest in AI and

has a well-developed ecosystem, consistsing of an industrial fabric but also of institutions such as VLAIO, Innoviris and imec. Another example of why this country is a good place for start-ups are the ICON subsidy programmes. These are designed to facilitate collaboration between small and large companies and to optimally bring academic knowledge to the market. These programs are unique in the world.", Berte explains.

The CEO has set very high ambitions for his company within this ecosystem. And not only in terms of technology, "Our goal is to have the model AI software for the entire world", says Berte, but as well at the social level. "Within 10 years, we want to become the essential component to make society better, more transparent, inclusive and more equal".

INTERVIEW WITH
Ségolène Martin, *CEO and co-founder*

ARTIFICIAL INTELLIGENCE

COMPANY

Kantify

REGION

Brussels

Founded: 2016

Location HQ: Brussels

Number of employees: 8

Awards and recognition: selected for
- KBC Bank's Belgian Startit@kbc incubator
- French Tech Euratechnologies incubator
- leading technology companies NVIDIA and Microsoft for their schemes for startups specialising in artificial intelligence

Website: www.kantify.com

The Belgian startup Kantify specialises in artificial intelligence and its key role is to develop bespoke AI solutions that give its clients a competitive advantage in their market. The company has a solid track record, having already formulated multiple solutions to previously unresolved AI problems.

According to its CEO and co-founder Ségolène Martin, Kantify owes the competitive edge it has in the AI market to the ultra-high-performance models that have emerged from its R&D efforts and proved their worth in a variety of industries. Another factor is the way the company has been able to adapt its technology to develop tailored solutions for its clients' specific issues.

PUTTING DATA TO USE

Kantify has a dual technological and business-oriented approach. This allows the startup to give clients a better understanding of how to use AI before it develops solutions for them. Ségolène Martin explains that "data has no value unless it is put to use. As we help our clients to understand how they can use their data and de-

"Predictive price analytics give us the best results out of any company working in this area in the whole world."

velop AI solutions for them, our objective is always to generate maximal value through our robust, high-performing solutions."

The company is now growing impressively, not least thanks to the three key capabilities that the CEO emphasises: predictive price analysis, automated video and image analysis, and predictive marketing.

Regarding pricing, she says that "Kantify's predictive analytics make it easier for buyers to make decisions by enabling them to buy materials or produce products at the right time given the way prices are developing, for example. Predictive price analytics give us the best results out of any company working in this area in the whole world." For instance, Kantify is active in the petrochemical industry,

using its predictive skills to analyse the price of raw materials. "The main advantage of our approach is that it gives our clients the chance to make the right decisions using information that no other operator on their market has, least of all their competitors," explains Ségolène Martin. Kantify also helps businesses to decide upon retail prices that suit their strategy and/or objectives. "Dynamic pricing allows vendors to decide on a retail price that will maximise their chances of securing a contract or increasing their revenue or margins." Kantify uses artificial intelligence to help businesses rapidly generate value.

In terms of predictive marketing, Kantify empowers businesses to cut down on customer churn rates by predicting when and why customers will call time on a contract. Kantify also provides a customised marketing solution that gives businesses the opportunity to present their B2B or B2C customers with the product or service they are most likely to buy. "For example, if our client has a website with 10,000 products and 500,000 customers, their objective will be that the end consumer sees the products he or she is likely to buy before anything else, as well as the product that turns a profit for the company," the CEO goes on to say.

Finally, as part of its image analytics work, Kantify has developed automated technology that allows businesses to analyse millions of images and videos in real time. "We give brands the opportunity to spot when influencers are giving visual exposure to their products on social media by displaying either a product itself or a logo, for example. This gives them real-time feedback on the return-on-investment their promotional campaigns are generating, while also allowing them to compare themselves with their competitors or even figure out who their latest champions or detractors are."

"The keyword in each of our projects is 'value', as our number-one objective is to quickly provide sustainable value for our clients."

"These three key capabilities allow our customers to do things that were once impossible, or which formerly took a much longer time," Ségolène Martin says. "The keyword in each of our projects is 'value', as our number-one objective is to quickly provide sustainable value for our clients." As such, Kantify's solutions help clients to save money, up their performance or develop new services. According to her, "the one thing that all our clients have in common is that they are all using AI as a driver for growth."

The startup now works in the petrochemicals, logistics and financial services sectors, as well as more broadly to marketing and media operators. Kantify also has a presence in the medical industry.

AN ADDED ADVANTAGE: BELGIUM'S NETWORK OF UNIVERSITIES AND SCIENTISTS

From the CEO's point of view, Belgium has a number of assets it can offer businesses. First among these is its knowledge bank, in that the country has an advantageous number of research laboratories and universities. Belgium's geographical location also opens up opportunities for international trading: "it is easier to make links given the major markets we have just across our borders and our easy travel connections. Our international clients appreciate that we are never far away," she stresses. So what is the next step in Belgium's journey? "It is now important that Belgium increases its visibility globally and collectively. Belgium has no end of talented people and cutting-edge technology – we just need to make sure others get to hear about them," the CEO explains.

A FAILSAFE STARTUP

"Artificial intelligence is a new area. Some businesses are worried about investing time and resources and then not getting any results. For instance, making an investment so that you can predict something that no one has ever been able to predict before might be judged a risk, and rightly so." Kantify has developed an upstream analysis methodology which allows users to foresee and prevent risks by taking precautions around the technology or data sources they select. This feasibility analysis is very important. "Because of the methodology we use, we have always been able to produce good results for our clients and to generate value for them quickly," says Ségolène Martin. The business consequently plans to develop its work in the coming years, with a particular focus on its consultancy service so that it can open up a permanent channel with clients and respond to whatever needs they may have.

INTERVIEW WITH
Olivier Devolder, *Head Energy & industry activities*

ARTIFICIAL INTELLIGENCE

COMPANY

N-Side

REGION

Wallonia

Founded: 2000

Location HQ: Louvain-La-Neuve

Number of employees: 90 (30% PhD)

Turnover: 7 million EUR (2018)

Growth: Double-digit growth of turnover each year (during the last 4 years)

Export share: 80%

Patents/licences: IP creator

Awards and recognition:
• nominated for the Solvay Awards
• multiple awards from clients

Website: www.n-side.com

N-SIDE provides software solutions as well as consultancy services, built on innovative optimisation and artificial intelligence technology. This company, based in Louvain-La-Neuve, specialises in data analysis and was founded in 2000 by Philippe Chevalier (now president of the Board of Directors and Operation Research professor at the Université Catholique de Louvain's School of Management). "Mr. Chevalier intuited that there was an opportunity to be seized by forging a link between university research and industry," says Olivier Devolder, who manages the firm's energy & industry activities. Part of N-SIDE's DNA is advanced analytics technology, which is based on applied maths, statistical and artificial intelligence techniques

LEADING IN PHARMA, ENERGY AND HEAVY INDUSTRIES

N-SIDE mainly works in three major industries, the most significant of which, contributing more than 50% of the company's turnover, is pharmaceuticals. "Pharmaceutical companies have to deal with a lot of uncertainty during the clinical trials which indicate how effective the innovative new treatment is for their volunteer patients. It is extremely difficult to predict the recruitment process of patients, how these patients will react to the treatment and how big a dose should be. They are therefore manag-

"N-SIDE rolls out algorithms that combine economic and technical issues, even when these are as complex as physical-chemical equations."

ing a lot of unknowns as they work to ensure that each patient gets adequate treatment," Olivier Devolder explains. "N-SIDE's role is to estimate and optimise the quantities of medicine that should be produced and distributed to hospitals all around the world, and to quantify the risks to patients. Pharmaceutical companies cannot risk a patient not getting the right treatment. But by cutting down on waste, mathematical optimisation resources can reduce the costs involved by significant average margins of 30 to 40%. Twelve out of the pharma sector's 20 biggest operators are clients of N-SIDE."

The second industry N-SIDE works in is energy. The company has been present in this area for several years thanks, in particular, to Euphemia, its flagship algorithm. "Our algorithm collects data on energy sales and purchase propositions and the limitations of the electric network and it then uses them to match up supply and demand across Europe and determines

electricity prices on an hourly basis." N-SIDE has capitalised on its considerable expertise to develop several innovative solutions based on optimisation techniques and machine learning. These are now used by key operators in the energy sector, including transmission system operators (TSOs), distribution system operators (DSOs), market operators, utilities companies and major consumers.

N-SIDE's third sector is heavy industries such as steel, paper and chemicals. "One important part of our work involves helping the iron industry to optimise the raw materials it selects," says Olivier Devolder. "To meet this objective, N-SIDE rolls out algorithms that combine economic and technical issues, even when these are as complex as physical-chemical equations. An algorithm like this can help industrial operators to significantly reduce their costs by 3 EUR to 4 EUR for every tonne produced," he explains. N-SIDE is also developing smart production planning solutions so that it can convert electricity prices' volatility into real financial opportunities while reducing the ecological footprint.

Olivier Devolder goes on to explain one final key advantage that N-SIDE can provide: modular, customisable, multi-purpose solutions. Because artificial intelligence techniques are universal in nature, a single algorithm can be used for similar objectives in areas such as risk management for the pharmaceutical, paper milling and energy industries, for instance. Moreover, modular solutions give clients

"Moreover, modular solutions give clients the opportunity to combine planning and price prediction models."

the opportunity to combine planning and price prediction models. This combination in turn allows those electricity-intensive industries that are very strongly affected by fluctuations in energy prices to optimise their production schedules in line with their industrial and technical requirements, and to manage their energy consumption to suit spikes in electricity prices. This type of optimisation solution developed by N-SIDE makes it possible for heavy industry operators to save 10% of their energy budget.

BELGIAN TALENT: A SERIOUS ASSET

"Our talent is our number-one advantage when it comes to reaching our goals and making sure we stay competitive, especially on an international level. Being based in Belgium is a significant asset when we are trying to attract talented people with the skill-sets we need," confirms Olivier Devolder. "Belgium is right at the centre of Europe's interconnected networks of energy, logistics and so on, and therefore an interesting location for companies involved in artificial intelligence."

N-SIDE's strong, enduring international presence is reflected in its staff team made up of 15 different nationalities, but also in the kind of work it is involved in, in that 80% of its turnover is generated in exports. Most of income generated by the energy brach of N-Side comes from Europe, while the heavy industry branch is geographically more diverse with important turnover in China, Ukraine, Brazil and the United States. The latter country and Europe are also crucial markets for the pharmaceuticals branch.

A TECHNOLOGICALLY ADVANCED FUTURE LED BY INNOVATIVE SOLUTIONS

"The objective is to offer modular solutions which all share the same technological bases so that we can add greater breadth to our range and meet clients' needs quicker," Olivier Devolder explains. "N-SIDE also intends to continually simplify its user interfaces so that it can remove any complex algorithmic barriers that might exist," he adds. "From the client's perspective, the aim is to make complex decisions in an easier way. It's not up to the client to look into all the complexities of the algorithm, what they want is effective, transparent solutions. Orienting our business model towards increasingly modular, innovative solutions will allow us to enhance our growth."

The company also intends to reinforce its position in the USA and to branch out into new markets as it targets a future turnover of 10 million EUR.

INTERVIEW WITH
Jan Verhasselt, *CEO*

ARTIFICIAL INTELLIGENCE

COMPANY

Yazzoom

REGION

Flanders

Founded: 2011

Location: Ghent

Number of employees: 11 FTEs

Growth: 40% (2017)

Awards and recognition:
- Maintenance & M+R 2017 Digital Innovation Tour Audience Award
- AGFA Smart Healthcare Hackathon Award 2017

Website: www.yazzoom.com

Yazzoom is specialized in the combination of two fields of expertise: Artificial Intelligence and advanced control engineering. The former involves machine learning and optimisation algorithms, while the latter mainly revolves around the constant control of machinery and process systems. As such, Yazzoom optimises operational processes and designs innovative products. "Our most important contribution to new products such as new measuring devices or automatic inspection systems is the mathematical software that extracts important information from the raw sensor", explains Jan Verhasselt, Yazzoom's CEO.

PREDICTIVE AND PRESCRIPTIVE ANALYTICS

Predictive and prescriptive analytics are at the heart of its knowledge base. When it comes to predictive analytics, Yazzoom predicts the value of useful variables by applying machine learning to historic data. In the case of prescriptive analytics, Yazzoom's software even takes a step further by making actual recommendations through the application of optimisation algorithms

"Yazzoom invests no less than 75% of its gross margin in research and development."

to predictions made by predictive analytics and possibly to other parameters.

An example of this technology can be found at the Belgian industrial company Umicore, which uses Yazzoom software for real-time optimisation. By predicting the price of electricity for the upcoming 15 minutes and measuring Umicore's industrial production processes, Yazzoom's software – every 10 seconds – determines whether it is more economical to produce the required steam from the gas turbines, or whether other energy sources should be used. "This is a great example of industry 4.0, because it combines the Cloud aspect, the connectivity aspect, the predictive aspect and the industrial aspect", adds Jan Verhasselt.

Before taking on a project, Yazzoom examines its feasibility. "First and

foremost, we identify the available data and gauge the impact of absent data. Then, we create a model at minimal cost, which we test offline as a proof of concept using the available data. Based on its performance, the customer then decides whether or not the predictive model goes live."

YASENSE AND YANOMALY

Yazzoom invests no less than 75% of its gross margin in research and development. Thanks to this, and thanks to the experience in various fields of application that the company has managed to build over the years, it has been able to develop two innovative products named Yasense and Yanomaly.

"Yasense is a software application that facilitates the creation and deployment of virtual sensors", explains Verhasselt. "If you intend to measure a certain quantity, but don't have access to a sensor that can consistently do so in an economically justifiable way, we can make an accurate prediction by measuring other process data parameters. To do this, we use a combination of historic process data, occasional data and AI. An example is the prediction of laboratory measurements of physical quantities that can only be measured by taking samples or so-called occasional data. We have, for instance, created virtual sensors for the paper industry that measure the strength, thickness and moisture content of the manufactured paper."

The second product offered by Yazzoom is called Yanomaly. This big data software has been designed to detect anomalies in machinery, production lines and IoT devices. Yanomaly implements unsupervised machine learning

based on the data produced by these systems. "This software only requires data from a functional machine, production line or IoT device to automatically create a mathematical/statistical description of the normal performance of such a system. This means that Yanomaly can detect problems that have never occurred before," says Verhasselt. This software can implement univariate as well as multivariate anomaly detection, searching – respectively – for errors occurring in specific sensors and in the relationship between various sensors.

"We have great faith in this product and are convinced that it is all set for an international breakthrough, thanks also to its many application options."

STRONG PERSPECTIVES

"We have great faith in this product", says Jan Verhasselt. "We're convinced that it is all set for an international breakthrough, thanks also to its many application options. Energy group Engie/Laborelec relies on Yanomaly for monitoring CHP plants and AGFA Speciality Materials trusts it to monitor batch chemical processes, while man-

ufacturing industry applications include assembly- and packaging lines."

The company currently operates in various countries, more specifically in the Netherlands, France, Germany, Denmark, Sweden, Finland, the UK and South Africa. In addition to active business development in neighbouring countries, Yazzoom supports the "follow your customers" theory. Thanks to its new software products, a further international breakthrough is in the pipeline, although the CEO is cautious about moving too fast. "First, we want to gather good references from all involved industries. Then we can broaden our horizons and explore the international markets further", he adds.

"Thanks to its highly trained labour force and good work ethic, Belgium creates lucrative opportunities for the establishment of AI ventures", says Verhasselt. "Our team includes engineers, physicists and chemists, all trained to a very high level. Belgium has an extensive ecosystem with major economic activity in both the start-up scene and the industrial sector. And it has institutions and organisations that support young enterprises at various levels. Because of this, Yazzoom received support from organisations like Vlaio, FIT and Voka, and was able to take advantage of tax deductions for R&D activities. We pay a lot of taxes in Belgium, but we also get a lot in return."

INTERVIEW WITH
Kristof Coddens, *Vice-President Artificial Intelligence*

DATA CAPTURING & PROCESSING

COMPANY

Melexis

REGION

Flanders

Founded: 1989

Location HQ: Tessenderlo and Ypres

Number of employees: approximately 1,500, In Belgium 300-350

Turnover: 512 million EUR (2017)

Growth: 12.2 % (2017)

Awards and recognition:

- Elektra awards 2017 and Developing & Innovation Award at the annual China Automobile & Parts Awards in 2018 for the tyre pressure monitoring system (TPMS).

- In 2018, CEO Françoise Chombar won the Global Prize for Women Entrepreneurs of BNP Paribas.

Website: www.melexis.com

11 CHIPS IN EVERY NEW CAR
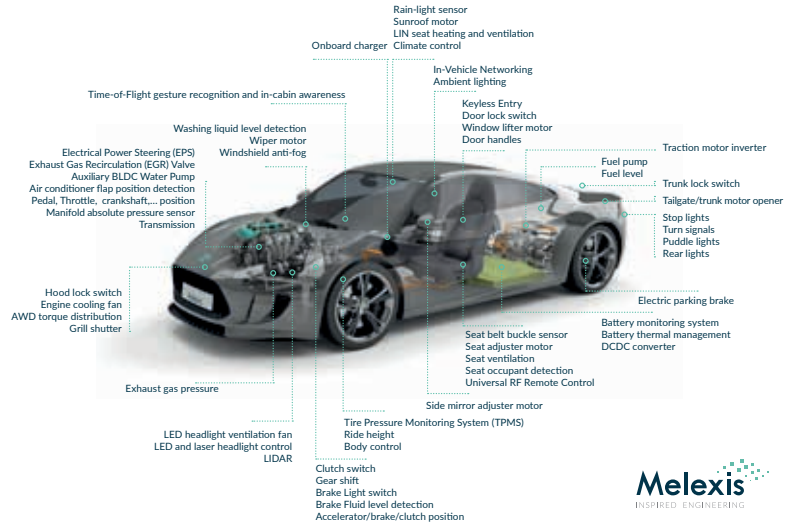
Melexis designs, markets and tests high-grade semi-conductor components. The company has approximately twenty branches spread across the globe and has a turnover of more than half a billion EUR per annum. Melexis counts Bosch, Continental, Valeo, Denso and Magnetti Marelli among its customers and is an absolute pioneer and driving force in the automotive industry. "We are big enough to matter, but small enough to care", says Kristof Coddens, Vice-President Artificial Intelligence.

"We expect that the demand for microchips will only continue to grow with the forecasted increase of electric and self-driving cars."

PIONEERING IN SENSORS

The company specifically focuses on three major divisions. "The main division of Melexis concentrates on sensors, which you can find in, among others, accelerator pedals. A second division focuses on drivers or actuators, which are mainly used to drive motors. A specific example of this are sensors in the electric windows of a vehicle. Finally, we are also working in the area of communication, such as the development of the microchips needed to unlock the doors of your car without using a key," says Coddens.

Melexis microchips can be found in almost every car. More than 90% of Melexis' turnover is generated in the automotive industry where strong growth has been recorded, especially in the last ten years. "Previously we used to have a 75% automotive - 25% other sectors ratio, but now there are an average of 11 Melexis chips in a car. In high-end models, this number may be even higher. We expect that the demand for microchips will only continue to grow with the forecasted increase of electric and self-driving cars."

The magnetic position sensor is one of the most successful Melexis products. "The principle is fairly simple: you let a magnet move above a chip, which can then determine the position of this magnet. In this way you can, for example, define the angle of your brake pedal", explains Coddens. These magnetic position sensors have profoundly changed this niche market in the automotive industry.

In addition, Melexis has a firm footprint in other strategically interesting markets such as "white goods" (sensors for drying and washing machines), smart buildings (including the development of infrared sensors) and the industrial market (sensors for motor drive). Melexis has acquired household name status within the automotive industry, while it is actively involved in business development for other markets. To this end, it operates a network of several international representatives.

A EUROPEAN COMPANY

"Exports have been been extremely important to us from the start, as there are hardly any large Belgian industrial companies within our niches. In the first couple of years, our most important customers were mainly from Germany and France.", explains Kristof Coddens. Major American customers also joined later. In the

"Annually, the company applies for 40 to 50 patent families, of which a significant percentage comes from Belgium."

meantime, Asia and especially China has become the largest buyer of Melexis sensors and drivers."

Notwithstanding the importance of the Asian market, Melexis positions itself as an innovative European company. A large part of the research & development is still taking place in Europe, thanks to R&D offices in for example Belgium, Germany, France and Switzerland. Annually, the company applies for 40 to 50 patent families, of which a significant percentage comes from Belgium. An important part of the production also takes place in Europe, partly because Melexis' products and test procedures contain a lot of IP that the company wants to optimally protect.

The higher wages in Europe are, according to Coddens, of less importance for Melexis because production is highly automated. "In the end, all depends on the quality of the engineers. High output trumps high labour costs."

AN EXCITING FUTURE AHEAD

Melexis is therefore positive about the future for Belgium within high-tech manufacturing. Kristof Coddens points for example to the growing number of clusters combining companies and research centres that nurture start-ups, including some very promising ones. "Start-ups are not only good for companies such as Melexis, but also for bolstering young talent. Because of these start-ups, it becomes more interesting for young people to start engineering studies. And it is even better if these start-ups succeed in growing, because, after all, the cake is big enough for everyone" according to the VP Artificial Intelligence of Melexis.

Commercially speaking, Coddens also predicts a bright future. "Sensors will become increasingly important in everyday life" he says. "We are already anticipating the needs of the car of the future that will be filled with sensors. But this trend will also continue for many other industrial and commercial applications." With the development of new-generation sensors, such as current sensors and battery monitoring systems, the company has many opportunities ahead.

INTERVIEW WITH
Harold Grondel, *Managing director*

DATA CAPTURING & PROCESSING

COMPANY

Productize

REGION

Brussels

Founded: 2014

Location: Brussels

Number of employees: 8

Turnover: 1.050.000 EUR (2018)

Growth: 60% (2018)

Investment: 25% of turnover on IP (2018)

Export share: 15 to 20%

Website: www.productize.be

"Productize is a startup which provides clients with strategic consultancy services around the impact that the Internet of Things can have on their business. Prototyping that allows us to quickly test and approve solutions is at the heart of our approach," explains managing director Harold Grondel.

"We have the advantage of being a very small, specialist company, and this means businesses very quickly get access to real-life prototypes that allow them to accelerate or decelerate their innovation project," Harold Grondel explains. He goes on to describe how Productize combines all the agility and innovative flair of a startup while guaranteeing the client's solution a long lifespan. This is possible because Productize belongs to a network that includes Bagaar and Xylos and offers a wide range of services. The business can also call on specific partners for help with robotics, artificial intelligence and so on.

"What Productize does is test out hypothetical value propositions related to the Internet of Things. We then test a small number of units end-to-end in the lab and in a controlled environ-

"Businesses very quickly get access to real-life prototypes that allow them to accelerate or decelerate their innovation project."

ment in the client's own premises. These form the proof of concept, proof of value and pilot projects that allow us to add greater definition to the user experience. We generally go through a feature downsizing process at the end of the pilot before launching the first series of the product alongside the client," Grondel explains.

The managing director stresses that "connected objects make mass customisation and just-in-time production possible, and this has real implications for businesses' outcomes. For instance, we developed the electronics for a prototype device that lets businesses open cars without needing a key. A feature like this might make it easier to hire vehicles or car-share,

for exemple, or allow users to complete in-vehicle deliveries or even re-stock units in technicians' vans. In other words, car makers now have a service platform."

"By connecting objects, businesses can measure how much use customers make of their products. This essential piece of data makes it possible to start a pay-per-use service, for example. This major trend in the outcome economy changes a business' role, transforming it into a service provider and aligning its business model with its customer's. This represents a complete overhaul of the business' value proposition, as its job is now to guarantee a continuous level of service and cost, whereas before it was selling products," Harold Grondel explains. "In recent times, we have contributed to radical changes in the cycling industry alongside Cowboy, in sailing with Sailsense, virtual car keys with Ota Keys, in water leak detection with Shayp and energy saving with June. In each of these cases, connecting physical objects has allowed the operator to gain the upper hand by carefully processing data and offering a clear value proposition."

BELGIUM'S TECHNOLOGICAL CREDIBILITY

Productize has received support from Innoveris, Agoria and AWEX (Agence Wallonne aux Exportations et Investissements Etrangers). "We take part

"Connecting physical objects allows operators to gain the upper hand by carefully processing data and offering a clear value proposition."

in their conferences, and it has been really positive. In particular, they have helped us to organise international trade fairs in France and the United Kingdom, to give you a couple of examples, but we have also been assisted with a prospecting strategy that gave us the chance to meet various technology firms in Israel," the managing director confirms.

"In addition to all this, it very easy to communicate within Belgium and also reach out to the rest of the world thanks to our multicultural values. We are also very credible from a technology perspective, as we have some great universities in this country. A real network of skills has formed, and it includes lots of top engineers. Our relationships with KU Leuven and DSP Valley have a lot of very interesting potential," says Harold Grondel.

"Productize is keen to export to France and the Lille region in particular. However, we are waiting for our external

growth to stabilise before we launch ourselves onto new markets," he adds.

LOOKING TOWARDS THE FUTURE AND ITS NEW BUSINESS MODELS

"In the future, we will focus on standardising the objects element of our work. Productize has a big presence in this area, so we will need to turn towards a data-based value proposition. We are moving towards objects that will automatically know when they need to work, so they will generate the required service request independently. The producer's business model will be completely aligned with the customer's and will experience the market's vagaries, technological threats and breakdowns at the same time. As a result, new questions will arise out of these fascinating circumstances, and we really hope that Productize will be in pole position to tackle them."

"In Belgium, it is essential that agencies such as Productize can help businesses to get up to speed with the digitalisation process, because if they lose control of their data, they will no longer be able to offer services and products. I hope that the excellent technological network we have in Belgium and our fabulous knowledge bank will provide everything we need to be able to resolve these issues over the coming years," Harold Grondel concludes.
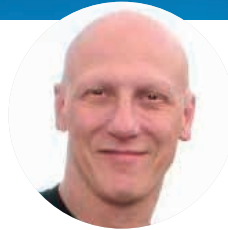
INTERVIEW WITH
Frédéric Jourdain, *CEO*

DATA CAPTURING & PROCESSING

COMPANY

Thingsplay

REGION

Wallonia

Founded: 2014

Location: Floreffe

Number of employees: 5

Turnover: 350,000 EUR (2018)

Growth: Between 2017 and 2018 business multiplied by 5

Awards and recognition:
- Wallonia Export Prize – KIKK Belfius Awards 2017 (innovative start-up)
- Orange Fab BeLux Selection 2018 (innovative telecommunications start-up)

Website: www.thingsplay.com

Thingsplay's main aim is to provide the industrial sector with agile and innovative technological tools for dealing with connected objects. Thingsplay's business covers three key sectors, which are industry, logistics and smart cities.

The company is very active in the industrial world with the development of connected boilers, pellet stoves and connected ventilation systems. "Taking the example of the pellet stove, Thingsplay is currently talking about enabling the user to see all their usage statistics on their smartphone. For example, if the client is not often present in their home, it is more profitable for them to have a unit on rental, with invoicing according to use. All equipment requiring predictive maintenance, lifts and escalators for example, could benefit from this new business model." explains Frédéric Jourdain, the start-up's co-owner and CEO.

In the logistics sector, Thingsplay has been active in developing an innovative container tracking tool. "The tracking of containers would solve what has been a problem area for years in mon-

"Thingsplay has succeeded in developing an autonomous tracking system that can geolocate a container anywhere in Europe with amazing precision."

itoring the transport of parcels and materials, by ensuring improved organisation of despatches to the client and the overall regularity of their supply chain. After a year of effort, Thingsplay has succeeded in developing an autonomous tracking system that can geolocate a container anywhere in Europe with amazing precision. At the same time, we have come up with technology for the remote management of any problems with the trackers." adds Frédéric Jourdain.

As well as electronic cards, Thingsplay also offer their clients software solutions. "We have set up software platforms that allow all our industrial clients to be connected for data purposes," explains Frédéric Jourdain. "Our company collects the data

by installing data-receiving tools on storage equipment and in storage depots and analysing product and raw materials movements. The data are then gathered by the clients on servers, to be fed into their management systems (ERP – Enterprise Resource Planning). The clients analyse the data using specific tools, Artificial Intelligence tools in fact, to convert them into extremely advanced statistics, for example." recounts Frédéric Jourdain. "In our business, to gain a competitive edge, you need to be able to obtain data that interest the client: data that are qualitative and generate value for the lowest possible cost." he affirms.

The company is also active in the smart cities sector, offering equipment for measuring air quality, both outdoors (micro-particle monitoring) and in buildings (temperature, humidity, CO2, …). Recently, Thingsplay also developed connected technology for checking the filling of waste containers and in addition they supply routing applications to reduce refuse collection management costs.

BELGIUM'S STRENGTH LIES IN ITS CLUSTERS AND NETWORKS

"Belgium is a welcoming country for those with development projects in the Internet of Things and plenty of assistance is available for those who seek to develop R&D activities. In our case, we had the backing of NamurInvest and BeAngels in particular" emphasises the CEO. "Belgium also has the big advantage of its limited size, making it easy to establish contact with a certain number of clients in a short time. It is our major strength as it enables us to have the people we want to work with in our economic areas. Seen from outside the country, Belgium's reputation is also that of an excellent

partner. In Belgium, skills can be found for all branches of Industry 4.0, largely thanks to a boost provided by the numerous seminars organised on the subject. Indeed, a wonderful initiative was launched in Namur by few companies and Infopole, where all the Artificial Intelligence players worked together to provide a range of AI services for Industry 4.0." the CEO explains.

"Belgium is a welcoming country for those with development projects in the Internet of Things and plenty of assistance is available for those who seek to develop R&D activities.

A FUTURE TURNED TOWARDS THE EFFECTIVE USE OF DATA

Thingsplay plans to channel investments of between 100,000 EUR and 300,000 EUR, i.e. 20% of turnover, into R&D each year. "This investment is in-

dispensable as the market is evolving radically and it is therefore necessary to keep one step ahead all the time, making essential use of the support systems made available by the public authorities, like the Wallonia region." adds Frédéric Jourdain.

"Thingsplay is currently working on miniaturised connected objects applied to logistics. We hope to get as far as the geolocation device, with simple connections that enable the tracking of a boxed package."

"We would also like to make progress on the interconnectivity of the markets and the gathering of data from production lines. To identify fabrication steps on a production line, more sensors are required and it is technically more complicated, so this is what we want to develop," stresses Frédéric Jourdain.

Thingsplay currently works for various industrial players in Europe such as Stûv, Airria and AGC Glass, and provides clients with a complete set of "data solutions" via Wi-Fi, GSM, the telecomms operator LTE and NB-IoT (Narrowband Internet of Things) technology.

INTERVIEW WITH
Luc Wanten, *CEO*

SMART SOLUTIONS & ROBOTICS

COMPANY

Borit

REGION

Flanders

Founded: 2010

Location HQ: Geel

Number of employees: 40 to 50

Trade: approximately 7 million EUR (2017); expected to grow to 10 million EUR in 2019

Awards and recognition:
• Deloitte's Fastest Growing Clean Tech company in 2017
• Agoria Factory of the Future Award 2018

Website: www.borit.be

The new generation of fuel cells uses very thin plates of metal to distribute hydrogen and oxygen for maximum power density. Due to weight and dimensional optimisation, there is a trend towards using ever-thinner materials with thicknesses of less than a tenth of a millimetre. Borit develops the technology that enables forming, cutting and welding of these extremely thin metal components. These components find their way to state-of-the-art low and high temperature fuel cells, and various types of electrolysers.

"Specialised forming and cutting technology is used to create complex shapes and structures from thin sheet metal. Then, two separate plates, anode and cathode, are joined by means of thin-plate welding technology. Along with membranes, these plates are stacked to form a fuel cell.", explains Luc Wanten, CEO of Borit.

A WIDE RANGE OF SOLUTIONS

Fuel cells, at the same time an alternative and complement of a battery, are an active electrochemical system converting hydrogen into electricity.

"Because of these new environmental goals, there has been an urgent drive towards introducing so-called new-energy vehicles, including fuel-cell vehicles"

They can be used in a wide range of applications such as large-scale power plants, domestic power supply, backup power systems and a range of transport applications (electric propulsion of e.g. cars, materials handling trucks, lorries, trains, boats, etc.). And, when the hydrogen is produced using excess energy from solar or wind farms via electrolysis, a fully clean, emission-free and sustainable cycle becomes reality. In this case, hydrogen acts as a unique storage medium of energy that can be released without any harmful emissions.

To shape extremely thin metal parts, Borit installed its first industrial press in 2011 soon after establishment of the company in 2010. This press was

based on unique technology, developed and patented by the company itself. Since then, Borit has seen a more than tenfold increase of its business. "We've shown strong growth and have invested more than 15 million EUR since our start-up," says Luc Wanten. "And we will continue to invest in the upcoming years as we want to remain one of the leading suppliers in this developing market. The focus on climate actions and a switch to cleaner and sustainable energy sources is giving our growth a massive boost", he adds.

For the general public, hydrogen technology is most visible in the automobile industry, as now several brands put cars on the market. According to Wanten, this technology offers some distinct advantages when compared to cars with large battery packs. "Just like conventional combustion-engine cars, hydrogen vehicles don't take long to refuel. Long battery-vehicle recharge times don't apply, so the consumer experience is much better. And with ranges of 500 to 600 kilometres currently achievable, hydrogen fuel cell powered vehicles outperform pure battery cars. As a third advantage, a hydrogen vehicle doesn't lug around hundreds of kilogrammes worth of batteries, meaning that the weight and footprint of the drivetrain is reduced. As is the case with electric charging points, limited hydrogen refuelling infrastructure presents the greatest challenge right now, although the problem is being tackled by major global investments."

According to Wanten, hydrogen technology is also gaining a foothold in a range of industries. "We're discovering more opportunities for other forms of transport, such as freight vehicles, ships and forklift trucks. But the technology can also provide electricity on

airplanes, heat homes and can even be used in power plants."

EXPORTS ARE VITAL

Thanks to its value chain, Borit occupies a unique position in this new industry. "There are a few companies that are similar but don't have the complete and flexible value chain like us. Other companies active in the field supply also products that compete or conflict with customers' products. We therefore are uniquely positioned". As a consequence Borit participates in many innovative projects involving both system integrators and end-customers.

Almost all these customers are based abroad. "Export has been vitally important to us from the start. Currently, 95% of our turnover comes from exports", says Wanten. "Many customers find us through word-of-mouth, but we also attract new business through focused prospecting and participation in trade fairs like the Fuel Cell expo in Tokyo and the Hannover Messe in Germany."

Borit's most significant markets are Europe and North America. Wanten expects Asia to become an important growth market in the future. This is mainly due to the government policy of countries like China to improve air quality and invest in new sources of energy. "Because of these new environmental goals, there has been an urgent drive towards introducing so-

called new-energy vehicles – including fuel-cell vehicles", says Wanten.

A BELGIAN BRAIN CENTRE

Because of global demand, part of future mass-production will probably take place abroad. Borit wants to keep its manufacturing operations as close as possible to its main customers and, by doing this, maintain short and integrated supply chains. "But the site in Geel remains the development centre of this company. A few years ago, we strategically invested to enable the development and the scaling-up of the technology and manufacturing processes in Belgium. In a subsequent phase, these processes can be globalised."

According to the man at the helm of Borit, doing business in Belgium – after all – offers many benefits. "Belgium as a country has always focused strongly on exports and has access to a highly-trained workforce. Also, a good network of research centres that collaborate with the country's various universities, is available." The CEO furthermore mentions that Borit, as a young company, has been fortunate to benefit from R&D tax deductions.

"The next few years are bound to be very exciting", says Luc Wanten. "I believe that the manufacture and sale of our products and services will become more and more globalised, with the upcoming 2 to 3 years being crucially important. Hence our strategic investments to remain in the top league.", adds Wanten. "Our intent is to broaden our portfolio of products and services over the next few years. This will allow Borit to grab all possible opportunities by providing our customers with an even wider and better offering."

INTERVIEW WITH
Lionel Anciaux, *Director*

SMART SOLUTIONS & ROBOTICS

COMPANY

IOT Factory

REGION

Brussels

Founded: September 2015

Location: Brussels

Number of employees: 10

Turnover: 500.000 EUR (2017)

Export share: strong international growth

Website: www.iotfactory.eu

IOT FACTORY

IOT Factory supplies sensors and a software platform that connects and analyses end-customers' data using IoT solutions sold by partner integrators. "For example, our integrators might offer to optimise the costs and to control and monitor the energy consumption and use of a machine, factory or building," explains the start-up's director, Lionel Anciaux.

In order to do so, IOT Factory can provide about 20 different smart metering sensors. "These allow us to assess how for example electricity, water, heat or gas is being consumed, or even to detect presence of smoke. These sensors come from a Russian partner, and IOT Factory works on their specifications so that the product moves forward and can be distributed outside Russia," declares Lionel Anciaux.

The company also provides a software platform that can be operated either in the Cloud or on the client's own premises. "This platform manages data acquisition and processing. It then provides analytical solutions, which include dashboards and alerts.", says the Director.

"IOT Factory wants to package up solutions that are meaningful but not overly complicated. This is why the company provides end-to-end solutions that enable partners to get their business up and running fast and with the least possible expense."

"For instance, artificial intelligence algorithms give us solutions that allow us to predict a building's resource usage so that prices can be optimised, or to determine when maintenance is required on a machine by remotely detecting breakdowns, misuse or leaks.", explains Lionel Anciaux.

"For logistical and industrial clients, we supply asset-tracking solutions to locate machines and vehicles on a work site – or people – so as to prevent theft and temporary shutdowns and improve personal safety. One example we are particularly proud of at IOT

Factory is the asset-tracking spin-off we developed thanks to the IOT Campus accelerator. Sonaca will be its first customer. In other applications for industry, IOT Factory provides safety solutions such as door closure monitoring, which sends out an alert when a door is open. Sensors can also be used to analyse how a machine is used during the different stages in a manufacturing process."

"Another example of how we use predictive maintenance relates to manufacturers who have their products on their customers' premises and can't access the data network. Think for example of tumble dryers for large organisations such as hospitals, hotels and prisons. With our solutions, the integrators install their own sensor and collect the data, so that maintenance can be managed remotely," adds Lionel Anciaux.

"The main challenge is that every situation requires data to be used a different way. As a result, IOT Factory wants to package up solutions that are meaningful but not overly complicated. This is why the company provides end-to-end solutions that enable partners to get their business up and running fast and with the least possible expense, because the total cost of ownership for one of our solutions – including the sensor and software – is just 4 EUR to 5 EUR," Lionel Anciaux says.

IOT Factory has some very strong assets. One of them is that it has actually built up its expertise over a long period of time, and this is something his international market very much appreciates

says Lionel Anciaux, who himself has 15 years of experience in the connectivity business. "And last but not least, IOT Factory ensures a significant level of flexibility by opening up clients' platforms. This empowers them to develop their own apps and add their own solutions to them. They can embed sensors of all kinds and define their own data processing protocols when they make their dashboards. Also, customers can use their own wireless data communications networks."

"The Internet of Things enables the creation of new business models turned towards the circular economy. Because the market is oriented towards pay-per-use subcriptions for machines, the IoT enables us all to analyse breakdowns, for instance, so that the product can be continuously improved and resources are not wasted," points out Lionel Anciaux.

AN EXPORT-ORIENTED BUSINESS

"All our product and service development work has an international focus. We receive four or five enquiries a day on our website from all around the world. We have partners in South Africa, South America, Russia, Australia and Europe and we are also hoping to develop in Asia. Something that made forging these relationships easier was having access to the trade fairs organised by Brussels Invest & Export and hub.brussels.

Thanks to the LoRa alliance, we can export our solutions to France, Spain, Italy and Germany, although we do intend

to make 50% of our turnover outside Europe in 2019," Lionel Anciaux goes on to say. "The resources and software supplied by IOT Factory provide expertise for countries that are just setting up in the business. This means they can be sure there are no risks involved and that our solutions will really work," affirms Lionel Anciaux.

MULTIPLE FORWARD-LOOKING PROJECTS

"Today, we provide a multipurpose platform that produces several solutions to problems. However, the future will be about verticalising what we do, as customers will want solutions that are more pinpointed. This is why, with IOT Campus, we will launch a spin-off every year that will generate specialised solutions to offer to our partners," says Lionel Anciaux.

"We are planning to develop more resources so that we can integrate new sensors for other suppliers. We might also introduce our own sensor, manufactured by our partner," the director explains.

"Lastly, IOT Factory is in the final stages of simplifying its mobile app so we can sell it on very low-cost markets. The objective is to come up with a simple solution with a sensor and dashboard. For example, the customer might scan a sensor using the mobile app and view the relevant dashboard." According to Lionel Anciaux, sensors and prices will become smaller and cheaper and new networks will emerge with the advance of industry 4.0.

INTERVIEW WITH
Axel Kupisiewicz, *CEO*

SMART SOLUTIONS & ROBOTICS

COMPANY

LASEA

REGION

Wallonia

Founded: 1999

Location HQ: Liège Science Park, Angleur

Number of employees: 72 (not including CISEO)

Consolidated revenue: 14 million EUR (not including CISEO) (2018)

Growth: 30%+ annually over the past seven years

Awards and recognition:
- 2018 Ambassador for the Made Different | Digital Wallonia scheme
- winner of the Grand Prix Wallonie à l'Exportation 2018
- machines and tools Micron d'Or for the development of simultaneous 7-axis machines

Website: www.lasea.eu

PRECISION LASER **SOLUTIONS**

LASEA produces effective, reliable precision micro-machining laser solutions that meet industrial operators' most complex marking, cutting, drilling and other texturing requirements. The sales and R&D teams at LASEA concentrate on two sectors, one of which takes them into the world of luxury goods: Swiss watchmaking. The second is MedTech, for which LASEA focuses on cutting processes for ocular or cochlear implants and marking for syringes and lab flasks.

LASEA has pionneered femtosecond laser technology since 2003. "This technology has been industrialised via micro-machining tools. LASEA launched it onto the market in 2011, when it got its world premiere at the Laser World of Photonics trade fair in Germany. It allows users to ablate materials with great precision and quality results using an ultra-short non-thermal laser. There are only a few companies around the world that are able to supply this advanced technology," explains LASEA's founder and director, Axel Kupisiewicz. "This strategy has been a profitable one for the company,

"Clients can feel confident that their production will keep rolling without any maintenance shutdowns."

because it gained us entry into a fast-growing sector," says the CEO.

HIGHLY INNOVATIVE TECHNOLOGICAL SOLUTIONS

The company's CTO, Jean-François Colson, explains that LASEA provides the three key capabilities required for these niche solutions. The company has firmly established itself as the unrivalled leader when it comes to the first two: helping materials and lasers interact, and coordinating the mechanical axes using an optical laser head.

"The model we use for material-laser interactions involves a laser whose non-linear configuration allows it to remove material from the item in

question. This is called micro-machining because the items being worked on are about a centimetre in size and the laser has a precision focus of up to 0.2μm – that is 250 times smaller than the diameter of a single hair. There are lots of industrial applications for this, including cutting, marking, engraving, texturing and ablation, and our expertise has been employed in a very wide variety of sectors," explains Jean-François Colson. "Soon we are going to integrate artificial intelligence into our system so that machines can learn independently. Our main goal is to ensure our clients do not need highly qualified operators to help them update and optimise their production processes and can instead use an intelligent machine," adds Axel Kupisiewicz.

"Our second strength, coordinating mechanical axes and directing the laser beam, has emerged out of a very innovative machine that we were the first on the market to construct. Machines with this technology can dynamically coordinate how they position an item and operate the laser across multiple rotational axes. When both systems are synchronised, production is drastically faster and higher quality," explains the founder.

The company's third strength is the inter-connectivity it has created between clients' and suppliers' systems. The two are able to communicate with each other, enabling LASEA to collect a considerable amount of data. "This way, we can get a very precise prediction of how the machine will operate. We are currently rolling out connectors so that we can analyse the data, draw up predictive models for our machines and, as a result, further optimise production times," says Axel Kupisiewicz. "In addition to this,

thanks to the predictive maintenance system we get real-time information about which part of a machine needs replacing. As a result, clients can feel confident that production will keep rolling without any maintenance shutdowns," Axel Kupisiewicz explains.

PUBLIC SECTOR SUPPORT

According to Axel Kupisiewicz, "in Belgium, staff tend to be very highly trained and have real technological and engineering skills. Our workforce ticks all those boxes, but it also stands out for its creativity, commitment and sense of responsibility. Because it owns a stake in our company, it is highly motivated too."

"We have also received some very effective help from the Wallonia Region, which has provided R&D funding streams. Our exports are also supported by AWEX (Agence Wallonne à l'Exportation et aux Investissements Etrangers). We have taken part in international trade shows and economic assignments (including royal assignments organised by the Belgian Foreign Trade Agency), as events such as these give us access to the highest-level partners out there," he explains.

A STRONG INTERNATIONAL PRESENCE

Exports made up 95% of LASEA's turnover in 2017, and the company has installed 250 machines in 27 countries. Nearly all of these exports took place outside of Europe, with a significant number destined for Switzerland. Other important export markets include the USA, Australia and various Asian countries, while France, the
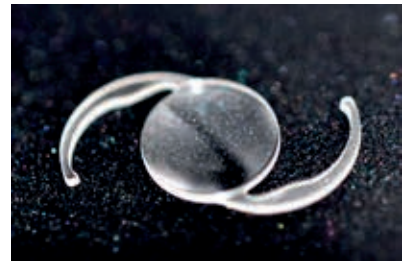
United Kingdom and Italy account for the majority of intra-EU sales.

Although it remains loyal to its Wallonian roots, this Liège-based company now has subsidiaries in the USA (San Diego), Switzerland (Biel/Bienne) and France (Bordeaux). It counts among its clients the world's top, Switzerland-based watchmaker, Silicon Valley companies, and giants of the worlds of pharmaceuticals (such as Sanofi) and medical devices (including Australian business Cochlear and its cochlear implants).

STEPPING INTO THE FUTURE

"Every year, we see improvements in the capacities we create to laser more materials with greater speed and precision and higher quality results, over wider areas endowed with hydrophobic, antibacterial properties. This year, we were the first to embed a 500-watt femtosecond laser in a micro-machining tool. In five years' time, items will be completed 25 times faster, and that will open up vast new markets for us. LASEA will also be able to triple its production rates in 2020 when our new building is ready," the founder specifies.

"We are expecting organic growth of 20 to 25%, and once that is secured we will look to expand externally too. We are also helping to prepare futuristic machines for the aeronautical and electronics sectors, 25% of our R&D budget having been ringfenced for these areas of research. Our business, photonics, numbers among the EU's six priority areas, and it is guaranteed to grow significantly. And as we move into Industry 4.0 in the coming years, the market will double," Axel Kupisiewicz concludes.

DIRECTORY
OF COMPANIES

This directory is not exhaustive. For more information please contact Flanders Investment & Trade (FIT), Brussels Invest & Export by hub.brussels, Wallonia Export - Investment Agency (AWEX) or the Belgian federations (see Chapter 1, Section 4)

ENTITY NAME	ZIP	CITY	REGION	WEBSITE	ADDITIVE MANUFACTURING	DATA CAPTURING & PROCESSING	AUGMENTED REALITY AND VIRTUAL REALITY	ARTIFICIAL INTELLIGENCE	SMART SOLUTIONS & ROBOTICS
123 AUTOMATION ENGINEERING & DEVELOPMENT	6210	Frasnes-Lez-Gosselies	Wallonia	www.123automation.be					•
3D INFINITY	9910	Knesselare	Flanders	www.3dinfinity.be	•				
3D-SIDE	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.3dside.eu	•				
ACAPELA GROUP	7000	Mons	Wallonia	www.acapela-group.com		•		•	
ACHILLES DESIGN	2800	Mechelen	Flanders	www.achilles.be	•				
ACTEMIUM	4040	Herstal	Wallonia	www.actemium.be					•
ACTEMIUM / PROMATIC	9880	Aalter	Flanders	www.actemium.be					•
ADDIPARTS	6040	Charleroi	Wallonia	www.addiparts.com	•				
ADOPT id PLM	8800	Roeselare	Flanders	www.adopt-id.com					•
AE-ARCHITECTS for BUSINESS & ICT	3001	Leuven	Flanders	www.ae.be		•			
AEROPLANE	2800	Mechelen	Flanders	www.aeroplane.ae			•		
AGIDENS PROCESS AUTOMATION	2070	Zwijndrecht	Flanders	www.agidens.com					•
AIROBOT	3500	Hasselt	Flanders	www.airobot.eu		•			•
AKUINO	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.akuino.net		•			
ALL THINGS TALK	9000	Ghent	Flanders	www.allthingstalk.com		•			
ALLORA FACTORY	9080	Lochristi	Flanders	www.allorafactory.com		•			•
ALOXY	2000	Antwerp	Flanders	www.aloxy.io		•			
ALTACHEM	8530	Harelbeke	Flanders	www.altachem.com	•				
ALVEY, nv	8540	Deerlijk	Flanders	www.alvey.be					•
ALX SYSTEMS	4000	Liege	Wallonia	www.alxsys.com				•	
AMB ECOSTERYL	7000	Mons	Wallonia	www.ecosteryl.com					•
AMPACIMON	4460	Grace-Hollogne	Wallonia	www.ampacimon.com		•			
AMS BELGIUM	3740	Bilzen	Flanders	www.ams-innovation.com				•	
AMU ROBOTIC	4900	Spa	Wallonia	www.amurobotic.be					•
ANSEM	3001	Leuven	Flanders	www.ansem.com		•		•	•

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ANY-SHAPE	4400	Flemalle	Wallonia	www.any-shape.com	•				
APTUS	8500	Kortrijk	Flanders	www.aptus.be		•			•
ARKITE	3600	Genk	Flanders	www.arkite.be					•
AROUND MEDIA	9000	Ghent	Flanders	www.around.media			•		
ASORECO	9000	Ghent	Flanders	www.c-site.eu			•		
ATHERIS	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.atheris.eu		•			
ATLAS COPCO (AIRPOWER)	2610	Wilrijk	Flanders	www.atlascopco.com	•	•		•	
AVANADE BELGIIUM	9820	Merelbeke	Flanders	www.avanade.com				•	
AVERNA TECHNOLGIES	3500	Hasselt	Flanders	www.averna.com		•		•	•
AVOLTA ENGINEERING	4460	Horion-Hozemont	Wallonia	www.avolta.be		•			
AVR	8800	Roeselare	Flanders	www.avr.be	•				
AW EUROPE	1420	Braine-L'alleud	Wallonia	www.aweurope.be		•		•	
AXYMATIC	7822	Ath	Wallonia	www.axymatic.com					•
B12 CONSULTING	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.b12-consulting.com				•	
BARCO	8500	Kortrijk	Flanders	www.barco.com		•		•	•
BEKAERT	8550	Zwevegem	Flanders	www.bekaert.com	•				
BHC	7000	Mons	Wallonia	www.bhc.be		•			
BIG BAD WOLF	1332	Rixensart	Wallonia	www.bigbadwolf.be			•		
BIGBOARDS	3200	Aarschot	Flanders	www.Bigboards.io		•			
BINGLI	2020	Antwepren	Flanders	www.mybingli.com				•	
BIOCARTIS	2800	Mechelen	Flanders	www.biocartis.com		•			
BMT ADDITIVE	9880	Aalter	Flanders	www.bmtadditive.com	•				
BORIT	2440	Geel	Flanders	www.borit.be					•
BOTWIZER	1000	Brussels	Brussels	www.botwizer.com				•	
BREKO	3500	Hasselt	Flanders	www.breko.com		•			
BRIGHTEYE	8800	Roeslare	Flanders	www.brighteye.be					•
B-SENS	7000	Mons	Wallonia	www.b-sens.be		•			
BUREAU D'ELECTRONIQUE APPLIQUEE	4031	Angleur	Wallonia	www.bea-sensors.com		•			
C.P. BOURG	1490	Court-Saint-Etienne	Wallonia	www.cpbourg.com	•				
CADCORNER	8880	Sint-Eloois-Winkel	Flanders	www.cadcorner.com		•			•
CADMES BELGIUM	9820	Merelbeke	Flanders	www.cadmes.be					•
CADMES SYSTEMS	6041	Gosselies	Wallonia	www.cadmes.com	•	•	•		•
CADSKILLS	9051	Ghent	Flanders	www.cadskills.be	•				
CAMCO TECHNOLOGIES	3001	Leuven	Flanders	www.camco.be		•			
CARDS PLM SOLUTIONS	3600	Genk	Flanders	www.cardsplmsolutions.com					•
CASE NEW HOLLAND	8210	Zedelgem	Flanders	www.cnhindustrial.com		•	•	•	
CENTRE DE RECHERCE EN AERONAUTIQUE	6000	Charleroi	Wallonia	www.cenaero.be	•	•		•	

ENTITY NAME	ZIP	CITY	REGION	WEBSITE	ADDITIVE MANUFACTURING	DATA CAPTURING & PROCESSING	AUGMENTED REALITY AND VIRTUAL REALITY	ARTIFICIAL INTELLIGENCE	SMART SOLUTIONS & ROBOTICS
CENTRE D'EXCELLENCE EN TECHNOLOGIE DE L'INFORMATION ET DE LA COMMUNICATION	6000	Charleroi	Wallonia	www.cetic.be		•	•	•	
CERATEC ELECTRONICS	7784	Comines-Warneton	Wallonia	www.ceratec.be					•
CERHUM	4000	Liege	Wallonia	www.cerhum.com	•				
CIMPRO	9100	Sint-Niklaas	Flanders	www.cimpro.com				•	•
CISEO	5100	Namur	Wallonia	www.ciseo.com					•
CITIUS ENGINEERING	4102	Seraing	Wallonia	www.citius-engineering.com					•
CLEVER	9000	Gent	Flanders	www.clever.be				•	
CLOOSTREMANS-HUWAERT D.	9220	Hamme	Flanders	www.cloostermans.com					•
CMC	9600	Ronse	Flanders	www.cmcnv.com		•			
COLLIBRA	1120	Brussels	Brussels	www.collibra.com				•	
COLOSSUS	3600	Genk	Flanders	www.colossusprinters.com	•				
CONTEC	2030	Antwerp	Flanders	www.contec.be					•
CONTiTECH BELGIUM	2600	Berchem	Flanders	www.continental-automotive.com					•
CO-TOOLS	7090	Braine-Le-Comte	Wallonia	www.co-tools.be		•			
CRAFTWORKZ	3001	Leuven	Flanders	www.craftworkz.co				•	
CREAX	8500	Kortrijk	Flanders	www.creax.com					•
CREW	1080	Molenbeek-Saint-Jean	Brussels	www.crewonline.org			•		
CRM GROUP	9052	Zwijnaarde	Flanders	www.crmgroup.be	•				
CRUNCH ANALYTICS	9000	Ghent	Flanders	www.crunchanalytics.be		•		•	
DANA BELGIUM	8200	Brugge	Flanders	www.dana.be		•		•	
DATASTORIES	2300	Turnhout	Flanders	www.datastories.com		•		•	
DECISION ENGINEERING	1330	Rixensart	Wallonia	www.decis.be		•			
DELL EMC	1930	Zaventem	Flanders	www.dellemc.com		•			
DELTAROCKET	9881	Bellem	Flanders	www.deltarocket.be	•				
DEMUTE	1081	Koekelberg	Brussels	www.demute.studio			•		
DENTSPLY IMPLANTS	3500	Hasselt	Flanders	www.dentsplysirona.com	•				
DEPOT57	1070	Anderlecht	Brussels	www.depot-57.com			•		
DESIMONE	6240	Farciennes	Wallonia	www.desimone.be					•
DIABATIX	3001	Leuven	Flanders	www.diabatix.com				•	
DIGITAL GOLEM	1030	Schaarbeek	Brussels	www.digitalgolem.com			•		
DIMENSION4	9000	Ghent	Flanders	www.dimension4.xyz	•			•	
DOTOCEAN	8200	Bruges	Flanders	www.dotocean.eu		•		•	•
DTA	4041	Herstal	Wallonia	www.dta.be					•
DUI GLOBAL	6040	Charleroi	Wallonia	www.duiglobal.com		•			
E.D. & A.	2920	Kalmthout	Flanders	www.EDnA.eu		•		•	•
EASICS	3001	Leuven	Flanders	www.easics.com		•		•	

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EASYSENSE	7000	Mons	Wallonia	www.easysense.io		•			
ECV	4460	Grace-Hollogne	Wallonia	www.ecv-sa.be					•
EMIXIS	1130	Brussels	Brussels	www.emixis.com		•			
ERTMS SOLUTIONS	1000	Brussels	Brussels	www.ertmssolutions.com		•			
ESMA	3630	Tongeren	Flanders	www.esma.be	•				
ESSENSIUM	3001	Leuven	Flanders	www.essensium.com		•			
EURA NOVA	1435	Mont-Saint-Guibert	Wallonia	www.euranova.eu				•	
EUREKA-ITS	4823	Rodange	Wallonia	www.eureka-its.com		•			
EUTOMATION-SCANSYS	4700	Eupen	Wallonia	www.eutomation.be					•
EWON	1400	Nivelles	Wallonia	www.ewon.biz		•			
FACELYTIX	3500	Hasselt	Flanders	www.facelytix.com				•	
FACTION XYZ	2000	Antwerp	Flanders	www.faktion.com				•	
FACTRY, bvba	9000	Ghent	Flanders	www.factry.io		•			
FILAMENT.DIRECTORY	1200	Brussels	Brussels	www.filaments.directory	•				
FIRMALYSER	1000	Brussels	Brussels	www.firmalyser.com					•
FLAGSTONE bvba	8530	Harelbeke	Flanders	www.flagstone.tech					•
FLANDERS MAKE	3920	Lommel	Flanders	www.flandersmake.be	•	•	•	•	•
FLUIDDA	2550	Kontich	Flanders	www.fluidda.com					•
FOODPAIRING	9000	Ghent	Flanders	www.foodpairing.com				•	
FORMANDO	3012	Wilsele	Flanders	www.formando.be	•				
FORMID, bvba	9140	Temse	Flanders	www.formid.eu	•				
FREPA	3530	Houthalen-Helchteren	Flanders	www.frepa.be	•				
FRS ROBOTICS	3001	Leuven	Flanders	www.frsrobotics.com					•
GETRONICS BELGIUM	1831	Digem	Flanders	www.getronics.com		•		•	
GRAPHINE SOFTWARE	9000	Gent	Flanders	www.graphinesoftware.com			•		
HAMAMATSU PHOTOGENICS BELGIUM	1435	Mont-Saint-Guibert	Wallonia	www.hamamatsu.com		•			
HERAEUS ELECTRO-NITE INTERNATIONAL	3530	Houthalen-Helchteren	Flanders	www.electro-nite.be		•			•
HIPPEROS	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.hipperos.com		•			•
HOWEST	8500	Kortrijk	Flanders	www.howest.be			•	•	
I.P.C. EUROPE	4537	Verlaine	Wallonia	www.ipceurope.com					•
I-CARE	7000	Mons	Wallonia	www.icareweb.com		•			
ICSENSE	3001	Leuven	Flanders	www.icsense.com		•			
ICTEAM LARGE GRAPHS AND NETWORKS - UCLOUVAIN	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.uclouvain.be				•	
ICTEAM SIGNAL AND IMAGE PROCESSING - UCLOUVAIN	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.uclouvain.be			•		
IDNA	2630	Aartselaar	Flanders	www.idna.be	•				
IMA, nv	3530	Houthalen-Helchteren	Flanders	www.machinebouw.be	•				•
IMAX PRO	4920	Harze	Wallonia	www.imaxpro.be					•

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I-MOSS	3060	Bertem	Flanders	www.i-moss.com		•			
IMMERACTIVE	1070	Anderlecht	Brussels	www.immeractive.com			•		
INDIGI	8900	Ypres	Flanders	www.indigi.be		•			•
INFOFARM	3550	Kontich	Flanders	www.infofarm.be		•		•	
INGESTIC	1301	Wavre	Wallonia	www.ingestic.be				•	
INMANTA	3001	Leuven	Flanders	www.inmanta.com					•
INSTITUT MONTEFIORE - DEPARTMENT D'ELECTRI-CITE, ELECTRONIQUE, ET INFORMATIQUE - ULIEGE	4000	Liege	Wallonia	www.montefiore.ulg.ac.be		•	•	•	
INSTITUT OF INFORMATION AND COMMUNICATION TECHNOLGIES - UCLOUVAIN	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.uclouvain.be		•	•	•	
IOT FACTORY	1000	Brussels	Brussels	www.iotfactory.eu					•
IPCOS GROUP	3001	Leuven	Flanders	www.ipcos.com		•			
IQUNET	9220	Hamme	Flanders	www.iqunet.com		•			
IQVIA	1930	Zaventem	Flanders	www.iqvia.com		•		•	•
IRISTICK	9830	Sint-Martens-Latem	Flanders	www.iristick.com			•		
ISENSE IT	9550	Herzele	Flanders	www.isenseit.eu		•			
IVEX	3001	Heverlee	Flanders	www.ivex.ai		•		•	
JUMO AUTOMATION	4700	Eupen	Wallonia	www.jumo.be		•			
KANTIFY	1050	Brussels	Brussels	www.kantify.com				•	
KNOWLIAH	3190	Boortmeerbeek	Flanders	www.knowliah.com		•		•	
KU LEUVEN	3001	Leuven	Flanders	www.kuleuven.be	•				
LABOR AIDING SYSTEMS EUROPE	3540	Herk-De-Stad	Flanders	www.lase.be					•
LABORELEC	1630	Linkebeek	Flanders	www.laborelec.be	•				
LASEA	4031	Liege	Wallonia	www.lasea.eu					•
LASER CLADDING VENTURE	3660	Oudsbergen	Flanders	www.lcv.be	•				
LIVESCOPE	1050	Ixelles	Brussels	www.livescope.be			•		
LR PHYSICS	4280	Hannut	Wallonia	www.lrphysics.com				•	
LUCEDA PHOTONICS	9200	Dendermonde	Flanders	www.lucedaphotonics.com		•		•	
LUCIAD	3001	Leuven	Flanders	www.go.hexagongeospatial.com		•			
LUCIDWEB	1000	Brussels	Brussels	www.lucidweb.io			•		
LYNXCARE	3080	Tervuren	Flanders	www.lynx.care				•	
MACGUFF	1050	Ixelles	Brussels	www.macguff.com			•		
MATCHID	9031	Ghent	Flanders	www.matchid.eu		•			
MATERIALISE	3000	Leuevn	Flanders	www.materialise.com	•				
MELEXIS	8900	Ypres	Flanders	www.melexis.com		•			
MELOTTE	3520	Zonhoven	Flanders	www.melotte.be	•				
METAKOR	8501	Heule	Flanders	www.metakor.be	•				

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METAL TECHNICS 3D	8520	Kuurne	Flanders	metaltechnics3d.com	•				
MICHEL VAN DE WIELE	8510	Marke	Flanders	www.vandewiele.com		•		•	
MIMESYS	3500	Hasselt	Flanders	www.mimesysvr.com			•		
MPI ENGINEERING	4670	Blegny	Wallonia	www.mpi-engineering.eu					•
MULTITEL	7000	Mons	Wallonia	www.multitel.be		•	•		
NEWELEC	4041	Herstal	Wallonia	www.newelec.be					•
NEWTEC	9100	Sint-Niklaas	Flanders	www.newtec.eu		•			
NIMBIAN	2100	Antwerp	Flanders	www.nimbian.com		•			•
NOZON	1050	Ixelles	Brussels	www.nozon.com			•		
N-SIDE	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.n-side.com				•	
OBJECTIVE BELGIUM	9260	Wichelen	Flanders	www.objt.com		•			•
OCAS	9060	Zelzate	Flanders	www.ocas.be	•				
OCTINION	3001	Heverlee	Flanders	www.octinion.com				•	•
OHMEWATT	9420	Erpe-Mere	Flanders	www.ohmewatt.be		•			
OMCO INTERNATIONAL	9880	Aalter	Flanders	www.omcomould.com	•				
OMETA	2160	Wommelgem	Flanders	www.ometa.net				•	•
OMING	1300	Wavre	Wallonia	www.oming.com	•	•	•	•	•
ONE-TWO	8890	Moorslede	Flanders	www.one-two.com		•			
ONEBONSAI	1030	Schaarbeek	Brussels	www.onebonsai.com			•		
OPINUM	1435	Mont-Saint-Guibert	Wallonia	www.opinum.com		•		•	
OPTIMAL COMPUTING	7034	Mons	Wallonia	www.optimalcomputing.be				•	•
ORFIT INDUSTRIES	2110	Wijnegem	Flanders	www.orfit.com	•				
OUAT	1000	Brussels	Brussels	www.ouat.eu				•	
OXYKUBE	1000	Brussels	Brussels	www.oxykube.com				•	
PEGUSAPPS	9790	Wortegem-Petegem	Flanders	www.pegusapps.com		•			•
PEPITE	4000	Liege	Wallonia	www.pepite.be				•	
PICANOL	8900	Ypres	Flanders	www.picanol.be		•		•	
PICK-IT	3001	Leuven	Flanders	www.pickit3d.com		•		•	•
PILIPILI PRODUKTONTWERP	8500	Kortrijk	Flanders	www.pilipili.be	•				
PIXELVISION	3500	Hasselt	Flanders	www.pixelvision.be				•	
PIXIMATE	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.piximate.net				•	
POOLPIO	1040	Etterbeek	Brussels	www.poolpio.com			•		
PRODUCTIZE	1000	Brussels	Brussels	www.productize.be		•			
PROVAN	3600	Genk	Flanders	www.provan.be					•
QINETIQ SPACE	9150	Kruibeke	Flanders	www.qinetiq.com					•
QOVER	1030	Brussels	Brussels	www.qover.com		•			
QSPIN -DEKIMO EXPERTS	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.qspin.be		•	•		•

ENTITY NAME	ZIP	CITY	REGION	WEBSITE	ADDITIVE MANUFACTURING	DATA CAPTURING & PROCESSING	AUGMENTED REALITY AND VIRTUAL REALITY	ARTIFICIAL INTELLIGENCE	SMART SOLUTIONS & ROBOTICS
QUAD INDUSTRIES	9100	Sint-Niklaas	Flanders	www.quad-ind.com	•	•			•
QUAMOTION	1040	Brussels	Brussels	www.quamotion.com					•
QUIMESIS	1435	Mont-Saint-Guibert	Wallonia	www.quimesis.be		•			•
RAYTECH	8200	Bruges	Flanders	www.raytech.be	•				
REALITY+	1050	Ixelles	Brussels	www.realityplus.org			•		
REDITECH ENGINEERING	2880	Bornem	Flanders	www.reditech.be					•
RIAKTR	1050	Brussels	Brussels	www.riaktr.com				•	
RMONI WIRELESS	3740	Bilzen	Flanders	www.rmoni.com		•			
ROBLAND	8000	Bruges	Flanders	www.robland.be	•				
ROBOJOB	2220	Heist-Op-Den-Berg	Flanders	www.robojob.eu					•
ROBORANA	2250	Kontich	Flanders	www.roborana.be					•
ROBOVISION	9052	Zwijnaarde	Flanders	www.robovision.be				•	
ROMBIT	2000	Antwerp	Flanders	www.rombit.be		•			•
RTBF	1044	Schaarbeek	Brussels	www.rtbf.be			•		
SAGACIFY	1040	Brussels	Brussels	www.sagacify.com				•	
SAILSENCE	1000	Brussels	Brussels	www.sailsence.com		•			
SAVACO	8500	Kortrijk	Flanders	www.savaco.com					•
SENSOLUS	9000	Ghent	Flanders	www.sensolus.com		•			
SENTIANCE	2018	Antwerp	Flanders	www.sentiance.be				•	
SEPTENTRIO	3001	Leuven	Flanders	www.septentrio.com		•			
SEVEN SENSING SOFTWARE	3001	Leuven	Flanders	www.7sensingsoftware.com		•			
SEW EURODRIVE	6900	Marche-En-Famenne	Wallonia	www.sew-eurodrive.be					•
SIDEMA	4800	Verviers	Wallonia	www.sidema.be			•		
SIEMENS INDUSTRY SOFTWARE	3001	Leuven	Flanders	www.siemens.com	•	•		•	•
SIRRIS	4102	Seraing	Wallonia	www.sirris.be	•				
SITEMARK-DRONEGRID	3001	Leuven	Flanders	www.sitemark.com		•			
SKALUP	5000	Namur	Wallonia	www.skalup.com				•	
SKYLANE OPTICS	5650	Fraire	Wallonia	www.skylaneoptics.com		•			
SMAPPEE	8500	Kortrijk	Flanders	www.smappee.com					•
SMART METAL WORKS	9940	Evergem	Flanders	www.smartmetalworks.be	•				
SMARTDOC	9550	Herzele	Flanders	www.smartdoc.eu		•		•	
SOCABELEC	5190	Jemeppe-Sur-Sambre	Wallonia	www.socabelec.com					•
SOFTKINETIC	1050	Ixelles	Brussels	www.softkinetic.com			•		
SOGESAL	4032	Chenee	Wallonia	www.sogesal.be		•	•		•
SOUNDTALKS	3001	Leuven	Flanders	www.soundtalks.com		•		•	•
SPATIODATA	4102	Ougree	Wallonia	www.spatiodata.com		•			
SPIE	7110	Strepy-Bracquegnies	Wallonia	www.spie.be		•			•

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STUDIO DOTT.	2600	Antwerp	Flanders	www.studiodott.be	•			•	•
SUPPORTSQUARE	9000	Ghent	Flanders	www.supportsquare.io				•	•
SWTICHGEAR COMPANY	9850	Nevele	Flanders	www.switchgearcompany.eu					•
TEAM PANOPTES	1000	Brussels	Brussels	www.teampanoptes.itch.io			•		
TECHNORD AUTOMATION	4102	Seraing	Wallonia	www.technord.com		•	•		
TELETASK	9000	Ghent	Flanders	www.teletask.be					•
TELEVIC GROUP	8870	Izegem	Flanders	www.televic.com		•			
TENCO-DDM	3600	Genk	Flanders	www.tenco-online.com	•				
TEXTGAIN	2000	Antwerp	Flanders	www.textgain.be		•		•	
THE FRIDGE	1081	Koekelberg	Brussels	www.thefridge.tv			•		
THE PICKPATH	4263	Braives	Wallonia	www.thepickpath.com				•	
THELIS	5100	Naninne	Wallonia	www.thelis.be		•		•	
THINGSPLAY	5150	Floreffe	Wallonia	www.i3things.eu		•			
TIVECOMA	2610	Wilrijk	Flanders	www.tivecoma.com	•				
TRIDEA	1190	Brussels	Brussels	www.tridea.co	•				
TRIDEUS	3945	Ham	Flanders	www.trideus.be	•				
TUSK-IC	2018	Antwerp	Flanders	www.tusk-ic.com		•			
TWIKIT	2600	Berchem	Flanders	www.twikit.com	•		•	•	
UGENT	9000	Ghent	Flanders	www.ugent.be	•				
UHASSELT	3590	Diepenbeek	Flanders	www.uhasselt.be	•				
UNDERSIDE	6041	Gosselies	Wallonia	www.underside.be			•		
UNIWAN	6230	Pont-A-Celles	Wallonia	www.uniwan.be		•			•
UWARE	1000	Brussels	Brussels	www.uware.com					•
VADIS	1190	Brussels	Brussels	www.vadis.com				•	
VALCUN	9041	Oostakker	Flanders	www.valcun.be	•				
VAN HOECKE AUTOMATION	9890	Gavere	Flanders	www.vha.be					•
VECTION VR	1040	Etterbeek	Brussels	www.vectionvr.com			•		
VELLEMAN	9890	Gavere	Flanders	www.velleman.eu	•				
VERHAERT	9150	Kruibeke	Flanders	www.verhaert.com	•	•	•	•	•
VEROTECH	3000	Leuven	Flanders	www.verotech.be		•		•	•
VIEWIE-TALKIE	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.viewie-talkie.be		•			
VIRTUAL ROOM	1000	Brussels	Brussels	www.virtual-room.com			•		
VIRTUAL SURVEYOR	3001	Leuven	Flanders	www.virtual-surveyor.com		•			
VITO	2400	Mol	Flanders	www.vito.be	•	•		•	•
VIU MORE	9820	Merelbeke	Flanders	www.viumore.com			•		
VMA NIZET	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.vma.be					•
VOCSENS	1348	Ottignies-Louvain-La-Neuve	Wallonia	www.vocsens.com		•			

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VRT	1043	Schaarbeek	Brussels	www.vrt.be			•		
VUB	1050	Brussels	Brussels	www.vub.ac.be	•				
WAYLAY	9000	Ghent	Flanders	www.waylay.io		•			
WEBMONKS	3500	Hasselt	Flanders	www.webmonks.io				•	
WESMART	1020	Brussels	Brussels	www.wesmart.com		•			
XENOMATIX	3001	Leuven	Flanders	www.xenomatix.com		•			•
YAZZOOM	9051	Ghent	Flanders	www.yazzoom.com				•	
YONDR AGENCY BE	9120	Beveren	Flanders	www.yondr.be			•		
ZENSOR	1040	Brussels	Brussels	www.zensor.be		•			
ZETES	1130	Brussels	Brussels	www.zetes.com	•				
ZIGGZAGG	9880	Aalter	Flanders	www.ziggzagg.be	•				