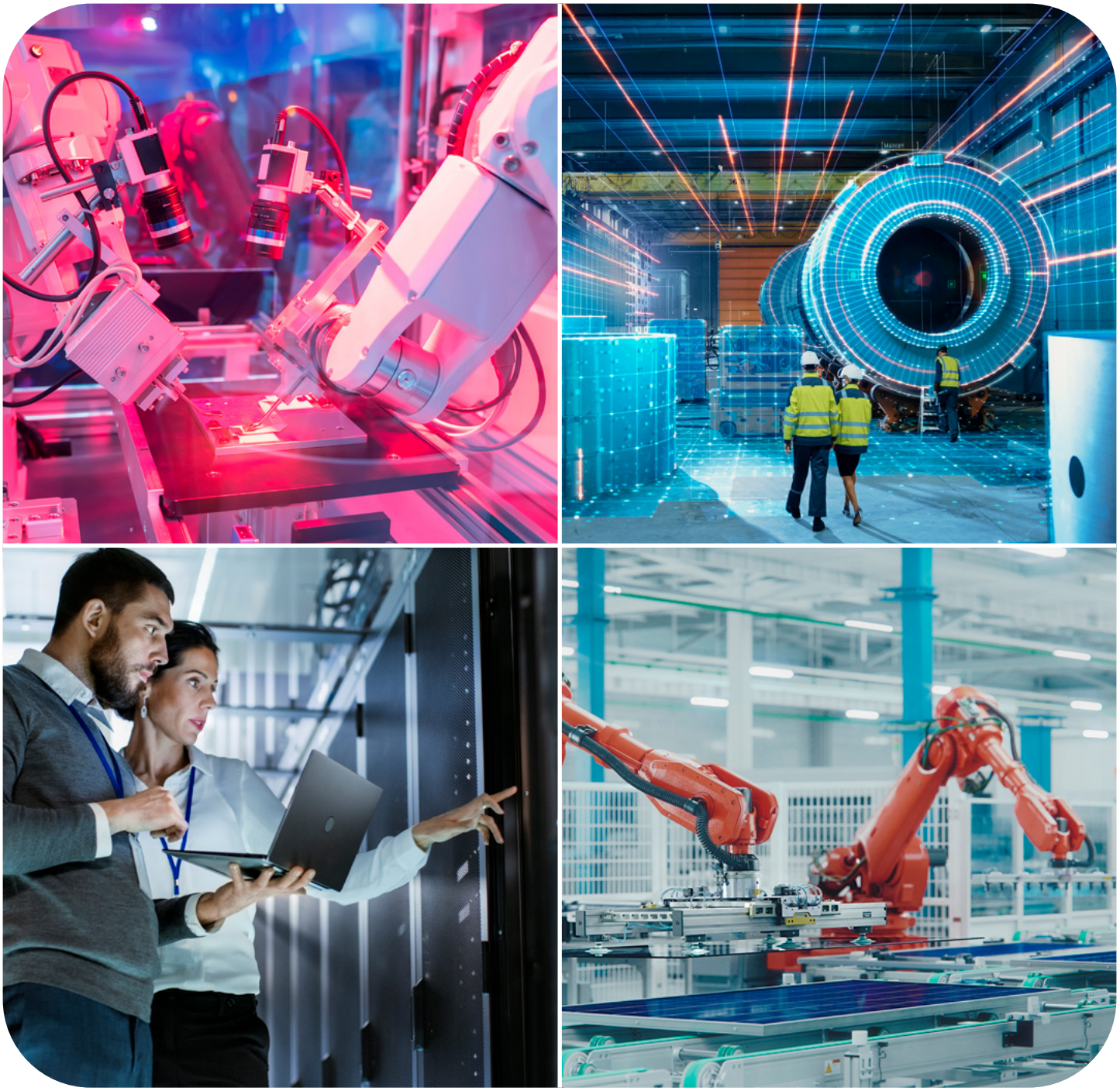
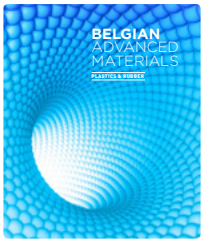
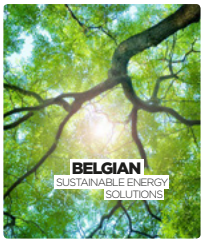


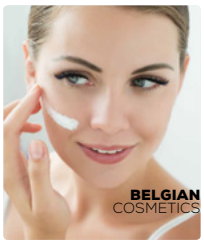
BELGIAN

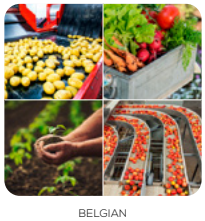
ADVANCED MANUFACTURING TECHNOLOGIES

Belgian
Foreign Trade Agency









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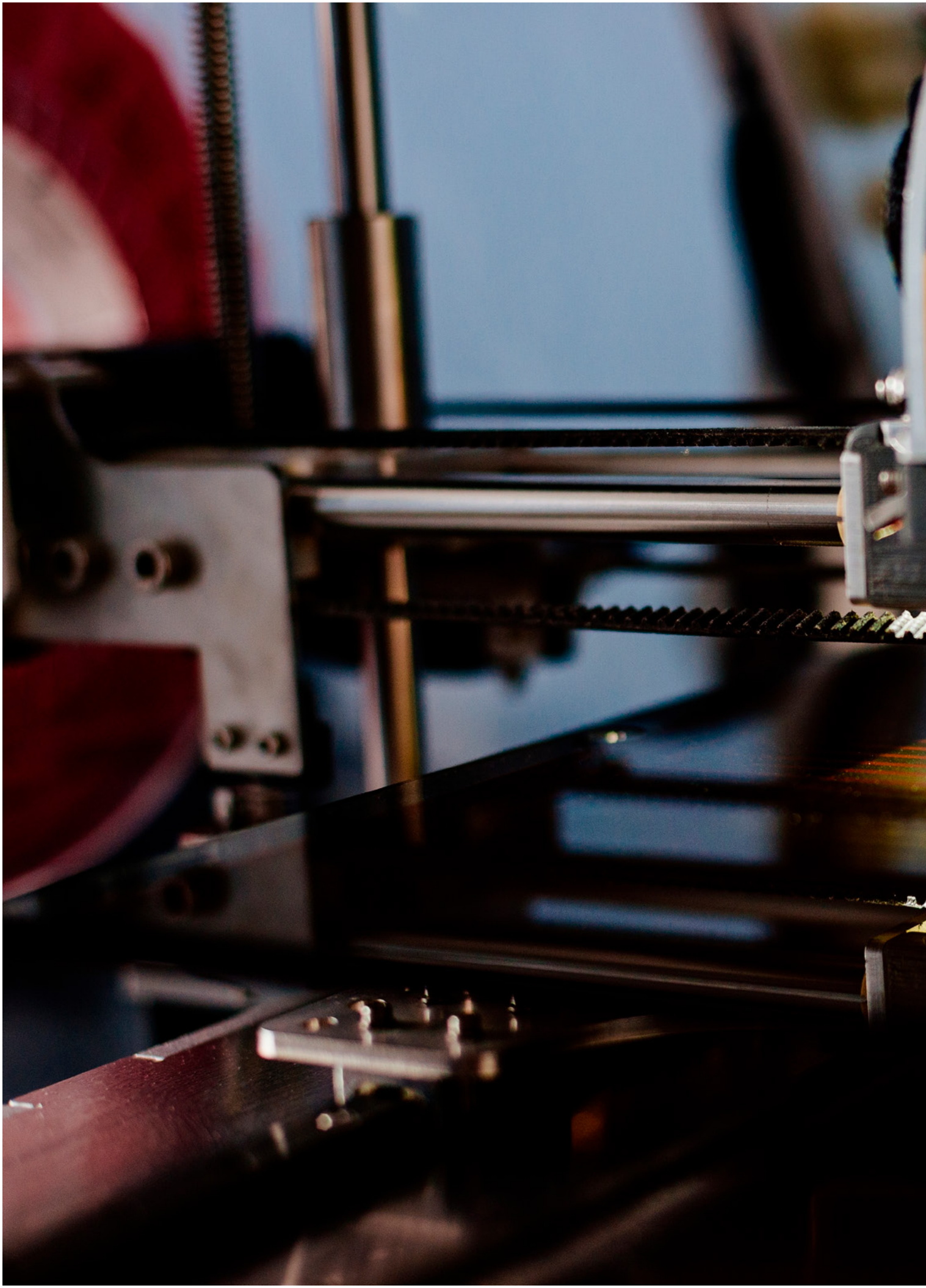
The contents of the interviews were approved by the respective companies for use in this publication.

TABLE OF **CONTENTS**



PRESENTATION
OF THE SECTOR

SECTION 1

PRESENTATION OF THE SECTOR

1.1. Introduction

Advanced manufacturing technologies are part of the "fourth industrial revolution" allowing industries to improve manufacturing capability and efficiency.

While the study on the "fourth industrial revolution" (Decoster, BFTA, 2019) has given us a broad analysis of this new revolution, this study will focus on new developments in physical production as well as machine technologies in Belgium.

Significant supply chain disruptions have occured and it has been a topic of concern for some time for Belgian companies, including Belgian industrial companies: growing trade tensions between economic blocs with new trade barriers and the implementation of customs tariffs; the 2021 Suez Canal obstruction was a first major crisis in terms of supply chain disruption - shipping was blocked on the major trade route between Europe and Asia; the Covid crisis with the shutdown of our economies, followed by the global shipping crisis and the difficulties of responding to global demand. Most recently, there have been the consequences of the war in Ukraine, where energy costs are rising in Europe, threatening its competitiveness, and the supply of food is disrupted all over the world.

As a result, manufacturers are working on their value chains and rethinking them. Some are using the benefits of new manufacturing technologies to relocate a part of their production closer to either their clients or to their headquarters.

Advanced manufacturing technology is increasingly a response to these challenges, allowing more and more reshoring and near-shoring, as well as diversification of suppliers, which is also a response to industrialised states' policies on the reindustrialisation of their economy. Belgian industries are already working on solutions to respond to this trend. According to the survey Export Barometer 2022 published by Credendo[1], Belgian companies are diversifying their suppliers, being supplied locally or even producing some components themselves. This approach, according to the Global Risks Report 2022 published by WEF, comes from industries and governments working on regional convergence and might come at the expense of global integration.

Advanced manufacturing technologies in Belgium are reshaping local industry and allowing innovation in manufacturing processes. These technologies are described by the European Union as follows: "Advanced manufacturing technology encompass the use of innovative technology to improve products or processes that drive innovation. It covers two types of technologies: process technology that is used to produce any of other advanced technologies, and process technology that is based on robotics, automation technology or computer-integrated manufacturing." (European Commission).

New technologies are at heart of Industry 4.0, allowing traditional manufacturing to become advanced manufacturing by encompassing significant transformative trends in the industry.

Whereas traditional manufacturing worked on mass production, advanced manufacturing is **customized** and **customer-centric**. Advanced manufacturing allows industries to manufacture with greater **flexibility** and **increased productivity**. **Adaptability** is a key aspect of advanced manufacturing where a **prototype** is easy to make, and a domino effect is easier to react to. This virtuous circle enabled by advanced manufacturing enhances **innovation**.

[1] Credendo, 2023

It offers **high-standard customised solutions** for customers and suppliers alike. They can respond to isolated requests as well as adapting ongoing production processes depending on the situation. This causes manufacturers to be **proactive** rather than reactive.

Regarding the manufacturing structure, traditional manufacturing is mostly hierarchical, whereas advanced manufacturing is **more horizontal** with an open flow of information.

Thirdly, whereas workforces needed to be numerous (but not necessarily skilled) for traditional manufacturing, advanced manufacturing employs a **limited but highly qualified workforce** with technical skills. Furthermore, **safety** is at the heart of advanced manufacturing, contributing to a reduction in hazardous situations.

Regarding investments, advanced manufacturing is continuously **reinvesting in R&D** compared to traditional manufacturing, which mostly invests in production.

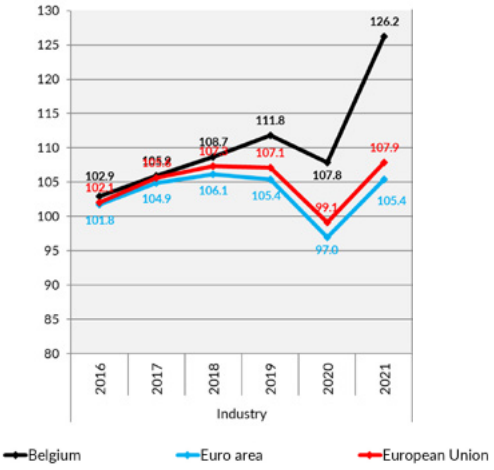
Regarding energy consumption, advanced manufacturing has a **lower cost of energy supply** compared to traditional manufacturing. Furthermore, it is worth mentioning that advanced manufacturing technologies are more **sustainable, using fewer raw materials** and producing **less waste**. Regarding infrastructure requirements, traditional manufacturing needs space, whereas advanced manufacturing relies more on **digital infrastructure**. On top of these changes, the transition to large-scale **digitalisation** and **connectivity** of factories enables new practices and possibilities. Lastly, manufacturers are also increasingly selling not only machines, but **services** as well, called Product Service Systems (PSS), where the manufacturer provides updates etc. (Jin, Tang, Ji, Liu, Gao, Huisingh, 2017).

1.2. Industry in Belgium and international trade

The last **Belgian economic outlook** report published in November 2022 by the Belgian Ministry of the Economy (FPS Economy) reveals that industry contributed 13.8% of total gross added value in Belgium in 2021. Industry employs roughly 487,216 people, which represents 11.83% of all people employed in Belgium (ONSS, 2023).

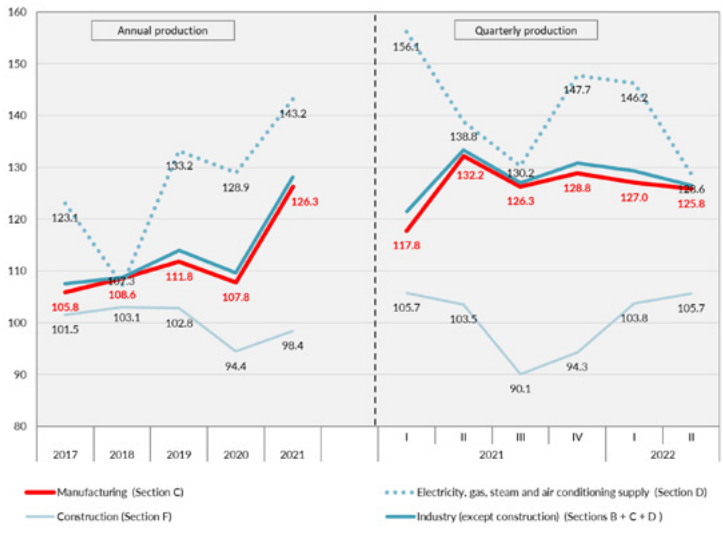
In terms of production in the industrial sector in the Belgian economy, figures show an improvement in production compared to the Euro Zone and the EU27 (126.2) in 2021 (graph 1). However, in 2022, Belgium has seen a slight decline in industrial production growth (graph 2).

Graph 1. Production index in the industry
Index 2015 = 100



Source: Eurostat in Belgian economic outlook report, Belgian Ministry of the Economy (FPS Economy), 2022

Graph 2. Evolution of the industrial production indices
2015 = 100



Source: Statbel in Belgian economic outlook report, Belgian Ministry of the Economy (FPS Economy), 2022

Although Belgium is primarily a service economy (55.8%), the manufacturing sector accounts for 13.8% of added value and should not be overlooked. The manufacturing sector is vast and includes every product from the industrial sector. Technology manufacturing is one of the components of the manufacturing industry.

In 2021, the industry had a very positive year, exceeding pre-Covid-19-crisis levels (graph 1). If we analyse the industrial sector in Belgium in more detail (graph 3), certain sectors within it have significant weight:

- pharmaceutical production and pharmaceutical preparations (16.6%)
- chemicals and chemical products (15.7%)
- manufacturing of food products, beverages and tobacco products (14.7%).

Belgian manufacturing industry and foreign trade

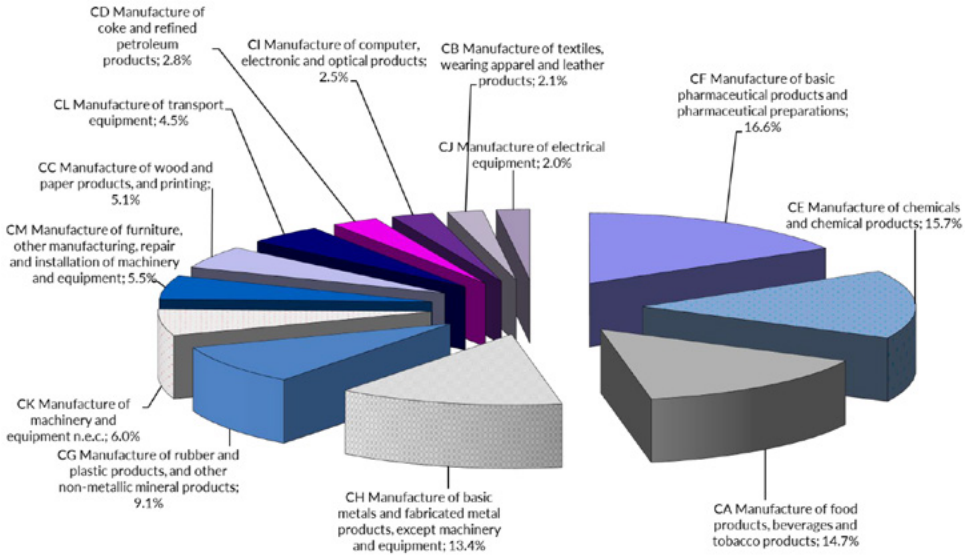
The significance of manufacturing goods in Belgium's balance of trade is significant: exports by companies in this sector account for more than 50% of Belgian exports (Federal Planning Bureau, 2019). In 2021, Belgium was the 10th largest exporter of goods, according to the WTO's Trade Profile 2022 report, (2.44% share of total world exports) and the 13th largest importer (2.26% share of total world exports). According to the report's figures, of Belgium's merchandise exports in 2020, manufactured goods accounted for more than 75% of such merchandise (next to agricultural products, 12%, and mining and petroleum products, 9.8%). Manufactured goods also accounted for more than 75% of imports (next to agricultural products, 11%, and mining and petroleum products, 13%).

More specifically, an analysis of the figures in the **Sectoral Panorama 2022** report, published by the Belgian Ministry of the Economy (FPS Economy), leads to some interesting findings about Belgium's manufacturing trade. The trade partners of the Belgian manufacturing industry are mainly European, followed by the United States, China and Japan. In terms of outlets, Germany is the main partner (54 billion euros), followed by France (38.8 billion euros) and finally the Netherlands (34.8 billion euros). In terms of imports, Germany is the largest (50.1 billion euros), followed by the Netherlands (46.9 billion euros) and France (29.1 billion euros).

Belgium's trade balance for the manufacturing industry in 2021 is positive, with a trade surplus of 25 billion euros with exports exceeding imports.

This means that manufacturing is important for Belgian international trade both in terms of purchases and sales. Belgian companies active in advanced manufacturing technologies benefit from exports by the Belgian manufacturing industry while being active internationally themselves, taking advantage of Belgium's central position at the heart of the European economy.

Graph 3. Breakdown of the Belgian manufacturing industry in 2021
Gross value added as a % share of total value added of manufacturing industry.



Source: Belgian economic outlook report, Belgian Ministry of the Economy (FPS Economy), 2022

1.3. Advanced manufacturing technologies

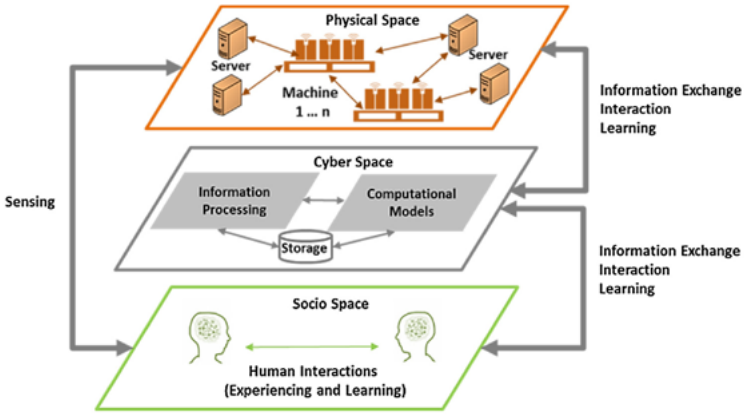
1.3.1. Technologies

For a better and more specific idea of what these are, we expand here on some of the technology concepts used the most in advanced manufacturing.

- **Additive manufacturing technology** (AM), also known as 3D-printing: this process makes an object by depositing thin layers of material. This technology makes it possible to create objects with high precision and great complexity.
- **Laser machining**: LASER stands for "Light Amplification by Stimulated Emission of Radiation" and was developed in the sixties. This technology can be used for different operations such as cutting, repairing or shaping. Laser technology allows very precise application.
- **Mechatronics**, is a word made from "mechanics" and "electronics". Mechatronics describes a discipline of engineering that combines different technologies such as robotics, computer science, electronics and mechanical processes. The aim is to create processes and objects at the same time as making the production process itself more automatic and autonomous.
- **Big data analytics (BDA) and data-driven technologies** are used more and more in manufacturing in order to optimise production or decision-making processes. BDA allows industries to collect data, store it and then process it. **Artificial intelligence** (AI) has become a common term for any system that replaces human intelligence to perform tasks. Furthermore, data science enables AI to perform and vice-versa. **Sensors**, as an example, generate data and thanks to AI can enable self-monitoring and self-configuration of complex production lines. Eventually, data and AI contribute to **Machine Learning** as well.
- **Internet of Things** (IoT) or Industrial IoT (IIoT), is basically the connectivity between the internet, machines and their environment. It allows machines to communicate among themselves (**Machine-to-Machine communication** or M2M). **Cyber-physical systems (CPS)** refer to the connectivity of machines within a system. IoT allows also production to adjust and control itself. By doing so, it also contributes to machine learning and automation.
- **Nanotechnology** is basically the use or functioning of any object at the molecular scale.
- **Robotics and autonomous robots** have been made possible and are constantly being improved thanks to the processes explained above.

The cyber physical social system (CPSS) is a relevant paradigm where humans are part of the system and can reap the benefits of new advanced manufacturing technologies. Figure 1 shows the interaction between the physical space (interaction between machines and physical aspects), cyber space (allowing connections between the physical and the socio space) and the socio space (encompassing human interactions). Those interactions are components of the new industrial revolution, Industry 5.0, which will be developed at a later stage.

Figure 1: cyber-physical-socio space.



Source: Ansari F. & Khobreh, M. & Seidenberg, U. & Sihn, W.. A Problem-Solving Ontology for Human-Centered Cyber Physical Production Systems. CIRP Journal of Manufacturing Science and Technology, 2018.

1.3.2. Use of technologies in Belgium

Belgian companies are already using these new technologies in their production chains and are rather well ranked compared to their European neighbours (see study below).

The Belgian Ministry of the Economy (FPS Economy) has compared the use of new technologies by Belgian companies with those of the European Union. Several technologies were selected for this study: AI, machine learning, additive manufacturing, Big Data and finally the IoT.

In terms of AI, Belgian companies are clearly in the lead for companies of all sizes. Moreover, whether at the Belgian or the European level, the larger the company, the more likely it is that this technology will be used. And more than 40% of large Belgian companies use AI, compared to only 28% of large European companies. According to the FPS Economy, companies in Belgium are primarily using AI to strengthen their digital security and to optimise their management processes.

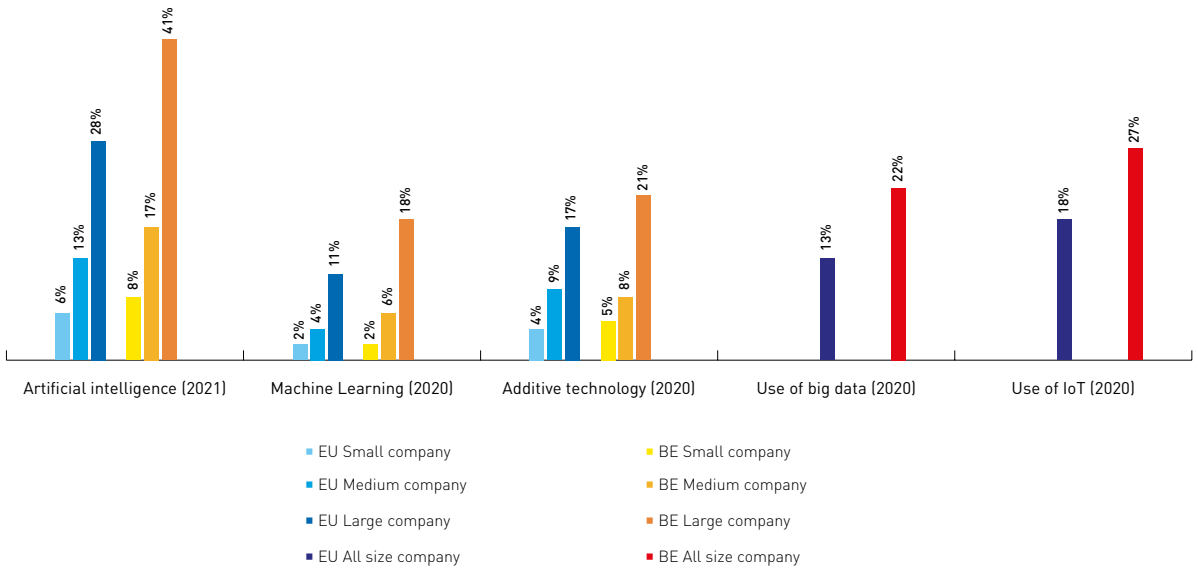
The second technology analysed was Machine Learning. Once again, a correlation between the size of the company and the use of this technology is observed. The gap in Belgium is more pronounced between small (2%) and large companies (18%) compared to the European average (2% versus 11%). Furthermore, it is interesting to see that large Belgian companies tend to use Machine Learning more than those in the EU.

The third technology is 3D printing. In 2020, 6.2% of companies in Belgium were using additive technology. Again, the use of this technology is strongly correlated with the size of the company, with 21% of large companies using it compared to only 5% of small companies. The difference for large companies between the European level (17%) and the Belgian level (21%) is quite marked.

The fourth technology selected is the use of data (study dating from 2020). About 22% of Belgian companies were using Big Data, compared to 13% of European companies.

The fifth technology is the IoT. In 2020, more than a quarter of Belgian companies were using Internet of Things devices, compared to 18% for the EU27. Belgium ranks 4th at the European level.

Graph 4. Use of advanced manufacturing technologies



Source: Belgian Ministry of the Economy (FPS Economy), https://economie.fgov.be/fr/themes/line/les-tic-en-belgique/barometre-de-la-societe-de/les-entreprises-et-linternet/les-entreprises-et-les#toc_heading_4 (accessed on 10/12/22 and 23/01/23).

1.4. Belgium, leader in Europe in terms of innovation and technologies

As mentioned earlier, advanced manufacturing requires a great deal of R&D and a limited workforce but with highly qualified technical skills. Furthermore, advanced manufacturing is continuously reinvesting in R&D. Belgium is recognised in terms of innovation and this has an impact on its industry.

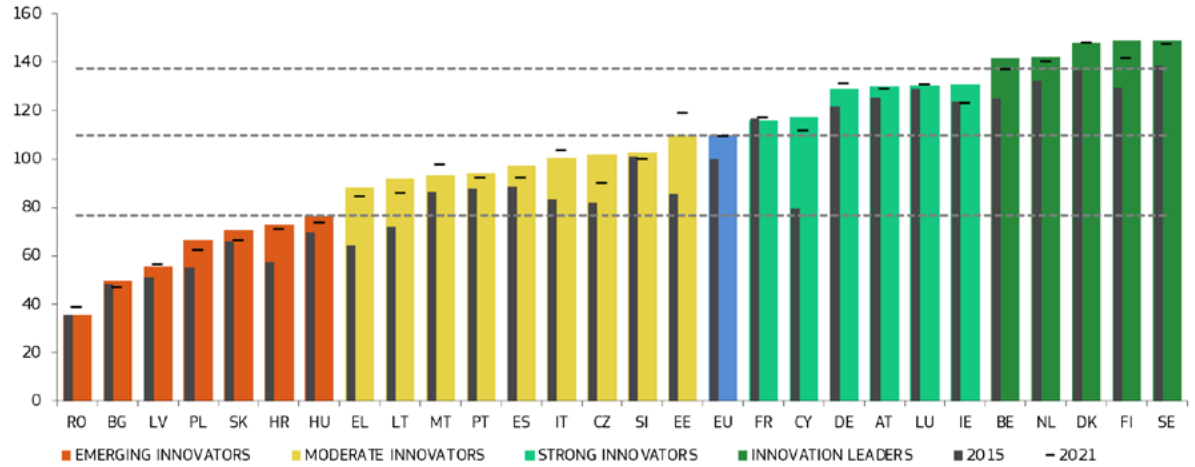
1.4.1. European innovation scoreboard

Belgium is at the forefront of innovation in the European Union, especially in advanced manufacturing technologies. According to data provided by the European Commission, Belgium performed better in terms of innovation and the development of technologies compared to other EU member states. When looking at the **European Innovation Scoreboard (EIS) 2022** published by the European Commission, Belgium is considered as an Innovation Leader with a score of 128.8% of the EU average. This score puts Belgium in the top 5 of the EIS scoreboard. Belgium has seen a significant improvement of 16.8% from 2015 to 2022. The most notable improvements are in terms of finance and support as well as firm investments.

The study suggests that the substantial increase is explained by the increase of firm investments in R&D, collaboration between SMEs and the attractiveness of the research system. The table below sums up the strengths and the improvements made.

Relative strengths
Public-private co-publications
Innovative SMEs collaborating with each other
Foreign doctorate students
Enterprises providing ICT training
International scientific co-publications
Strong increases since 2015
Public-private co-publications
International scientific co-publications
R&D expenditure in the business sector
Strong increases since 2021
Foreign doctorate students
Public-private co-publications
Product innovators

Graph 5. Performance of EU Member States' innovation systems



Coloured columns show countries' performance in 2022, using the most recent data for 32 indicators, relative to that of the EU in 2015. The horizontal hyphens show performance in 2021, using the next most recent data, relative to that of the EU in 2015. Grey columns show countries' performance in 2015 relative to that of the EU 2015. The dashed lines show the threshold values between the performance groups, where the threshold values of 70%, 100%, and 125% have been adjusted upward to reflect the performance increase of the EU between 2015 and 2022.

Source: EIS 2022, European Commission

1.4.2. Global innovation scoreboard: a world leader in innovation

At the international level, a look at the **Global innovation index (GII) 2022** published by WIPO (a self-funding agency of the United Nations), confirms Belgium's leading position. Belgium is 8th in the world in terms of university–industry R&D collaboration. Regarding gross domestic expenditure on R&D (GERD), Belgium is 4th (3.5% of its GDP). The private sector is an important participant contributing to this 4th position. GERD encompasses gross investment on research and development by the national public and private sectors. Furthermore, Belgium appears to be attractive in terms of R&D for foreign entities, as Belgium is 5th in terms of GERD financed from abroad. WIPO has an interesting criterion where Belgium stands out regarding Logistics performance (3rd).

Belgium also overperforms in terms of knowledge workers (5th) and has a good score regarding females employed with advanced degrees (7th). Regarding education, Belgium is recognised for its education performance (5th) where school life expectancy is quite long at 19.6 years.

Belgian position per indicator, 2022 (ranking on 132 countries)	**Rank**
Education	**5**
School life expectancy (19.6 years)	4
Knowledge workers	**5**
GERD performed by business (2.5% of GDP)	6
GERD financed by business (64.3%)	9
Females employed w/advanced degrees (28.1%)	7
Innovation linkages	**9**
University-industry R&D collaboration	8
GERD financed from abroad, % of GDP	5
Software spending (0.6% of GDP)	10
Logistics performance	**3**

1.4.3. CES Reward 2023

Belgium has been considered an "Innovation Champion" in the 2nd edition of the International Innovation Scorecard published by the Consumer Technology Association (CTA), which is the organiser of CES, a major conference on technology and innovation held annually in Las Vegas. CES also underlines the relatively high share of GDP in research and development. Belgium also excels in four other categories, namely telehealth accessibility, digital assets, cybersecurity (signing the Council of Europe Convention on Cybercrime) and Artificial Intelligence.

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1.5. Advantages of Belgium for the development of this sector

1.5.1. Domestic expenditure on R&D

As demonstrated above, Belgium is recognised worldwide for its performance in terms of innovation; this is because the Belgian State has set aside the necessary means to reach this level of excellence.

In 2005, the federal government introduced a number of fiscal measures for companies that benefit innovation and research in order to reach the Europe 2020 objective of 3% of GDP being spent on R&D. At the beginning of the 2000s, the federal government had noted that the level of R&D spending was too low; it represented only 1.64% of GDP. Moreover, in order to align with the European objective of R&D spending representing 3% of GDP, in 2005 the Belgian government decided to introduce fiscal measures to encourage such investments in conjunction with regional subsidies. As a result, Belgium was able to reach the 3% target by 2019, and indeed exceed it with an estimated R&D expenditure of 3.48% of GDP in 2020 compared to the European average of 2.32% (Dumont, Federal Planning Bureau, 2022). This figure includes both government spending (via subsidies and fiscal measures) and spending by companies themselves on R&D. In order to estimate the real cost of this expenditure, the international methodological reference established according to the OECD Frascati Manual (2016) for statistical surveys of research and development activities has been used:

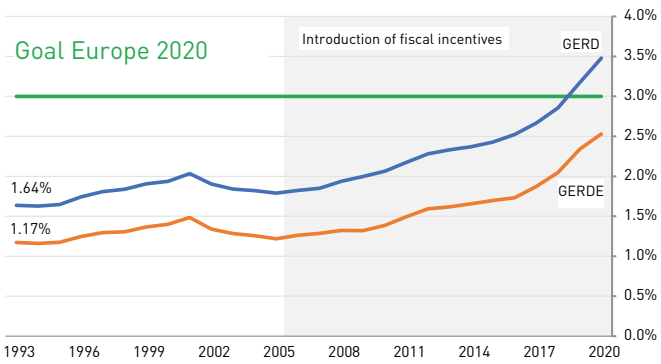
GERD: Gross Domestic Expenditure on R&D: national total of gross domestic expenditure on R&D - both private and public sectors.

GERDE: Gross domestic expenditure on R&D by enterprises.

According to the graph, the majority of Belgian R&D expenditure is carried out by the private sector (around 2.5%). Moreover, the majority of researchers in Belgium are employed by the private sector (see graph 10).

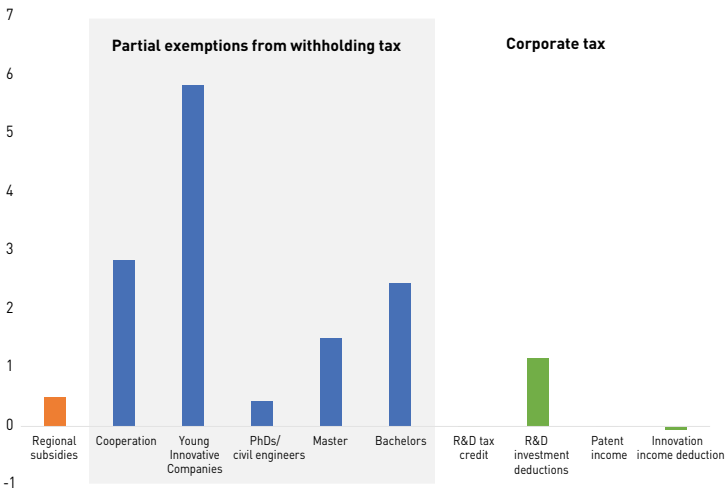
According to this study carried out by the Federal Planning Bureau - a Belgian institution responsible for producing economic, social and environmental studies - it is difficult to establish a causal link between public funding and the R&D development of companies (Dumont, 2022). This is why Dumont (2022) calculated a "bang for the buck (BFTB)", i.e. the amount of additional R&D expenditure that a company self-finances per euro of public aid received. In terms of public aid, Dumont selected several measures in three categories: regional subsidies, partial exemptions from withholding tax and, finally, measures that reduce corporate tax. Thus, for each subsidy received, the graph indicates the additional amount disbursed by a company for its R&D expenditure. The measures granting exemptions from social security contributions on salaries and the regional subsidies clearly show a positive effect, as does the tax deduction for patent income.

Graph 6. R&D Expenditures in Belgium (1993-2020)
% GDP



Source: M. Dumont, Federal Planning Bureau, 2022

Graph 7. Bang For The Buck (BFTB) of public support to R&D



Source: M. Dumont, Federal Planning Bureau, 2022

The justification for granting public aid to companies for their R&D activities is largely based on the assumption that these activities have spillover effects on the rest of the economy (Schoonackers, 2020). Further, according to Michael Porter's studies, there is a positive correlation between innovation and competitiveness, as it provides the company with a sustainable advantage in a competitive environment. R&D financed by companies as well as R&D encouraged by public subsidies or tax breaks are relevant for the economy, ensuring greater competitiveness for the country.

1.5.2. Measures to support innovation

Tax measures

Based on this observation, the federal government and the regions have taken specific measures to encourage business innovation in Belgium. The main measures adopted are the following:

- Reduction of the tax burden for qualified researchers
Since 2005, the main measure to reduce the tax burden on innovative companies has been the partial exemption from withholding tax for researchers employed in R&D activities, whether they have a doctorate, a master's degree or, from 2019, a scientific bachelor's degree such as applied sciences or biotechnologies. Through this provision, a maximum of 80% of the withholding tax paid on the professional income of researchers can be recovered. This means that, when an employer employs a salaried researcher, they will recover 80% of the professional withholding tax paid.

- Special tax system for impatriate employees, business managers or researchers
A tax-free impatriation allowance (employer's own expenses) covering employment in Belgium of up to 30% of the gross remuneration can be granted, up to a maximum of €90,000 per year. The employer can make a limited contribution to the costs of moving the employee and his/her family to Belgium.

- Innovation income deduction (IID) - IP Box
This measure enables the taxable base for corporate income tax to be reduced. The reduction can be up to 85% of the net taxable income from innovation income (after application of the Nexus factor), which is then qualified as intellectual property (IP) income.

- R&D investment deductions/tax credit
The company can opt for an investment deduction or tax credit for the development or acquisition of environmentally responsible patent(s). The investment deduction is a deduction from the tax base in addition to the normal tax depreciation on, among other things, eligible patents, environmentally friendly R&D investments and energy-saving investments.

Policies and subsidies

In addition to tax deductions, beside the European and Belgian levels, Belgian regions finance scientific research in companies (such as those active in the manufacturing sector) and encourage cooperation between them in terms of research and development, as well as with the academic world. Each entity has its own body that coordinates incentives for business R&D. These bodies are usually derived from policies established by the relevant political body. Some of the bodies involved and policies established are listed below.

European Union

NextGeneration EU & Horizon Europe
Following the coronavirus crisis, the European Union has agreed to define a recovery plan. The plan also aims to support the continent's economy in terms of its digital and environmental transition. This amounts to more than 800 billion euros.

The successor to Horizon 2020, Horizon Europe, is the new European programme for promoting research and innovation. This specific programme has been granted 95.5 billion euros for the period 2021-2027.

European Commission
DG GROW aims to support the European Union's Single Market, in particular its competitiveness and innovation. To this end, DG GROW has developed the Advanced Technologies for Industry (ATI) project, which aims to gather reliable and up-to-date data for policy-makers, industry representatives and academia.
DG CONNECT aims to support the digitalisation of the European economy and, in this case, the manufacturing sector through various programmes, the most recent being DIGITAL, the Digital Europe programme. The establishment of European Digital Innovation Hubs (EDIHs) aims to develop a European network to meet the challenges of digital technology and to be more competitive.

Belgium

Next Generation Belgium

Following the coronavirus crisis, the federal state has put in place a recovery plan that meets the criteria set out by the European Union in order to benefit from the funds. The plan is developed through 5 main axes: sustainability and climate, digital transformation, mobility, social affairs and finally the economy, productivity and innovation.

Brussels

Brussels Regional Innovation Plan

The Regional Innovation Plan of the Brussels-Capital Region defines the priorities for public funding of research and innovation for the period 2021-2027. At the heart of this plan is the regional innovation strategy for intelligent specialization (RSI3).

With this strategy, the Region intends to make Brussels a pioneer region in terms of transition, specifically through the promotion and development of solutions that strengthen knowledge and improve its resilience in the following areas:

- Climate - resilient building & infrastructure;
- Optimal use of resources;
- Efficient and sustainable urban flows for an inclusive management of urban space;
- Health & integrated personalized care;
- Social and public innovation & social inclusion.

Advanced digital technologies and services, which have long been a strength of the Region, also play a key role in this plan as a cross-cutting strategic area.

AGENCIES

Innoviris

Innoviris is the body that promotes and supports technological innovation. It finances scientific research projects carried out by companies and research organisations in the region.
More information at: innoviris.brussels

software.brussels & lifetech.brussels

software.brussels gathers 150 high-growth potential software companies, private & government support organisations, experts, universities and research institutions all dedicated to the Brussels software industry (ICT). It provides a business-oriented platform where members can share knowledge and best practices. It creates opportunities to foster local and international collaborations in which members can simultaneously find specific answers to their business needs and technological challenges.

lifetech.brussels, the public Brussels HealthTech cluster, aims at facilitating and stimulating the attractivity and success of high potential HealthTech solutions with a focus on social and environmental impact. Its main goal is to accelerate the availability of innovative healthcare solutions at the service of patients' wellbeing and professionals' needs. It promotes collaborations and synergies between entrepreneurs, researchers, makers, practitioners and industries.

Flanders

Science, Technology & Innovation Policy of Flanders

This plan has been established following the government coalition agreement of 2019-2024 and includes previous policies such as Flanders 2050 and Vizier 2030.

The plan aims to make Flanders the regional innovative leader of the European Union. To achieve this, the Flemish government has committed itself to spending more than 3% of GDP on R&D intensity by 2024. This plan sets out three strategic axes

1. allowing enterprises to undertake, innovate and internationalise
2. invest further in favourable framework conditions for a strong R&D&I-system
3. invest further in the interaction between the actors of the R&D&I-system.

AGENCY

VLAIO (Flanders Innovation & Entrepreneurship Agency)

VLAIO is the body that promotes innovation and R&D in companies. It focuses its funding on business research projects.
More information: www.vlaio.be

Wallonia

Recovery plan for Wallonia

The Walloon Region has established a policy based on clusters and competitiveness centres. Following the coronavirus crisis and the European recovery plan, Wallonia established its own recovery plan.

The "Industry of the Future" programme, one of the components of the Walloon recovery plan, aims on the one hand to promote the digital transformation of the manufacturing sector and, on the other, to improve its competitiveness.

GOVERNMENT SERVICES AND AGENCIES

SPW Economy, Employment, Research

The Public Service of Wallonia (SPW) Economy, Employment,

Research, offers subsidies to companies and research institutions.
It focuses on technological innovation projects by supporting the development of new products, processes and services, as well as the acquisition and development of new technologies. It also helps companies to file or extend a patent.

MecaTech cluster
The MecaTech cluster is Wallonia's mechanical engineering competitiveness cluster. This cluster boasts nearly 300 industrial and academic stakeholders collaborating on mechanical engineering projects in Wallonia. This cluster encourages innovation and cooperation. This initiative aims to create jobs and develop skills with a view to potential internationalisation. The digital cluster works on AI and IoT.
More information at: www.polemecatech.be

Wallonie Entreprendre
Finally, the financial arm of Wallonia is the Wallonie Entreprendre agency. The aim of this agency is to finance companies and projects that are meeting the economic challenges of Wallonia.
More information at: www.wallonie-entreprendre.be

1.6. Belgium at the forefront of Industry 5.0: human capital & sustainable solutions in advanced manufacturing

Having reviewed the technological innovations in advanced manufacturing technologies that characterise Industrial Revolution 4.0, this chapter now addresses the new industrial revolution, Industry 5.0.

The European Union is one of the first to highlight Industry 5.0 as a new paradigm to enable industry to better respond to the challenges of the 21st century by aligning it more closely with the 2030 Agenda for Sustainable Development launched by the UN. As such, this new revolution is not so much a technological breakthrough, like Industry 4.0, but rather a paradigm. Industry 5.0 is about people, sustainable development and resilience.

Industry 5.0 focuses on how technological advances can meet the expectations of employees, especially regarding their creativity. Indeed, technology can replace humans when it comes to the most dangerous or highly repetitive tasks. Robotisation and automation of tasks in industry allow more room for human creativity. In addition, advanced technologies, especially collaborative robots, avoid the need for humans to perform dangerous or physically demanding tasks.

Sustainable development and the reduction of CO2 emissions are also at the heart of Industry 5.0. Among its objectives are the reduction of industrial waste and overproduction, the prevention of pollution from the production chain, and the redefinition of the production chain to produce more locally. Finally, there is also the development of production techniques that limit the ecological footprint, in particular by thinking about the supply of green energy.

Industry 5.0 focuses more on the human aspect (leaving more room for creativity and knowledge) and on sustainable solutions; the study therefore addresses these two aspects in this chapter. It is interesting to see that Belgium has cards to play in this area.

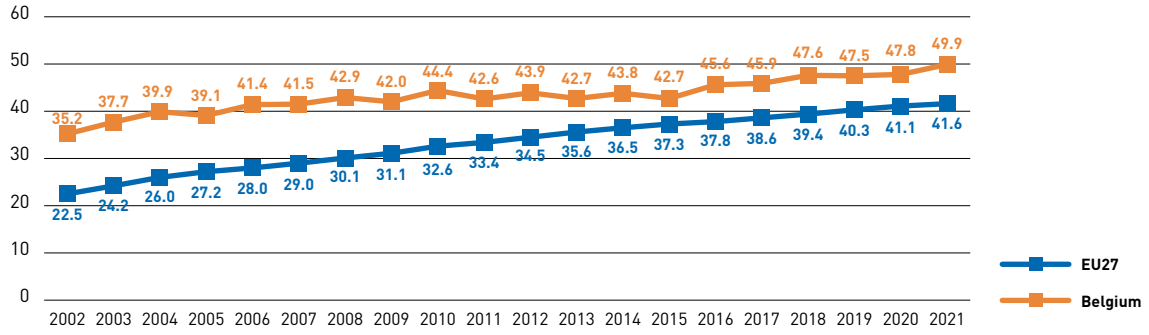
1.6.1. Workforce in Belgium

Education

As mentioned, Belgium performs well in terms of skilled labour according to the Innovation Index 2022 published by WIPO.

When establishing the Europe 2020 strategy, Member States set a target of 40% of 30–34-year-olds obtaining a higher education degree. Belgium, with a rate of 47.8% in 2020 and 49.9% in 2021, exceeded both the European (40%) and the national target of 47% during both of those years.

Graph 8. Higher education graduates - Belgium and EU27 comparison



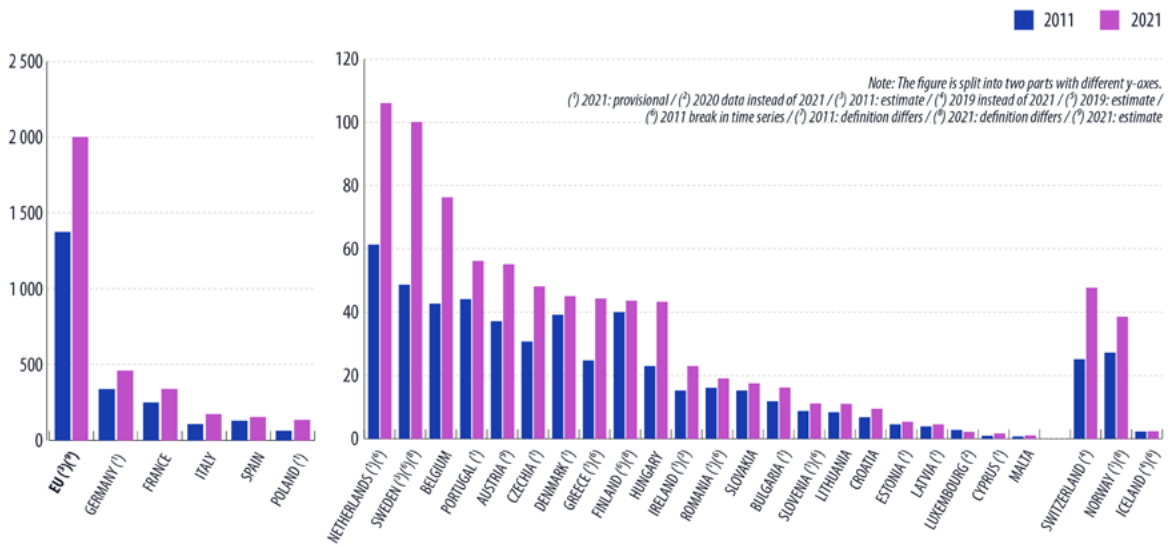
Source: Statbel; Eurostat, 2022, tertiary educational attainment by gender, age group 30-34, https://ec.europa.eu/eurostat (accessed on 30/06/2022).

University and research

The Belgian university system is recognised worldwide, as is indicated by the Times Higher Education World University Rankings 2023. Indeed, five Belgian universities are ranked in the world's top 250; KU Leuven (KUL), the top Belgian university to be ranked and the third in Europe, is in 42nd place. Also counted in this ranking are Ghent University, University of Antwerp, UCLouvain and finally the Université Libre de Bruxelles.

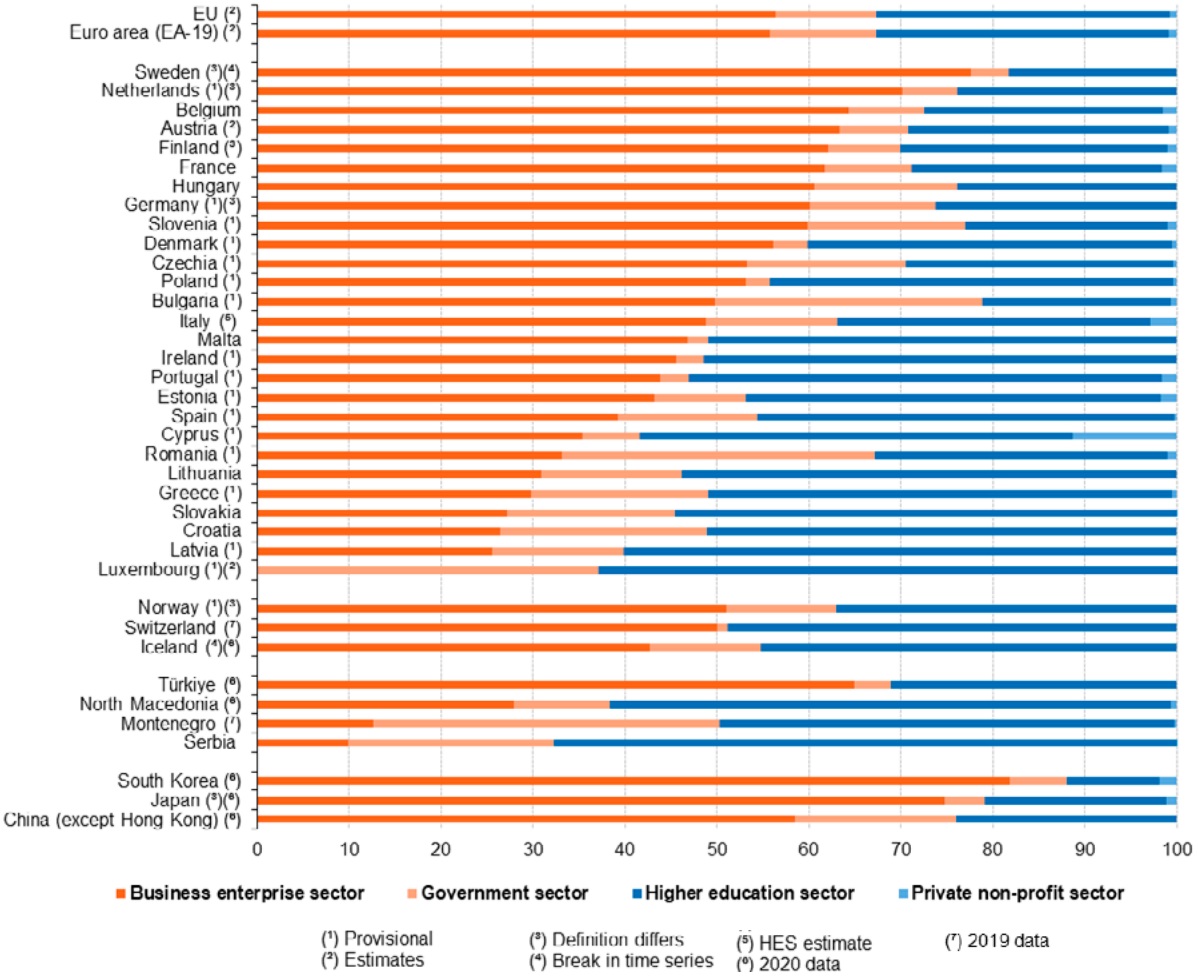
The Belgian research system is one of the most dynamic in Europe and in the world. According to Eurostat data (graph 9), Belgium has a relatively high growth rate in the number of researchers (+79%) compare to the European average increase (+45%) from 2011 through 2021. Moreover, Belgium is ranked first for this same criterion per capita, level with the Netherlands.

Graph 9. Number of researchers, 2011 and 2021
(thousand full-time equivalents)



Source: Eurostat, 2022

Graph 10. Researchers by sector, 2021
(% of total number of researchers, based on full-time equivalents)



Source: Eurostat and OECD database, published by Eurostat, 2022.

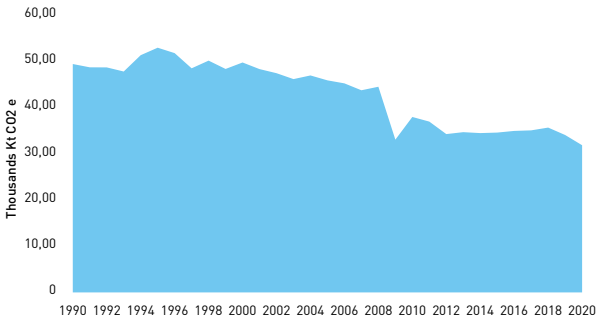
Another Eurostat study (graph 10) allows to identify who is employing these researchers. The majority of them are in the private sector, followed by higher education. Either from the private or the public sector, Industry 5.0 and the manufacturing sector in Belgium can therefore count on a pool of qualified workers, which is a real asset for this sector.

1.6.2. Sustainable development and advanced technologies

Industry generates 1/5th of the world's gas emissions and consumes 54% of energy resources (WEF, 2022). More specifically, the manufacturing industry is responsible for 29% of total CO2 emissions (M. Jin, R. Tang, Y. Ji, F. Liu, L. Gao, D. Huisingh, 2017).

Industry generates 28% of the green gas emissions (GHGs) emitted by Belgium in 2020 (European Environment Agency, 2023). It is interesting to note that greenhouse gas emissions for the industrial sector have decreased more than 35% from 1990 to 2020 looking at the figures. Every sector is involved, but the metallurgy sector has recorded the most significant decrease. According to the Belgian National Energy-Climate Plan (PNEC) 2021-2030, this decrease is due to the increased use of gaseous fuels, better energy efficiency, along with changes in the structure

Graph 11. Total emissions of Industry sector



Source: European Environment Agency, 2023.

of the economy (less energy-intensive industries and more added value in less energy-intensive sectors). The decrease is equally significant with the manufacturing industries: while the added value of this sector increased by 42% between 1990 and 2020, its greenhouse gas emissions decreased by 45% over the same period (climat.be, 2023).

Belgian companies or factories subject to the EU Emissions Trading Scheme (ETS), are driven to reduce their greenhouse gas emissions in order to comply with the European reduction target of 43% in 2030, whereas companies or factories not subject to the ETS and established in Belgium are driven to reduce their greenhouse gas emissions to comply with the European reduction target of 35% by 2030 compared to 2005 (Effort Sharing Regulation). As these ambitious targets have an impact on industry, the European Union is working on a new legislative package since the beginning of 2023 - the Green Deal Industrial Plan (GDIP) - in order to preserve its competitiveness and innovative spirit.

The technology industry sector in Belgium is already working to reduce its CO2 emissions and intends to continue along this path in order to meet the commitments made by Belgium, according to Agoria, the Federation for the Technology Industry. The solutions and technologies offered by the Belgian technology industry sector will have a positive impact on Belgian industry. Moreover, by working on the decarbonisation of industry, it is likely that these technologies, which are expensive today, will become more accessible to industry in the future. To this end, the use of advanced manufacturing technologies by Belgian industry can reduce its CO2 emissions by 10 to 12% by 2030 (Agoria).

In addition to these national and European requirements, the market and end consumers are demanding ever more sustainable solutions that emit less CO2. This has an impact on manufacturing industries. Finally, in addition to new standards, the significant rise in energy prices is forcing manufacturers to reduce their energy consumption or to find solutions that allow them to consume less energy.

This search for sustainable solutions is characteristic of the Industrial Revolution 5.0 mentioned above. Advanced manufacturing technologies make it possible, for example, to limit waste (and in particular scraps), on the one hand by analysing data from the production line and, on the other, by keeping an eye on orders and market demands. This also allows production to be made more efficient by adapting more easily to specific requests (i.e. prototyping or customised technical features). Finally, in addition to the use of new technologies or the adoption of new uses, there is also a revolution in terms of the materials being used.

The following is a non-exhaustive list of environmental solutions provided by advanced manufacturing technologies:

- Artificial intelligence: more efficient production using less energy and fewer resources thanks to a better understanding of the production process.
- Data: with regard to the production chain, data capture technologies (sensors, computer vision) make it possible to analyse the production chain and prevent disruptions, particularly through predictive maintenance (PdM). According to Agoria, 1/7 of Belgian manufacturers currently have a mature use of PdM, and this figure should rise to 60% by 2030.
- Digital Twin: building digital clones of industrial processes allowing to simulate and attempt to prevent unexpected errors.
- Additive manufacturing: reduced waste and use of less material. According to one study, researchers estimate that part production using additive manufacturing consumes between 33% and 50% less energy than conventional manufacturing (M. Jin, R. Tang, Y. Ji, F. Liu, L. Gao, D. Huisingh, 2017).
- IoT: connectivity between production devices and increased adaptability to better meet market demands.

SUCCESS STORIES IN BELGIUM

INTERVIEW WITH
Maxime Schoenmakers,
Sales and Marketing Manager

2.1. ADDITIVE MANUFACTURING

COMPANY

Aerosint

REGION

Wallonia

Founded: 2016

Location: Herstal

Number of employees: 24

Growth (2021): 904.83% increase from 2020

Investments (2021): Acquired by Desktop Metal (June 2021)

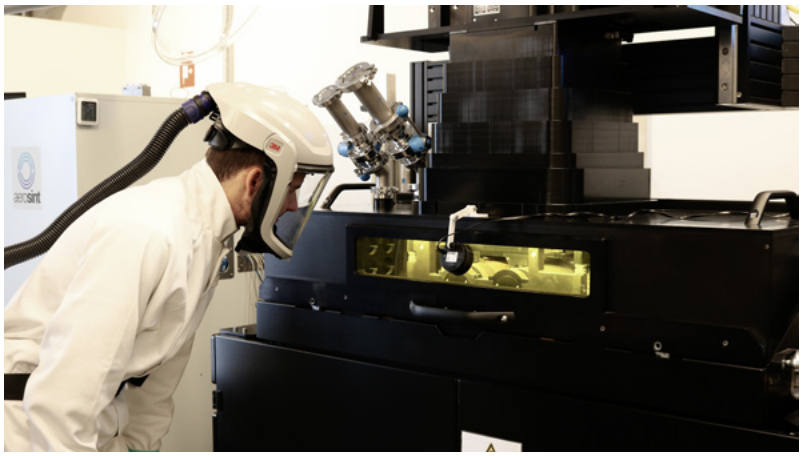
Start of exports: 2020

Share of exports in turnover: >70% (2021); >80% (2022)

Prizes, awards: 3D print innovative trophy 2022 and Formnext challenge in 2018

Website: www.aerosint.com

aerosint
Desktop Metal Company



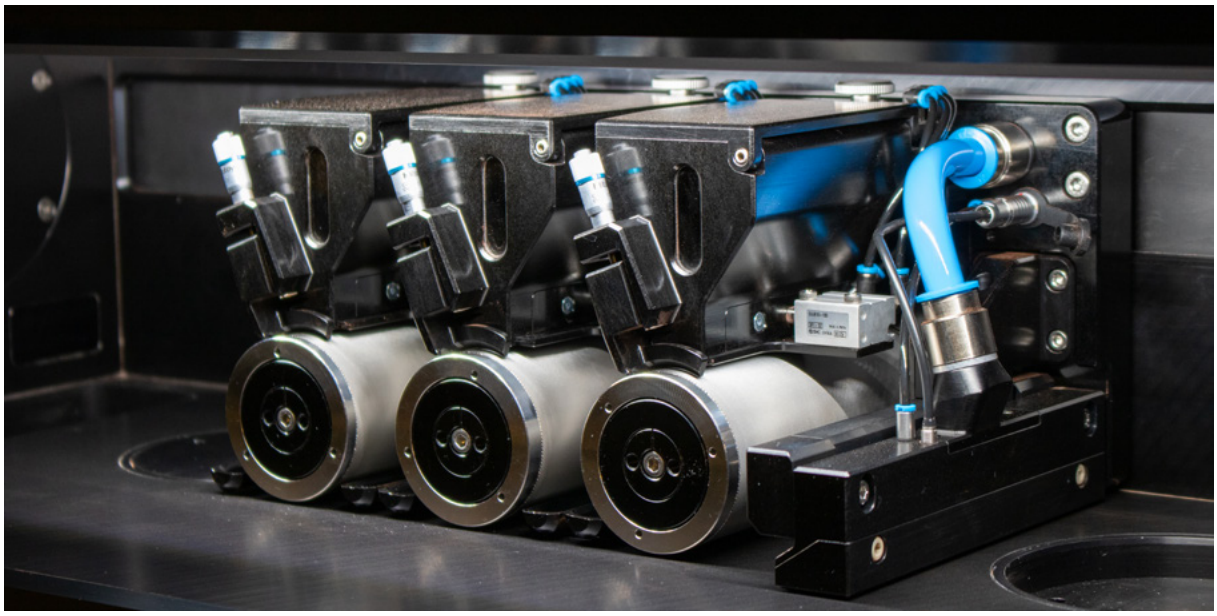
Aerosint is a scale-up company that sells multi-material printheads, using "recoaters" that can be integrated into existing 3D printing machines. This 3D-printing recoater solution is quite unique and allows different materials to be tried out. The added value is to play with the different materials to combine their properties enabling thermal conduction/dissipation, electrical conduction, aestheticism or corrosion resistance.

Maxime Schoenmakers, Sales and Marketing Manager at Aerosint, explains the technology: *"It works in the same way as an inkjet paper printer. Ink is selectively ejected onto the paper to draw a 2D image out of ink. The same goes for our technology, except that here the ink is replaced by metal powders. We deposit the powders selectively to draw a 2D pattern. By depositing multiple layers of this pattern, you create a 3D multi-material printed part."*

"Additive manufacturing is about creating value through optimising manufacturing processes, and Belgium does a great job in this field."

Edouard Moens de Hase and Matthias Hick, founders of Aerosint, developed a selective powder deposition technology in 2016, to provide additive manufacturing with a multi-material process at a reasonable cost and allowing a minimum amount of material waste. A Selective Powder Deposition (SPD) recoater uses two powders to form a single layer, contrary to standard Selective Laser Melting processes (SLM), which only use one powder. This process enables 3D printing using multi-metal components. It is the world's first commercially mature solution for multi-metals in this field of 3D printing.

Aerosint took about 4 years to gather the needed know-how and develop the technology to create the first recoater integrated into a printer, enabling different materials to be tested and their properties to be combined. During its product development phase, Aerosint mostly worked with Belgian companies. The development has been based on private funding, secured and sustained thanks to the favourable climate for technological development in Belgium. Maxime Schoenmakers, Aerosint's Sales and Marketing Manager, adds: *"The support from different public organisations played and still does play a big role in the success of the company. R&D support, projects with big industrial*



groups and/or universities, good technical knowledge in the region, with a valuable, skilled workforce, have been great assets for our development!"

Aerosint works with research centres, universities and R&D departments run by major clients to develop new processes and adapt their technologies to clients' applications. Be it with clients or research centres, the goal is to integrate the recoater into different machines for 3D printing. The company has also developed a printing service. Clients communicate the object they want to create, and Aerosint's developers work with them to see how multi-material processes can help improve their parts, and eventually print them. The scale-up company recently developed and produced a new machine that is dedicated to material research and multi-material application.

As a provider of and expert in recoaters, Aerosint is active all over the world, with clients in Germany, USA, France, Switzerland, UK, Middle East, Canada, Australia etc. However, in terms of sales, most of Aerosint's customers are in Europe due to the proximity. There is a good reason for that, according to Schoenmakers: *"We still ship directly so we can keep control of everything for our customers. We wanted to make sure our technology is stable enough to be shipped abroad."*

Competitors are not plentiful, but customers are diverse and widespread, from universities doing research to private companies in the aerospace, aircraft, tooling, injection moulding and automotive industries. As Schoenmakers continues: *"Anywhere you need to improve parts by combining materials is a market we could fit into."* According to him, the process of 3D printing unlocks a world of new possibilities. The 3D printing market is already worth around 13 billion USD and is expected to reach over $80 billion by 2030, Schoenmakers says. However, Schoenmakers points out that 3D multi-material printing is a very complex process, and it is important to not "overestimate" its application.

The integration of Aerosint to Desktop Metal Group (an American company specialising in 3D printing) in 2021 has been a great step into internationalisation. Aerosint kept its innovative spirit but can now rely on this international group to fund further innovative solutions and to export them. Within the new structure, Aerosint will continue to work and develop international business from Herstal. As a part of Desktop Metal Group, Aerosint will be able to target the US even more effectively, which is a big plus given the fact that, according to Schoenmakers: *"This is a huge market for 3D printing!"*

The future of Aerosint is promising as multi-material 3D printing technology is still in its early stages and is currently a niche market. *"With this technology, you can constantly work on new developments, new materials, new integrations to offer a wider range of applications"*.

Schoenmakers is confident about the development of Aerosint and of additive manufacturing technology in Belgium, in view of the number of highly innovative companies and research centres with plenty of expertise in additive manufacturing, such as Cerhum, AMnovis, Layerwise or Materialize. For Schoenmakers, *"Additive manufacturing is about creating value through optimising manufacturing processes, and Belgium does a great job in this field"*.

"Anywhere you need to improve parts by combining materials is a market we could fit into."

INTERVIEW WITH
Bertrand Herry
& Roger Cocle,
CEOs & co-founder

2.1. ADDITIVE MANUFACTURING

COMPANY

AnyShape

REGION

Wallonia

Founded: 2015

Location: Villers-le-Bouillet

Number of employees: 12

Turnover (2022): 2,4 M€

Growth (2022): +56,7 %

Investments (2022): 1,6 M€

Start of exports: 2016

Share of exports in turnover: 76 %

Website: www.any-shape.com

AnyShape

AnyShape has quickly become a major European player in industrial additive manufacturing for major international clients. Equipped with state-of-the-art machinery, it uses its expertise and know-how to produce 3D parts in plastic, composite materials or metal. The factor that sets them apart from their competitors is AnyShape's ability to develop high quality, innovative "flight" certified materials and parts that are considered critical and, furthermore, are difficult to find on the market.

The company was created in 2015 by two engineers from the industrial world, Roger Cocle and Bertrand Herry, who are still co-directors of the company today. Their ambition from the outset was to be able to meet additive manufacturing high requirement from companies in high-tech sectors such as aeronautics, space and transport. Roger Cocle explains: *"Although additive manufacturing is already a widespread technology in industry, we have sought to produce parts that meet the specific requirements of the high-tech industry. Since 2022, we have been 'flight hardware' qualified. Competitors in Europe active in this technology and certified as 'flight' can be counted on the fingers of one hand."*
Such "flight" qualification guarantees a very high quality and safety that allow companies to supply critical parts to leading industrial businesses in the aeronautics (Airbus), space (Ariane, OHB System and the European Space Agency), defence, transport and automotive (Stellantis and Daimler) or medical sectors. They also grab the triple ISO 9001 (quality management system), EN/AS/JIQ9100 (aerospace and defence) and ISO 13485 (medical devices).

In addition to these certifications, AnyShape has developed a sound ability to address the market with new and innovative material, dedicated to Additive Manufacturing technologies. This expertise represents a genuine differencing factor. As an example, AnyShape is one out of the only two suppliers able to process the new Aluminum grade material, called "Scalmalloy", initially developed by Airbus.

AnyShape aims to produce state-of-the-art parts using expertise that few competitors have in additive manufacturing (AM). By producing highly demanding parts, AnyShape has developed a close working relationship with its clients by meeting their needs. Roger Cocle explains: *"The difficulty in AM is to find business cases that permit viable production. That is to say, the use of AM must first be relevant (unavailability of more conventional manufacturing) and*

"We have sought to produce parts that meet the specific requirements of the high-tech industry. Since 2022, we have been 'flight hardware' qualified. Competitors in Europe active in this technology and certified as 'flight' can be counted on the fingers of one hand."

feasible. In addition, the manufacturing must be more efficient and of higher quality. Finally, the use of AM must also meet a certain critical manufacturing mass."

AnyShape has three departments to support the additive manufacturing value chain. The first department is engineering and design, where AnyShape engineers work with customers to evaluate the part manufacturing (material, design, weight). The second department works on production of the parts using state-of-the-art machinery. The third department is the quality control and certification department. Herry explains: *"All our parts are referenced and traceable."*

AN AMBITIOUS PLAYER IN WALLONIA

AnyShape was founded in 2015 in Flémalle (province of Liège) in the heart of the region's industrial area. With a full order book, the company was able to find the premises they were looking for in Villers-le-Bouillet, also in the province of Liège, in order to quadruple their surface area. In addition, they were able to find the manpower to become experts in this field. Herry adds: *"Our teams need to be multi-disciplinary and capable of working with any material but also for various industries active in different fields."*

AnyShape has been particularly active in Belgium and Europe, participating in numerous R&D programmes. Cocle explains: *"We went out and looked for these R&D programmes! Participation in such programmes (through calls for projects) is competitive. Our expertise is recognised."*

Both in Wallonia (Mecatech, Skywin (aerospace), Greenwin (hydrogen) projects) and at the European level, it is important for AnyShape to participate in these programmes in order to contribute to the development of the technology. At the European level, AnyShape is participating in the European Space Agency's Clean Sky programme. Herry explains: *"We are able to work with the Agency thanks to our certifications."*

Finally, AnyShape also has a presence in the medical market (medical devices and pharmaceuticals), where it generates 25% of its turnover. Cocle emphasises that *"pharmaceutical is a leading sector in Belgium and in particular in Wallonia, and we are also present in this sector"*.

TIER 1 SUPPLIER WORLDWIDE

Since the company was founded, AnyShape's ambition has been to produce "flight" parts and to be integrated into the value chain of major global manufacturers. Being active in the aerospace industry on the one hand, and in the automotive industry on the other, they used their network to quickly become a supplier to Original Equipment Manufacturers (OEMs). Very quickly, collaboration relating to R&D was established directly with the research centres at the headquarters of these major companies. They were able to establish themselves as a Tier 1 supplier to world-class OEMs.

AnyShape is well established in Europe (99% of turnover), and aims to extend its activities to the United States and India, particularly in the field of aerospace through the emergence of NewSpace (i.e. the emergence of a private space industry). As for the US, AnyShape is working directly with US companies based in Europe. However, it is notable that they signed their first US contract in early 2023. In India, AnyShape particularly aims to be present in the space sector, via a local representative able to respond to Indian requests for quotations (RFQs).

A BIG FUTURE

Based on its reputation among the world's leading high-tech companies, AnyShape is aiming for sustained growth of around 30-35% in the coming years. Cocle adds: *"We plan to invest in mass production, human resources and R&D in order to reach the European top 10 in additive manufacturing."*

In addition, they aim to continue investing in this technology as it can address climate change issues. Herry explains: *"This technology is less energy consuming and better addresses sustainability challenges. If you compare it to certain equivalent processes in traditional manufacturing, it consumes fewer materials and generates very little waste when producing parts. Further, our solutions allow to produce on-demand and avoid stockpiling."*

INTERVIEW WITH
Joachim Antonissen, *CEO*

2.1. ADDITIVE MANUFACTURING

COMPANY

Guaranteed

REGION

Flanders

Founded: 2019

Location: Zelzate

Number of employees: 8

Turnover (2021): €570,000

Growth (2021): €+130,000

Investments (2021): No investments in 2021

Start of exports: 2020

Share of exports in turnover: 25%

Prizes, awards: Finalist in 2022 ERAMET sustainable mining challenge, finalist in Equinor Energy Accelerator 2021

Website: www.guaranteed.be

Guaranteed
Value the future, upgrade the past

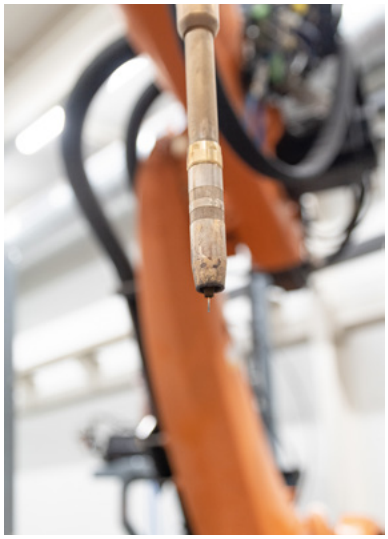
ABOUT THE COMPANY

Guaranteed was created in 2019 as a spin-off of Finindus, ArcelorMittal Belgium and OCAS. Its focus is on (re) producing, repairing or rebuilding large, slow-moving metal components beyond what is possible using conventional manufacturing technologies, thereby prolonging the life of ageing industrial equipment, shortening long lead times, and eliminating storage costs. Because strict compliance with lead times and quality requirements is important to its customers, they work with proven and robust industrial components to ensure a high Technology Readiness Level (TRL) and reliability of their production equipment. *"We use a technology called wire & arc additive manufacturing (WAAM), which combines well-known, mature welding technology and robotics with state-of-the-art computing and automation in order to (re)create, remanufacture or refurbish metallic objects in 3D"*, explains Joachim Antonissen, General Manager at Guaranteed.

Besides the fact that Guaranteed has unique global dimensional 3D printing capabilities for metal thanks to their record-breaking 10x6x5 meter production facility, the one-stop-shop approach is another thing that sets it apart from competitors. In this way, they can maintain full control over their quality and lead times and respond to their customers' need to receive ready-to-install parts at the lowest possible Total Cost of Ownership (TCO). *"If a component needs to be repaired, we also take care of all the pre-processing that might be needed, such as cleaning the parts and doing the necessary scanning. But we also take care of the post-processing needs. For instance, we make sure that the specifications and tolerances on the part are being met. In this way we take the hassle out of our customers' hands as they only have to communicate with us, while they receive a ready-to-use part that can be used directly in their installation"*, says Antonissen.

MAIN CLIENTS

The company's main focus is on all industrial sectors that use large metal castings or forgings, such as the steel industry (which is part of the DNA and heritage of Guaranteed through the ArcelorMittal connection), the maritime sector, the oil and gas sector, the aerospace industry, railways and transport infrastructure, etc. Within these different industrial sectors, Antonissen distinguishes three main types of customers: *"The first type of customers are the Original Equipment Manufacturers (OEMs), who want to use our technology to move from physical to digital inventories and produce just-in-time instead of just-in-case. Then there are the end users or the operators themselves. They mainly look to our*



technology as a remedy to obsolescence. If one component of a certain age fails in an installation, for various reasons it may no longer be possible to have that component supplied by the original OEM, which means that in the worst case the entire installation must be renewed. The third and final group of people interested in our technology are those who want a particular component repaired or refurbished to save costs, avoid long leadtimes and reduce their footprint."

NO REAL COMPETITORS IN EUROPE

There is a lot of competition in the general additive manufacturing industry, but in the niche sector in which Guaranteed operates, it still has the largest wire & arc manufacturing production facility in the world. At this time, there is no other company that can perform the size of component repair or reproduction that they are able to. Where most other companies sell 3D printing hardware or software, Guaranteed offers it as a production service. Antonissen emphasizes this by stating the following: *"Guaranteed does not sell its technology, we offer our additive manufacturing capabilities as a service to various industrial sectors. By offering our services, the customer does not need to buy an expensive machine nor does he need to have the skills and competence to operate it to produce quality parts. As far as I know, there is no other company in Europe that offers the kind of service we do."*

FUTURE PLANS

Guaranteed is very ambitious and has therefore been looking at further international expansion as the technology they implement is very interesting for companies worldwide in the aforementioned industrial sectors. They also already have a prototype available for a mobile factory. Antonissen further elaborates on the company's plans for the future: *"From day one, we have been looking to expand into regions such as Brazil, West Africa and Singapore, where many of our potential customers are located, but always with the idea of having a central technology hub in Flanders. We are also thinking of providing an on-site mobile production or repair service so that very large parts can be repaired in the field or perhaps even in-situ rather than taking them to our fixed installation. This would help companies avoid having to send over the part altogether and even do the repair without having to dismantle the component. That is a prototype concept that is now available and that we will try to roll out in the next one to two years. A third element we're working on is finding smart ways to screen our customers' entire inventory. The goal is to identify the right business cases for our customers, so that we can be sure that we get the full potential out of our technology for any given customer."*

"Guaranteed does not sell its technology, we offer our additive manufacturing capabilities as a service to various industrial sectors."

CREATING ECONOMIC BENEFITS AND HELPING SUSTAINABILITY

Guaranteed is aware of the changing business landscape and the growing importance of sustainability. When the company was founded, this was considered an important element, which is where the green check mark in their logo comes from. Guaranteed has done quite a few life cycle analysis studies so far, comparing their production capabilities to the more conventional way of manufacturing parts. *"If we compare one of our reproduced parts with a new part, we are about 50% more efficient in terms of energy and CO2 consumption"*, according to Antonissen. He goes on to point out that *"if we were to make a comparison with a repair or refurbishment job, the difference would even be as high as 90%. We now have the capability to provide a certificate of those savings to our customers so that they can use it in their CO2 reporting. Proving that switching from a conventional spare part to a digital spare part or to a 3D printed one creates value not only from a monetary point of view, but also from an ecological one, is becoming increasingly important for our clients in the oil and gas industry and the maritime sector."*

INTERVIEW WITH
Louis-Philippe Broze, *Co-founder & CEO*

2.1. ADDITIVE MANUFACTURING

COMPANY

Spentys

REGION

Brussels

Founded: 2017

Location: Brussels

Number of employees: 25 FTE

Growth (2022): 120% from 2021

Investments (2021): capital raising in 2022, opening of a US office in 2023

Start of exports: 2021

Prizes, awards: 2020 Start-up of the Year by hub.brussels

Website: www.spentys.com

SPENTYS
REINVENTING ORTHOPEDICS

Spentys offers a clinically validated scanning and modelling solution for 3D printing that enables high quality prostheses and orthoses tailored to the patient. A prosthesis replaces a part of the human body, while an orthosis aims to maintain the function of a deficient limb. Spentys has created a tool that allows the deficient part to be radiographed and scanned in a simplified way via 3D imaging using an iPad. This solution allows the analysis to be personalised and tailored to the patient's morphology. This innovative technology enables a qualitative leap in imaging while allowing the cost of the process to be reduced.

Louis-Philippe Broze, co-founder and CEO of Spentys, explains the paradigm shift in the world of orthopaedics brought about by this technology, co-created with Florian De Boeck: *"Orthotic and prosthetic technologies are mostly custom-made. Before, you would have to spend many hours stabilising the limb in question in a plaster cast. The practitioner would use the plaster cast to obtain a shape forming a negative. This shape was then turned into a mould which would then need to be adjusted. It was a rather unwieldy operation and less accurate than our solution."*

"This solution reduces costs and improves the quality of care given to the patient"

The solution offered by Spentys also allows for more freedom and precision in the production of orthotics or prosthetics, and specifically focuses on a therapeutic approach. This solution is made possible by software that Spentys has created and patented. Broze explains: *"Most of the work is done by the practitioner. We are marketing a platform/ software package that allows practitioners to interact with the prosthesis printing machine. Before, there was no software that could interact directly with the printing machine."*

Prostheses and orthoses are made by ortho-prosthetists or bandagists (also called CPOs - Certified Prosthetists/ Orthotists) using a medical prescription from the ortho-prosthetic surgeon. Such ortho-prosthetics usually involve large production facilities. Spentys' tool is complementary to this medical ecosystem. This is because the software we offer allows the ortho-prosthetic surgeon to scan the limb in question with great precision and to send the

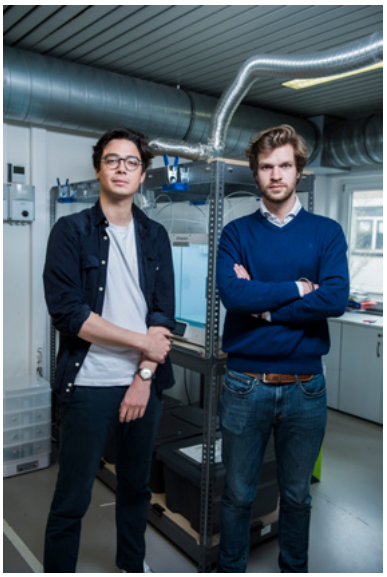
scan directly to the ortho-prosthetists or bandagists for production. This solution is revolutionary because the traditional process is not as digitalised and the process involves numerous participants. Spentys provides an end-to-end solution where the practitioner has just one supplier for the entire process. The company also offers a 3D printing service, either in its facility or via a partner. According to Louis-Philippe Broze: *"This solution reduces costs and improves the quality of care given to the patient."*

BRUSSELS, MEDTECH LAND

The Brussels ecosystem has been a great launch environment for Spentys to develop its technology and find partners. Brussels has a number of schemes in place to stimulate innovative sectors, in particular the MedTech sector. As Broze says: *"Wallonia and Flanders are quite specialised in biotech, while Brussels really stands out through its focus on MedTech and medical equipment."*

Brussels is home to several universities at the forefront of medical research, and numerous talented individuals are emerging from them. Broze explains: *"Joining these Belgian talents are numerous international profiles attracted by the opportunities offered by Brussels in the MedTech field. This is a real opportunity to stimulate technological advances in this field."*

Louis-Philippe cites several schemes put in place by Brussels to support innovative companies in the Belgian capital. For example, Spentys got the support of two regional schemes that promote its sector, namely the MedTech Accelerator and lifetech.brussels. In line with the incubator model, Florian and Louis-Philippe spent over a year following training courses and



workshops aimed at discovering the opportunities offered by the region and the private businesses already active there. Through this experience, they were able to secure financing from Innoviris and finance&invest.brussels in order to develop the business internationally. Spentys met Innoviris through calls for proposals and grants in order to be more adventurous in terms of research and innovation. In addition, Spentys is a partner in several research programmes involving universities in the region. Broze says: *"We intend to use the collaboration with the Free University of Brussels (VUB) to improve the performance of 3D imaging."*

INTERNATIONAL DEVELOPMENT

The programmes with which Spentys is affiliated facilitate its international prospecting. According to them, this search for bigger markets seems to be part of a Belgian tradition: *"Belgium has a fairly open culture, especially compared to Germany or France. [...] We have this need to go abroad because our market is too small, and we want to open ourselves up to the outside world despite having a temperament that is sometimes rather modest."*

Until now, as Broze explains, the strategy of making oneself known internationally was carried out via the Internet and social networks, in particular LinkedIn: *"We put ourselves out there online via content production - especially on LinkedIn. We had a particular strategy, which was primarily to create content, for example by publishing clinical studies in order to publicise our technology. This allowed us to raise our profile and attract people to us."*

This strategy allowed them to go international in 2021. The current strategy is to work with medical companies already active in 3D technology. In order to ensure the success of this international development, it is important for Spentys to work with organisations that have real growth potential in order to grow faster and limit the risks inherent to overseas exports. Speaking of overseas exports, Spentys took advantage of the Belgian Economic Mission to the East Coast of the United States in 2022 to expand its activities in that country. *"We have signed up for a collaboration with an American hospital. This first collaboration will allow us to free up cash to open an office there. Until now we have been doing the 'dirty work' ourselves as a team from our headquarters in Brussels. We see the United States as a real development opportunity. We want the US to represent 50% of our turnover by 2024."*

With this strategy in mind, Spentys remains focused on research to maintain its competitive edge and stay at the forefront of innovation in the MedTech field.

"We put ourselves out there online via content production - especially on LinkedIn."

INTERVIEW WITH
Mihailo Backovic, *Managing Partner*

2.2. DATA-DRIVEN MANUFACTURING

COMPANY

B 12 - Consulting

REGION

Brussels

Founded: 2012

Location: Louvain-la-Neuve & Brussels

Number of employees: 38 FTE

Turnover (2022): > 2,5 million EUR

Growth (2022): 30%

Investments (2022): around 20%

Start of exports: 2012 (services)

Share of exports in turnover: 10%

Website: www.b12-consulting.com

B12 OUTSIDE THE BOX

"B12 offers customised IT solutions for the most difficult business challenges" states Mihailo Backovic, Managing Partner at B12 Consulting. *"With our so-called IT 4.0 solutions, we are a service-orientated firm that understands its clients' ambitions and challenges and helps them achieve those ambitions through innovative software and AI solutions – and everything in between – using the latest technologies."* All the projects developed so far share three common elements: *"innovation, originality and customisation"*.

B12 Consulting considers itself to be "sector agnostic", even though it is strong on industry 4.0, biotech, mobility or indeed banking. Its clients range from local startups to multinationals such as GSK, AGC, Norsk Hydro and Besix.

B12 Consulting believes that using data, software and AI solutions within a manufacturing process is particularly relevant, making production lines more efficient by equipping them with sensors and AI solutions to detect defects, for instance. Furthermore, it allows manufacturers to look at what factors explain such defects in the production process, thanks to the correlation of different sources of data that enable optimisation of the production line.

"Innovation, originality and customisation"

Mihailo Backovic points out that the fraction of successful applications of AI in advanced manufacturing is higher than the global business average. He adds: *"I think this is because many problems encountered in manufacturing are driven by physical processes (e.g., defects in a product occur because of mechanical failures, or because product quality is dependent on humidity and temperature...). Physical processes are well modelled by machine learning solutions, in part because the laws of physics are constant over time."*

What sets B12 Consulting apart from other players, according to Backovic, is that all the intellectual property that B12 Consulting produces for its clients is transferred to them. *"Application or internal process maintenance is transferred to clients, making it a truly home-made product for them. Clients become the owners of their software and IT solutions."* According to Backovic, *"this approach is unique and answers an important need for clients who are looking for competitiveness, high quality products, high added value and a good return on investment."*

Clients are looking for tailor-made solutions, noticing all too often that existing solutions are not fit for their needs. Backovic notes that some B12 Consulting competitors are outsourcing to global consulting firms and IT providers that provide generic/ mainstream solutions. B12 Consulting, on the other hand, specialises in creating software, and, whereas large companies such as Microsoft create mainstream software, B12 Consulting creates and customises software specifically for its clients.

A UNIQUE ECOSYSTEM TO THRIVE IN

The ecosystem of innovative companies in Louvain-la-Neuve, with companies such as IBA and AGC, provides B12 Consulting with a great environment to thrive in. Having multiple high-level universities also gives the company great opportunities to develop the business, by collaborating with academia and providing access to highly skilled profiles. B12 Consulting emphasises *"the capacity of Belgium, as a highly skilled economy, to offer a lot of PhD profiles that display a large degree of adaptability"*.

Backovic recognises the philosophy of Belgian industry as well: *"There is also a strong attitude towards innovation in Belgian manufacturing. This is itself an asset. Belgian companies in my opinion recognise and value innovation, be it through digital transformation or other means, and can capitalise on it."*

To pursue its development, B12 Consulting has opened an office in Brussels to further extend its activity and make its in-house software and AI more accessible. Benefiting from Belgium's stronghold in terms of innovation, B12 Consulting attracts clients from all over the world to its offices in Brussels.

INTERNATIONAL MARKET AS AN OPPORTUNITY TO GROW

B12 Consulting is currently in the process of developing an internationalisation strategy. Having attracted international clients from France, Denmark, Germany and the US, the company is developing a strategy for exploring new markets and potential opportunities. Opportunities abroad are at core of this expansion. Backovic explains: *"We want to go to places where innovative IT service is lacking, and demand is high. This is, in part, because we insist on remaining self-funded, so the margin of error is quite constrained. We can't afford to fail!"*

Backovic details the strategy further: *"Right now two unrelated markets are of interest to us: Canada and Africa. It's likely that, by the upcoming spring (2023), we will be starting operations in Kenya. As for Canada, this is a market where there is enormous demand for IT services. On top of this, the euro has been weak for some time, making our services quite cheap!"*

FUTURE GROWTH

"For us, a high level of flexibility is crucial. The IT market is under fire because of the level of innovation and the growing complexity of clients' needs. For instance, cyber security has exploded. We want to position ourselves in this domain. Technologies are evolving and we are constantly learning. In 6 months, IT will be different!".

B12 Consulting has the people, the technology and AI solutions to respond promptly to an ever-changing environment. Furthermore, the consulting firm will not forget that it is a frontrunner in terms of data driven solutions and AI applications, having the support of clients already convinced by B12 Consulting's solutions.

"Belgian companies in my opinion recognise and value innovation, be it through digital transformation or other means, and can capitalise on it."

INTERVIEW WITH
Eric Delacroix
& Hervé Bath,
Co-founding partners

2.2. DATA-DRIVEN MANUFACTURING

COMPANY

Euranova

REGION

Wallonia

Founded: 2008

Location: Louvain-la-Neuve (Mont-Saint-Guibert)

Number of employees: 160 FTE

Turnover (2022): € 11.6 million

Growth (2022): 20%

Investments (2022): € 2.2 millions

Start of activities abroad: Tunis (2016) and Marseille (2017)

Share of exports in turnover: <3%

Prizes, awards: equality trophy by Ellesbougent, NGO promoting female scientists

Website: www.euranova.eu

A CONSULTANT FIRM IN DATA MANAGEMENT

Euranova is a consulting firm specialising in data management and data usage. It is also active in the field of AI and software engineering. Euranova has distinguished itself in its field by creating its own expertise through the development of its own research centre. Thanks to its in-house know-how, Euranova is now a major actor in innovative technology in Louvain-la-Neuve, the hometown of many brilliant technology companies and startups, sharing in the innovative spirit of the city, and is now a partner of the new hub for digital technology in Wallonia, the Place Of Digital, or POD.

As a consulting firm in innovative technologies, Euranova's core business is to provide customers with off-the-shelf "expert" solutions for managing and exploiting their data. Working in close collaboration with its in-house research centre, Euronova's consultants are able to offer a scientific approach in its proposed solutions. This emphasis on innovation and research *"inspires our clients"* says Eric Delacroix, cofounding partner of Euranova, adding that *"they are particularly interested in Euranova's studies on data management"*.

Clients of Euranova are of all sizes and are active in a wide variety of fields, from the pharmaceutical and automotive industries to services in telecoms and finance. When they call on Euranova, they are looking for solutions for making better use of their data. Delacroix explains that the solution can be adapted to the client's profile. Large companies tend to invest in long-term strategies for data management, involving many stakeholders and different financing plans, whereas smaller companies tend to go for more short-term solutions with no large investments.

"Trust is a key element in successfully implementing such projects. Industry 4.0 is a game-changer."

Speaking about the company's sector, Delacroix explains: *"We see two types of competitors. On the one hand, there are major consulting firms such as the Big Four and Capgemini, who offer standard data management solutions. On the other, there are small, specialised companies working on algorithms"*. Euranova is between the two, working cross-industry and offering sophisticated solutions related to advanced technologies.

One of the areas that Euranova is most active in is advanced manufacturing. *"The potential of advanced manufacturing technologies is huge, and the areas where they can be used are very varied,"* according to Delacroix. *"However, when it comes to data management, it is important to make a distinction between mature technologies*

where there is still the potential for growth, and fledgling technologies" he adds. For instance, it is increasingly recognised that *problem detection* using AI and data analysis (such as KYC - Know Your Customer - detection) is becoming a mature technology. Meanwhile, other applications should experience a leap forward in terms of data use and AI applications, more specifically in the medical sector, the energy sector, and the industrial sector.

A CENTRE OF EXCELLENCE IN WALLONIA

After getting his Master of science in Computer Science and Engineering, Delacroix decided to stay in Belgium to develop expertise in data management and AI. Delacroix envisaged, together with Hervé Bath, co-founding partner at Euranova, a Belgian centre of expertise in computer science giving Belgian engineers the opportunity to develop their expertise at home. Delacroix points out that the quality of Belgian engineers is outstanding, and it's important to take advantage of this.

Euranova was able to find the support it was looking for in Wallonia thanks to public investors, namely the Société Régionale d'Investissement de Wallonie (SRIW) in 2019. Besides public financial support, Euranova recognises the efforts of Wallonia, where a lot is being done by public authorities to create synergies, added value, and an innovation-friendly environment.

"*The challenge for Euranova is to get more companies on board to take the step into industry 4.0,*" says Delacroix. "*Trust is a key element in successfully implementing such projects. Industry 4.0 is a game-changer*". Therefore, Euranova is fully committed to proposing solutions to its clients in Belgium and beyond, since data management improves business competitiveness. "*Thanks to our flagship platform Digazu, clients can easily collect, store and manage data in order to tap into data science algorithms.*"

"I believe in multidisciplinarity to create value."

Delacroix is very confident about the opportunities for the advanced manufacturing industry in Wallonia and Belgium, in view of the potential advantages for players in optics, lasers and micromechanics. Because of the diversified industrial landscape, coordination among actors creates opportunities for developing a multitude of applications, both for themselves and for their clients. "*I believe in multidisciplinarity to create value. It must come from my polytechnic background!*", Delacroix adds.

A UNIQUE INTER-NATIONAL APPROACH

Euranova very quickly saw opportunities to grow at the international level both via its research centre and its commercial solutions. The research centre at Euranova works closely with international counterparts and leading universities, sharing and spreading new technologies and knowledge. Euranova is active in international conferences such as Osaka (IEEE Big Data) or Washington DC (Annual Data Privacy Conference USA – focus on data governance). It is important for Euranova to take part in the debate on data management and the data stream.

Euranova has established offices in Marseille and Tunis. With its engineers coming from all over the world (at least 14 nationalities), and with its offices abroad, it can work at the international level and the local level at the same time. This allows it to deliver a nearshoring approach. As Delacroix points out, an international strategy needs to be well prepared. Besides standard requirements, Euranova has specific needs; having local universities and researchers to work with, having sufficient capital to set up a branch to deliver such expertise in data management, and finding skilled people to deliver the expertise and high-tech solutions.

ACTIVE FOR THE FUTURE

Euranova is taking part in EU projects concerning AI liability, machine-learning boundaries and privacy issues. Security and risk management of such new emerging technologies are topics of concern for the EU. Being keen to commit to such policies, Euranova is working on solutions such as algorithms and software to prevent such risks.

At the regional level, Euranova aims to work in collaboration with the available expertise, mix skills, and to maximize the impact of these investments, gradually creating value along the way, while being aware of the ever-increasing complexity of our environment.

INTERVIEW WITH
Luc Deleu & Kristof Lemmens,
CEO & Sales & Marketing Executive

2.2. DATA-DRIVEN MANUFACTURING

COMPANY

Ometa

REGION

Flanders

Founded: 2001

Location: Wommelgem

Number of employees: 20

Turnover (2021): €2.26 million

Markets: Industry, Utilities and Government

Growth (2021): Mainly growth in Industry (a slowdown during the pandemic and now rather a revival of activities) and an increase in Government (+20% in number of cities).

Investments (2021): Ometa invests ongoing in its Ometa Software Framework.

Start of exports: 2001

Share of exports in turnover: Most of turnover is realized in Germany, Netherlands, US.

Prizes, awards: Factory of the Future Award (2019)

Website: website.ometa.net

ABOUT THE COMPANY

Ometa is a software company with expertise in system integration and digital collaboration. It was founded with a clear goal in mind: to manage and structure data for optimizing organizational operations. They are able to create smart integrations between the world of structured data (e.g. stocks, invoices, products) and the world of unstructured data (e.g. emails, drawings, documents). In the end, Ometa enables optimal, real-time information flows to streamline business processes. This results in efficient collaboration between end users and operational excellence for organizations.

The company's focus is on the continuous development of the Ometa Framework, which brings the right information to the right people, at the right time and in the right context. Their framework is designed for fast and flexible implementations, saving their clients efforts in terms of time and budget. Luc Deleu, CEO of Ometa, explains how the platform works: *"what we have built is basically a platform for real-time integration of data from various data sources in which information is easily accessible to all persons who need to be involved in a given process."*

"What sets us apart from our competitors is that we can integrate the entire data chain in real time."

When the company was founded in 2001, the idea was to create a collaborative platform to easily share data without re-copying that data to other data silos. Ometa was ahead of its time, because it is only now that people are really starting to understand what they have been accomplishing all these years. Today, this collaboration platform is mainly used in environments where decisions have to be made quickly, based on information from many sources. Kristof Lemmens, Sales & Marketing Executive, states that one of the main benefits of the Ometa Integrator Framework for the end user is that the data is not only visible to everyone, but also stored in one digital workplace where they can also manipulate it: *"people don't have to navigate to the various systems where the information comes from. They often do not know, understand, or care where the information originates from, they are only interested in the information that is relevant to them and that they need to see. And they want to consult that information in their own digital workspace. Our Industry 4.0 Shopfloor solutions in particular are a good example where Ometa provides relevant information, enabling people to make informed decisions."*

BOTH PRIVATE AND PUBLIC CLIENTS

Even though 80% of Ometa's turnover comes from working with (large) industrial clients in Belgium, the Netherlands, Germany and beyond, the company's user market is expanding and now even includes clients at the municipal level. According to Luc Deleu, about 50 Belgian municipalities are working with Ometa's framework for their public social services files: *"When a citizen asks for help from his or her local social services agency, all kinds of information about this person has to be collected from various government databases. With our platform, this data is brought together in one destination as quickly as possible, so that a well-informed decision can be made about the application within a short timeframe and the file of this person is properly archived. Certain water companies also use our platform. Not only do we send data from the systems of the water companies to their subcontractors, which mainly happens in the context of sewerage and water supply, but we also provide them with information about the management of the network and notifications."*

REAL-TIME AND BIDIRECTIONAL FLOW OF DATA

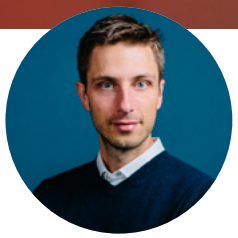
Two key aspects that are essential when talking about the Ometa Framework are that the data you see is real-time and bidirectional, according to Kristof Lemmens. *"By bidirectional I mean that you can change data in your digital workspace if you notice that deliveries are late. The modified data is then delivered to all relevant places without you having to email everyone. If the changes in all the different data cells were human-controlled, then it would be human-driven, and your email would be the thing that connects everything. What sets us apart from our competitors is that we can integrate the entire data chain in real time, we do not copy any data from certain sources to other databases. The reason I emphasize this is because when we look around at what other vendors are doing, they all claim to do real-time integration and visualization between all systems, but they really aren't."*

At Ometa they like to say that they have many competitors, but they have no real competitors. What they mean by this, if you dissect the Ometa platform, you can identify competitors for every aspect, but there is no one else who can deliver everything. In that sense, the framework that Ometa has developed is quite unique. *"If you want to replicate the Ometa framework, you have to buy separate products for integration, collaboration, and case management. If you then bring all those different products together in the entire chain, you have the extra challenge of having to connect them all. Moreover, the data is often no longer in real-time because at some point you start to manage the data locally, without knowing what changes have already occurred in the real world. With our platform you will not encounter these kinds of problems,"* according to Luc Deleu.

"We want to make sure that we can keep our original vision and structure, because what we are working on now will have an impact on generations to come."

INTERNATIONAL EXPANSION

Ometa is a bootstrapped company, meaning it was founded with little to no assets. Even now, they still operate without investors, even though they have received many proposals. Luc Deleu explains why Ometa has always waited to bring in investment capital until now: *"The longer you can wait to bring in external investment capital, the more certain you are that the idea you are building on will eventually grow into a sustainable company. We did not need investment capital to build our platform or for the proof of concept, but to scale up we will need to bring in external investment capital. However, we will only take this step when the time is right to make sure we don't just become part of something else. We want to make sure that we can keep our original vision and structure, because what we are working on now will have an impact on generations to come."*



INTERVIEW WITH
Kevin Françoisse, *Co-founder & CEO*

2.2. DATA-DRIVEN MANUFACTURING

COMPANY

Sagacify

REGION

Brussels

Founded: 2012

Location: Brussels

Number of employees: 25

Turnover (2021): € 1.9m

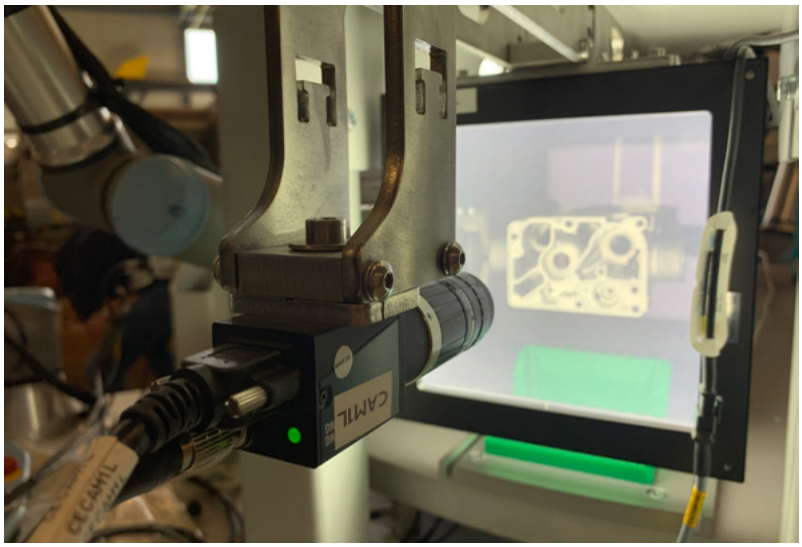
Growth (2021): 40%

Start of export: 2020

Turnover abroad: 10%

Investments (2021): Not disclosed but investment in a new product called Skwiz

Website: www.sagacify.com



ABOUT THE COMPANY

Sagacify was co-created by Kevin Françoisse and François Beuvens in 2012, both PhD holders in mathematics and computer sciences. From the beginning, Sagacify offered services and advice to help become more efficient by leveraging the value contained in their data. Sagacify started as a multisectorial AI provider, and quickly built solutions for manufacturing as well as fintech, insurance, healthcare, and logistics companies, but their focus is not primarily on manufacturing companies. Today, Sagacify uses his team of experts in data science and software development to leverage the new possibilities offered by data science.

THE CHALLENGES OF EUROPEAN MANUFACTURING

Françoisse makes some observations: "*European manufacturing companies are facing several challenges in the current business environment, including the high cost of energy, shortage of skilled labor, and intense global competition*". Adding: "*The cost of energy has increased significantly in recent years, putting pressure on companies to manage their energy usage and reduce costs. At the same time, there is a lack of skilled labor in many industries, making it difficult for companies to find workers with the necessary skills to meet their production needs. Finally, global competition has intensified, as companies from all over the world are competing for market share. This competition is driving down prices, putting pressure on European manufacturers to find ways to reduce costs, improve productivity, and remain competitive*". To overcome these challenges, according to Françoisse, "*companies need to adopt new technologies, invest in training programs to develop the skills of their workforce, and find new and innovative ways to reduce energy costs*".

> *"Companies need to adopt new technologies, invest in training programs to develop the skills of their workforce, and find new and innovative ways to reduce energy costs."*

DATA AS A PART OF THE SOLUTION

"Data, and the exploitation of it, can be the key to solving some of the most challenging of these problems" according to Françoisse. By leveraging data, companies can gain valuable insights into their operations, identify areas for improvement, and optimize processes to increase efficiency and reduce costs. In the last few years in particular, the breakthroughs in new data exploitation technologies allowed collecting and analyzing vast amounts of data from production processes, machines, and equipment. New AI techniques can now extract patterns and make decisions on the basis of databases and time series, but also on images, videos and natural language. They also can model production processes much more precisely than what technology allowed just a few years ago.

This evolution of AI and its algorithms creates new opportunities to deploy AI models on processes that were considered too complex to be automated before, but can also be used to replace existing processes by new, more efficient algorithms.

WHAT ARE THE PRACTICAL USES OF DATA?

With the support of modern AI models to leverage data, Sagacify help its manufacturing clients in many different ways. Firstly, *Visual defect detection* uses computer vision to inspect every aspect of production and detect complex defects more accurately than a human expert. These algorithms enhance quality and decrease costs, and sometimes permit the repair of defective items. Secondly, process control optimization cuts energy costs and enhances overall production quality. Advanced algorithms like reinforcement learning can also generate innovative production parameters and recipes, resulting in unanticipated optimization. Thirdly, *Predictive maintenance* schedules maintenance interventions at optimal times, minimizing downtime and extending equipment life. Continuous monitoring of the machines significantly reduces the risk of unexpected malfunctions. Finally, *Zero-defect manufacturing* identifies and resolves issues prior to product delivery, enhancing customer satisfaction and lowering costs related to recalls and warranty claims. By exploiting data with the solutions developed by Sagacify, companies can gain a competitive edge, increase productivity, and improve their bottom line.

A BELGIAN COMPANY

Sagacify took advantage of what Belgium can offer. On this, Françoisse Kevin says that, from the beginning, they have been able to get support from and access to public incentives, which have accelerated their development. But more than that, *"it is the environment in Belgium with regard to advanced technology that has been favorable to the development of the company,"* Françoisse explains.

"Data, and the exploitation of it, can be the key to solving some of the most challenging of these problems."

Firstly, according to him, they can find all the talent they are looking for in Brussels or in Wallonia, thanks to the world-class universities all over Belgium. Secondly, they have been given support from Wallonia, encouraging collaboration between companies on projects to increase innovation. The most relevant expression of such a project is the collaboration between Sagacify and Walloon company I-Care. Sagacify, a specialist in advanced algorithms (based on AI), shared its expertise with I-Care, a specialist in predictive maintenance (based on IoT), to propose automated solutions. Thirdly, more than subsidies, for Françoisse *"it is the opportunity to have a large variety of industries create a strong ecosystem – such as MecaTech, which facilitates matchmaking between manufacturers and technology developers."*

Françoisse develops *"Today, Sagacify solutions are used by several big players in Wallonia such as I-Care, Lasea, Groupe Comet, Groupe Cylix or Thales Alenia Space, to solve problems like early defect detection, process control optimization, predictive maintenance, and improve their process to get as close as possible to zero-defect-manufacturing"*.

INTERNATIONAL TRADE

Sagacify started its international expansion with collaboration with European companies, such as Resideo, a manufacturers of home automation solutions, and Arcelor Mittal.

Sagacify is currently strengthening its position in Belgium, and is building a network of partners and integrators to export internationally in the near future.

INTERVIEW WITH
Wouter Ceulemans, *President Airtec Division*

2.3. MECHATRONICS

COMPANY

Atlas Copco - Airpower

REGION

Flanders

Founded: 1873

Locations in Belgium: Wilrijk (development of compressors, dryers and filters); Boom (rental of compressors and generators), Hoeselt (distribution center); Overijse (sales and service)

Number of employees: 49 000

Customers in 180 countries

Turnover (2021): €11 billion

Operating Margin (2021): 21.2%

Investments (2022): €70 million over a period of 3 years in the Wilrijk factory

Prizes, awards: Winner of the Learning & Development Awards (2022); Lifetime Achievement Trophy from Flanders Investment and Trade (2021)

Website: www.atlascopco.com

ABOUT THE COMPANY

Atlas Copco is a Swedish multinational technology driven company that was founded in 1873 and has a total of 49,000 employees in 70 countries. It serves customers in more than 180 countries in all industries. The company operates in four areas: Compressor Technique (provides compressed air solutions such as industrial compressors, air and gas treatment equipment, air management systems and gas and process compressors/expanders), Vacuum Technique (provides vacuum products, exhaust management systems, valves and related products), Power Technique (manufactures portable compressors, lighting towers, pumps and generators, energy storage systems and light demolition equipment for a wide variety of infrastructure projects) and Industrial Technique (develops industrial power tools, assembly and machine vision solutions for i.a. the automotive and aerospace industries).

With a surface area of 130,000 m^2, the factory in Wilrijk is currently still the largest site of Atlas Copco in the world. Two of the company's four business units, accounting worldwide for almost 60% of the group turnover, have their headquarters there. "The company's head offices in Sweden have developed this site with its more than 800 engineers into the 'university of compressed air'.

"The energy transition that we are experiencing provides us with many opportunities to continue to grow in importance, in our portfolio and in our customer base."

Here, we combine basic research and product development with assembly, production and logistics", says Wouter Ceulemans, President Airtec Division at Atlas Copco Airpower. In Belgium, the group has other branches in Boom (rental of compressors and generators), Hoeselt (distribution center) and Overijse (sales and service). Altogether, up to 3,900 people work for the Swedish group in our country and the company's revenues from its branches in Belgium amount to more than €3 billion.

AIRTEC DIVISION

Atlas Copco's Airtec division in Wilrijk designs, develops and manufactures the compressor element, which is the heart of the compressor. According to Ceulemans, the Airtec division is a special kind of division within Atlas Copco because it operates as an internal supplier to the rest of the organization and has no external customers: "The Airtec division is built on three major pillars. The initial mission of this

department was to design, develop, and produce the true core components of the compressor. The second mission entrusted to Airtec was to do the necessary research to identify the next technologies, products or business models we would need to stay ahead of the competition. The third mission of the Airtec Division is to offer advanced engineering services to each of the 22 divisions that Atlas Copco has around the world in every corner of the industry device world. These services include traditional mechanical engineering, but also electrical engineering. In addition, there are more sophisticated services such as computer fluid dynamics (CFD), computer-aided manufacturing, all kinds of simulations, material analysis, but also software embedded controls."

SMART FACTORY

Atlas Copco is one of the few companies that uses 'connectivity' in both product and process. They have been connecting their compressors for the past decade using the latest network technology, which allows them to remotely monitor their use and condition and optimize equipment and customer use and service. "Currently, we have more than 200,000 compressors in the field that are connected and that we can see, monitor and learn from. That offers us a tremendous base of information to produce or design even better machines because now we see how the compressors are behaving in the field. The gained insights have helped us in connecting our factory machines, which is a more complex operation. However, there are also some risks if you start to connect your entire factory. We have invested significant resources to make sure that not only the products we deliver to our customers are inherently safe, but also to ensure that no one can hack into our factory and tamper with our machines and our installations", states

Ceulemans. Having a smart factory that is connected but also automated through the use of robots, cobots and AI technology brings full operational transparency and optimized efficiency.

ADDITIVE MANUFACTURING

Atlas Copco is also innovating in additive manufacturing, having gone through the classic trajectory, from prototype to functional prototype, tooling and now production. "We started six or seven years ago by investing in some polymer printers and learning the benefits they can bring us. We have now mastered the technology quite well and now have our own printer in house that makes production parts in polymer that people design here and that effectively make life easier. We then learned that metal is much more difficult to work with than polymers, but we still decided to invest in metal printing technologies to gain the necessary experience and see if we could have the same success with metals as with polymers", says Ceulemans.

SUSTAINABILITY TRANSFORMATION

As a market leader, Atlas Copco knows exactly what it needs to do to contribute to global climate change goals. The company is committed to 'conducting business within planetary boundaries'. With that in mind, it has set itself a series of ambitious emission reduction targets that are grounded in climate science through the Science-Based Targets initiative (SBTi). The SBTi has validated the company's clearly defined path to reduce CO2 emissions in their journey to a low-carbon society. Ceulemans points out that a large part in Atlas Copco's sustainability efforts stems from manufacturing products that are more efficient and use less energy: "We operate in a sector that is highly dependent on energy, but we have accumulated a lot of technological know-how internally that can help us and our customers to become more energy efficient. The energy efficiency of a compressor is an increasingly important factor. The less power you must put in and the more compressed air comes out, the more efficient. We are also working on energy conversion. Heat is released in a compressor room, and it makes sense to recover it."

INVESTMENTS IN PRODUCTION TECHNOLOGY AND R&D FACILITIES

The future of Atlas Copco's factory in Wilrijk looks bright, as only last year it was decided that the company would invest €70 million over three years in production capacity and expanded R&D facilities. The investments include an expansion of the Compressor Technique business area's smart factory, as well as production technology. "With these investments, we are fully committed to being part of the solution for a better tomorrow and we believe that the energy transition that we are experiencing provides us with many opportunities to continue to grow in importance, in our portfolio and in our customer base", concludes Ceulemans.

INTERVIEW WITH
Tom Henkes, *CEO of Capaul*

2.3. MECHATRONICS

COMPANY

Capaul

REGION

Wallonia

Founded: 1868

Location: Eupen

Number of employees: 85

Turnover (2022): € 9,500,000

Growth (annually): 9%

Investments (2022): € 2,200,000

Start of exports: 1868

Share of exports in turnover: 85% (directly or indirectly via our customers)

Prizes, awards: Gazelle Trends 2020, Eiffel Award 2022

Website: www.capaul.be

Capaul is a family-run company with origins dating back to the middle of the 19th century. The company is active in machining and assembly. Tom Henkes, current CEO of Capaul, says: *"Our core business is the development of robust machining and assembly processes for complex parts of any size. Our expertise lies in setting up a highly reliable production process that delivers parts ready to be assembled and delivered to the end customer without any additional testing."*

Capaul therefore supports its customers throughout the entire manufacturing process, from feasibility study to series production, including any special processes.

The upstream study is essential. As Henkes points out, the design of a part is key, but you also have to know how to manufacture it. Henkes explains: *"To manufacture the part, we study the whole process, whether it involves machining, brazing, welding, heat or surface treatments or assembly. We work to control costs, to guarantee a high standard of quality and to observe the manufacturing deadline. Respecting these commitments is essential."*

Regarding the production and assembly of parts, Henkes continues: *"This ranges from the procurement of materials from steel mills, forges and foundries to in-house machining or copper brazing and, of course, assembly. We also take care of the documentation for our customers, both in terms of quality and the specific characteristics of the parts."*

> *"Our expertise lies in setting up a highly reliable production process that delivers parts ready to be assembled and delivered to the end customer without any additional testing."*

Capaul's strength lies in its ability to master machining processes (from 3 to 5 axes) and, in particular, 5-axis milling and integrated turning in a single operation. Capaul is able to produce large parts up to 2 metres in diameter by combined milling and turning in a stable environment of 20°C, guaranteeing a high level of tolerance and precision in an autonomous process.

This expertise enables Capaul to meet the expectations of its customers. Henkes continues: *"Our strategy is to solve our customers' production problems. We automate and stabilise processes by minimising human intervention through use of the latest technology. This strategy sets us apart from our competitors, who are all over Europe as well as in China and India."*

EUROPEAN VALUE CHAIN WITH GLOBAL PLAYERS

Capaul's market is primarily European. As Henkes points out: *"We are dealing with increasingly bigger parts. To date we are up to 2 metres in size and 2.5 tonnes in weight. So these are not parts that get sent all over the world just for machining."*

Capaul is one of the companies of choice for major global players active in Europe, particularly those in the aeronautical sector (engine parts), such as General Electric, Safran and Rolls-Royce, as well as the defence or railway sectors. They are also active in the production of parts for the semiconductor sector, with end clients such as European world leader ASML or Japanese company Ushio, specifically in the supply of parts for EUV (Extreme Ultraviolet Lithography) machines used to produce semiconductors.

ANCHORED IN THE GERMAN-SPEAKING COMMUNITY IN THE WALLOON REGION

Capaul is anchored in the German-speaking region of Belgium. Tom Henkes and his two brothers own 100% of the company, with their father still heading up the board. Henkes says: *"In line with best practices, we attach importance to having a relatively horizontal structure where each member is equally empowered."*

The company attaches great importance to the training of young people in the region, as well as their integration into the group. They have initiated a number of programmes, including an in-house machining training centre, apprenticeships with local training centres and the launch of a 3-year project engineer traineeship. This programme allows engineers fresh out of university to rotate within Capaul and learn the trade on the job. Henkes is enthusiastic about this: *"We say to the engineers, you undergo the practical training to really learn the trade, and we benefit from the analytical skills you have acquired at university to develop new processes."*

Based in Eupen, Capaul is well aware of the advantages of being in that region. Its location on the borders and its multilingualism (French and German) are real benefits. Moreover, according to Henkes, these aspects contribute to the spirit of open-mindedness and adaptability to change, and are particularly appreciated by the Germans and the French.

Regarding industry in Belgium, Henkes underlines Belgium's real expertise in digital technology, for example in the area of simulation or the use of AI. Henkes emphasises: *"Belgium has a head start in digital technology, especially in simulation where there is true expertise."*

What distinguishes Belgium and the Walloon region from neighbouring countries, according to Henkes, are investment incentives and the open mind for new approaches. He explains: *"We are living in a region with historically different cultures due to our neighbourhood with Germany and France. It allows us to easily think out of the box, imagine new process approaches and install them on our site".*

FUTURE PROSPECTS

At the beginning of 2023, Capaul acquired a stake in an aluminium foundry based in France, European leader in this field. This new venture is part of its strategy to expand its own value chain. Henkes explains the approach: *"We want to offer our customers an ever more complete range of services, which means that the customer no longer buys a part from a foundry and then sends it to be machined separately, but rather entrusts the entire process to Capaul. We are working to become a leader – a hidden champion – in the process of manufacturing or assembling complex mechanical parts. A large industrial company, for example, will design a part and then look for a partner capable of producing it and finding the solutions to manufacture it. Capaul will be there for the customer to develop the best manufacturing process and mass produce parts."*

INTERVIEW WITH
Rob Smets, *Managing Director*

2.3. MECHATRONICS

COMPANY

uWare Robotics

REGION

Brussels

Founded: May 2018

Location: Brussels (Belgium), HQ - Alicante (Spain), Test site

Number of employees: 5

Turnover (2021): Seed stage

Growth (2021): Seed stage

Investments (2021): /

Start of exports: Seed stage

Share of exports in turnover: Seed stage

Prizes, awards: Innoviris Innovative Startup Award 2020, European Youth Delegate Our Oceans Conference Palau 2022, Belgian Youth Delegate United Nations Ocean Conference Lisbon 2022

Website: www.uware.io

uWare ROBOTICS

ABOUT THE COMPANY

uWare Robotics is a deep tech start-up specializing in data-driven engineering solutions for coastal environments. Currently, it offers autonomous 2D and 3D seabed mapping and map generation (Seagrass Meadows, Sandy Bottoms,...). Shortly, it will start the next phase of autonomous 3D inspection, applicable to infrastructure such as ports, ship hulls and more complex ecosystems such as coral reefs. It uses its highly mobile Autonomous Underwater Vehicles (AUVs) and modular sensor systems for data gathering and provides a software platform for processing and analyzing that data. To ensure that its solutions meet the standards of the marine sciences community, it collaborates with research institutes and coastal area managers. Its solutions will then be translated to blue economy industries for environmental assessment and infra-structure monitoring.

MAIN FOCUS AREA

Based on the premise of optimizing the way underwater data can be collected, processed and accessed, uWare has designed its AUV, the uOne, for maximum mobility, stability, cost-effectiveness and autonomy. *"Our core business is in underwater robotics, which is already quite a niche market in itself, but we go one step further"*, explains Rob Smets, Managing Director at uWare. He continues by stating the following: *"We are currently focusing on light AUVs in medium to smaller areas to perform underwater inspection tasks, both for marine conservation and industrial applications. Our goal was to design a product that not only is affordable for wealthy industries, but also for all smaller companies developing within the blue economy."*

"Our goal was to design a product that not only is affordable for wealthy industries, but also for all smaller companies developing within the blue economy."

CURRENT CHALLENGES

Creating a fully autonomous AUV presented certain challenges and from a technological point of view, the lack of underwater electromagnetic communication (4G, Bluetooth, Wi-Fi, GPS,...) is certainly one of the biggest, in addition to providing the robot with the intelligence for autonomous behaviour. Smets explains why it took uWare about four years to develop its uOne prototype: *"If you don't have a cable connected to your underwater robot, which is necessary to create real autonomy, you have to look*

at other, more limited ways of data transfer. Therefore, the uOne communicates with our uBuoy via our proprietary acoustic communications modem, the uCom, to provide live mission updates and accept new mission commands. However, the amount of data that can be exchanged in this way is quite limited, so we are looking at adding Li-Fi communication in the future so that we can use it in parallel with the acoustic communication. The advantage of Li-Fi is that you can send more data, but only over a relatively short distance. Since the robot can only exchange limited amounts of data, you also have to make sure that it has the intelligence on board to carry out its missions. The data transfer is for updates only, not for control. For example, you lose the GPS signal at a depth of half a meter, but by sending the position data from the robot to the uBuoy via acoustic communication, we can determine its position relative to the surface."

WHEN AND WHERE THE STORY BEGAN ...

uWare was founded in 2018 in Brussels, which is where the headquarters are still located, and the business development is happening. The company is also developing its data platform here in Belgium to extract the information from the AUV after it surfaces when an assignment is completed. However, due to the more favorable conditions in the Mediterranean, the company has opened a test facility in Alicante, Spain. There it has built a full pipeline of computers, not only for simulating robot behaviour, but also for 3D printing the parts and assembling the prototype.

The company very consciously wants to include biodiversity management as one of its main focus areas and offer its functional, comprehensive and data-driven solutions to companies and organizations that contribute to a sustainable blue economy. Smets points out that uWare wants to be known as a solutions provider for cost-effective robotics and artificial intelligence solutions to collect coastal and infrastructure data, as well as provide the tools to store, visualize and analyze that information: *"Most of the companies now focusing on data collection are simply gathering underwater images. We want to go one step further, because we believe that if you collect that data in a synchronized way, there are a lot of powerful solutions out there with artificial intelligence by using machine learning and computer vision to autonomously create 2D and 3D structures and maps and overlay the environmental data on those maps."*

FUTURE DIRECTION AND PLANS

At the moment uWare is in the seed phase and has yet to determine how it wants to position the uOne in the market. According to Smets, all options are still on the table and the company could choose to simply sell or rent its hardware: *"We are waiting for the market validation phase before we make a final decision. As for the data platform, we image it functions similarly to Dropbox, where you have the cloud-based storage, and the desktop application itself. This will most likely be used in some kind of software-as-a-service (SaaS), which is the most interesting for almost all software products right now."*

The company's long-term vision is to develop an entire ecosystem of accessible underwater robotics solutions that work together to perform complex tasks such as replanting a coral reef or managing an infrastructure site. Reaching this stage not only requires a lot of money, the knowledge and R&D fields will also have to continue to develop. *"Over time, we will need more computing power if we want these AUV's to make more complex decisions underwater on their own. At this point, we have reached the stage where the uOne does open water data collection, which is a fully autonomous task in itself. In the near future we will move towards collecting data in enclosed environments around 3D structures, but even at that stage we will just collect data without actually intervening in the environment in any way. It will be another 10 to 20 years before underwater robots carry out complex intervention tasks in team and make their own decisions on site"*, concludes Smets.

INTERVIEW WITH
Joris Ceyssens, *Director*

2.3. MECHATRONICS

COMPANY

Vintiv

REGION

Flanders

Founded: 1987

Location: Neusenberg 1a – 3583 Beringen

Number of employees: 50

Turnover (2021): €11 million

Growth (2021): +10%

Investments (2021): €1.5 million (facility extension)

Start of exports: 2010

Share of exports in turnover: 15%

Website: www.vintiv.be

VINTIV
BUSINESSLIKE MACHINES

ABOUT THE COMPANY

VINTIV is a company that specializes in manufacturing customized industrial machines for its customers. It also retrofits legacy machines and installations into state-of-the-art production equipment. Joris Ceyssens, Director at VINTIV, explains the company's success: "We offer our clients a technical solution. We translate their business model or business idea into a physical form. This means that when a potential customer wants to launch a new product and he cannot find the machine to produce it in the standard market, he comes to us and we offer him a custom built and engineered machine that perfectly meets his needs, so that he can achieve a maximum level of competitiveness."

What sets VINTIV apart from other companies in the field is that they will not only develop and build a certain machine, but they will also deliver the intellectual property rights related to the production of that machine to the client. "It's not all that common in a machine development market that producers of machines also offer the complete technical construction file of the machine. This is one of the main differentiators for us because we translate the process knowledge,

"Half the cost when you first build a new machine is in the number of hours it takes to develop it, which means you need a healthy amount of money to invest in the project."

which our client brings to the table, into a physical form. This means that our clients not only receive the machine that you generally see on the shop floor, but also the complete package of intellectual property related to the development. That way, our clients are 100% sure that their custom machine is fully owned by them", according to Ceyssens.

MAIN FOCUS AREAS

Besides developing and building custom new machines from scratch, VINTIV also retrofits already existing ones. The retrofitting of legacy machines is a significant market, because a lot of machines that are still being used today have been built tens of years ago, and quite a lot of them have old control systems that are no longer up to par with regards to the industry 4.0 movement towards artificial intelligence and data driven technology. This basically means that

they can no longer deliver or meet the requirements of the company. To give these outdated machines a new lease on life, VINTIV refurbishes them into state-of-the-art production machines with new software and hardware. Ceyssens points out that the skills you need to build a completely new machine are more or less exactly the same skills you need to retrofit an already existing one: "The only major difference is that the development process of new machines is largely mechanically driven, which means that the first step in developing a new machine is mechanics, how something will work. When you retrofit an existing machine, the mechanics are there, meaning you don't have to reinvent anything because the physical machine is already there. But you are going to strip the electrical panel and its wiring from the existing machine, recable it, add new electrical panels and software, and all the other new features that you want."

MAIN CLIENTS

At the moment, companies active in the pharmaceutical and life sciences industry are increasingly finding their way to the customized machines that VINTIV offers. Ceyssens states this is because these companies have healthy business models with room to invest in special machines that can help them to increase their competitiveness. He points out that developing a new custom machine is time-consuming and quite cost-intensive: "Half the cost when you first build a new machine is in the number of hours it takes to develop it, which means you need a healthy amount of money to invest in the project. The pharmaceutical industry has quite a healthy backbone, which makes them more inclined to invest in custom-made machines." Even though companies from the pharmaceutical and life sciences industries are important clients of VINTIV, it focuses on all sectors that benefit from custom machines, ranging from companies in the concrete industry, construction, metal, automotive, electronics, to companies in the food and beverage industry.

INTERNATIONALIZATION PROCESS

There was a time when manufacturing companies tended to move their facilities to countries in Asia, but now a reshoring movement is taking place as cost and operator availability is not only an issue here at home, it is starting to become an issue in Asia as well. In addition, higher transportation and energy costs are considered a global phenomenon. This prompts many companies to consider whether it would not be more beneficial to diversify production and also have facilities closer to home. VINTIV tries to point out the advantages of customization to its customers and together they look at whether it is worthwhile to bring at least part of the production back to Western Europe.

Currently, about 15 to 20% of VINTIV's revenues come from exports, and that number has tripled over the past five years. More and more internationally organized companies find their way to VINTIV and decide to have a machine built locally, before exporting that knowledge in the form of a machine to locations in the rest of the world. In the past, the clients that came to VINTIV were local small to medium sized companies, but nowadays they work together with larger companies that have branches and subsidiaries all over the world.

FUTURE PLANS

VINTIV only moved into its new building in 2019, but it has already reached its limits a few times. In 2021, it expanded by another 3,000 m^2 and now it is investing in an additional production hall. "Production machines spend much more time on our shop floor because lead times are increasing since there are many items that are not immediately available or take a long time to arrive", Ceyssens clarifies. VINTIV also recently started an engineering hub in Waregem. They made this decision because there is a lot of manufacturing in that region, and since this is the main industry they are in, it makes sense for them to have a local presence. However, the production of the custom machines is still being done locally in Beringen because of cost considerations. Ceyssens concludes by explaining the direction in which the company wants to evolve: "At VINTIV we strongly believe in the future of our manufacturing industry, by offering custom built machines and the benefits they create for our customers that want to boost their competitiveness. Our own focus will lie on sustainable growth and financial stability."


PROGRESS
75%
• 20 %
• 15 %
• 8 %

STAKEHOLDERS

SECTION 3

STAKEHOLDERS

3.1 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.

KINGDOM OF BELGIUM
Foreign Affairs,
Foreign Trade and
Development Cooperation

www.diplomatie.belgium.be/en

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 the 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 and offers tailored advice and guidance. Companies can call on its network of contacts both in Flanders and abroad. And FIT provides financial support and information on a wide range of financial incentives, country specific business practices and market opportunities.

Flanders has many assets for ambitious Flemish enterprises and SMEs as well as for interested international companies. For companies based in Flanders, its region acts as a perfect gateway to global markets. For them, FIT tries to lower the threshold to doing business abroad and offers all Flemish companies worldwide publicity. 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 R&D friendly incentives, open economy and numerous other strengths. FIT adopts a tailored approach to potential investors and convinces them of the opportunities for their company in Flanders. Furthermore, FIT focuses 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 clusters to grow into major international players.

FLANDERS INVESTMENT & TRADE
Flanders State of the Art

www.flandersinvestmentandtrade.com

Wallonia Export-Investment Agency (AWEX)

The Wallonia Export-Investment Agency (AWEX) develops and manages the international economic relations of Wallonia, the Southern region of Belgium. The agency, which employs more than 400 people, promotes the competitive advantages of Wallonia internationally.

AWEX makes use of its global network of more than 100 offices to strengthen in a sustainable way the image of Wallonia abroad. To promote international business relations, AWEX exchanges commercial information with both the international business community and Walloon companies.

The agency provides exporters, importers and potential investors with information on:

- the region of Wallonia and its export potential by means of macro-economic data
- Wallonia-based companies and their products/services
- the potential of Wallonia-based companies for international partnerships

Furthermore, AWEX assists companies based in Wallonia with a wide range of services in regard to their international activities such as:

- gathering information on foreign markets
- carrying out individual market studies upon request
- organizing trade missions, group stands at international fairs, and visits to Wallonia by foreign dignitaries and captains of industry
- promoting commercial contacts with international organizations
- providing financial incentives for export activities
- organizing professional training of specific commercial skills
- increasing awareness of international business opportunities

In addition, AWEX has a key role in the expansion or development of the business of potential foreign investors. It offers its expertise in how to establish a business in Wallonia, as well as provide them with detailed information and tailored made assistance on local investment opportunities.

Wallonia.be
EXPORT
INVESTMENT

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

hub.brussels

hub.brussels, the Brussels Agency for Business Support is offering free-of-charge solutions and advice for start-ups and scale-ups in Brussels and beyond, as well as services focusing on strategy, financing, clustering and internationalisation.

One of the missions of hub.brussels is indeed to facilitate the internationalization of Brussels' economy by helping Brussels businesses compete in global markets. More than 90 economic and commercial attachés located on every continent provide free support to SMEs, approach potential local prospects and partners, organize networking events, ...

A "Welcome Package" is available to potential investors, providing them with fully equipped office space for three months and a wide range of services so that they can experience the advantages of setting up business operations in Brussels.

www.hub.brussels

hub
.brussels
our business is to help yours

3.2
ADVANCED MANUFACTURING TECHNOLOGIES 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

Sirris

Sirris is the trusted companion of all Belgian companies with an appetite for technological innovation. Simply put, we help companies realise their innovation ambitions with hands-on support.

This includes access to qualified multidisciplinary teams, partners and ecosystems, a broad set of industrial labs and tons of specialised inspiration.

From ideation to implementation, Sirris support companies along every step of the innovation journey. As Sirris is founded and managed by the industry itself, it has a neutral perspective, so stakeholders interests always come first. Concrete services include specialised technological support, training and access to infrastructure as well as tailored advice.

As the collective centre of the Belgian technological industry, founded by Agoria in 1949, Sirris is the reference for technology adoption in 5 domains: advanced manufacturing, product solutions, digital transformation, green transition and innovation management. This approach results in more than 1,300 innovation projects a year..

Sirris is active in 3 major fields:

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

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)

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).

www.sirris.be

Vlamef

VLAMEF vzw, is the Flemish Metal Federation for SMEs, and is the professional association for the Flemish SME company in the metal sector. VLAMEF groups companies and entrepreneurs active in metallurgy, metalworking, metal processing and mechanical engineering. The association aims to unite, study, represent, defend, develop and promote the general and professional interests of companies from the metalworking and related sectors in the Flemish, federal and international fields. This both economically, socially, legally, as well as morally and socially.

www.vlamef.be

Flam3D

In Flanders, the 3D-printing sector is united in Flam3D, a membership association representing over 125 companies and research institutes active in Additive manufacturing. The organisation is neutral and not-for-profit. Their goal is to promote all aspects of 3D printing and facilitate and support the creation new value chains. Any company or organisation is welcome to contact Flam3D for information or support related to Additive Manufacturing. Flam3D is supported by the Flemish government.

www.flam3d.be

Flanders Make

Flanders Make is the strategic research centre for the manufacturing industry. The goal is to create added value for the manufacturing industry. Flanders Make is doing this by:

1. Contributing to the technological development of the vehicles, machines and factories of the future;
2. Help companies innovate better and faster;
3. International cooperation in the field of innovation and to participation in European research projects

Today Flanders Make is a unique research community of more than 750 researchers working together with industry and academia in a joint research agenda.

From our sites all over Flanders, we stimulate open innovation through excellent research. In addition, companies can work together with us in a custom innovation trajectory. Finally, we also offer an extensive range of testing and validation infrastructure for your products or production.

www.flandersmake.be

lifetech.brussels

lifetech.brussels is the public Brussels HealthTech cluster. It aims at facilitating and stimulating the attractivity and success of high potential HealthTech solutions with a focus on social and environmental impact. The main goal is to accelerate the availability of innovative healthcare solutions at the service of patients' wellbeing and professionals' needs. The cluster promotes collaborations and synergies between entrepreneurs, researchers, makers, practitioners and industries.
lifetech.brussels is part of hub.brussels, the Brussels Agency for Business support.

Main services:

- Clustering activities:
  - Guidance: the individual coaching is a free of charge personalized guidance to turn innovative idea into a commercial solution (business model, financing strategy, subsidies, partnerships, innovation management, internationalization, regulatory requirements awareness,...) ; access to hub.brussels expertise (legal, financial, tax, etc.) ; access to a specialized consultancy network
  - Networking and knowledge sharing: animation of a vivid HealthTech community (workshops, pitching sessions, ...)
  - Visibility: promotion of the Brussels know-how and members' activities and projects to increase the visibility of the sector and the members
  - Internationalisation: support the internationalisation of the cluster members through the organization of missions abroad, the support of a broad network of trade advisors worldwide, the access to European funding programs via the network of National Contact Points and search for technological partners via the Enterprise Europe Network

Specific Projects:

- Collective coaching through the MedTech Accelerator®: 6-month of a collective and individual coaching program to boost the development of (connected) medical devices with the help of seasoned experts and dedicated coaches. (60 start-ups helped since 2016; 8th edition in 2023). For more information: www.medtech-accelerator.eu
- Prevention Project: Facilitate testing, validation, and adoption of innovative solutions for primary, secondary, and tertiary healthcare prevention.
- CIMH: The Center for Medical Innovation in Hospitals aims to provide concrete innovative responses to problems that patients or doctors encounter with medical practices, or obstacles directly related to the quality, safety or organization of health care.

www.lifetech.brussels

hub.brussels lifetech
innovate further, care better

software.brussels

The software.brussels cluster is a powerful network of 120+ innovative start-ups, scale-ups and SMEs active in the software industry (SaaS, platforms) and related IT services. It includes companies using Artificial Intelligence, Big Data, Internet of Things, AR/VR in transversal or specialized fields such as FinTech, RetailTech or Mobility Tech.

software.brussels is part of hub.brussels, the Brussels Agency for Business support.

Through its five services (Networking, Individual support, Knowledge sharing, Visibility and Internationalisation), the cluster promotes the economic development of its members. It can also rely on a network of partners, including research institutions.
The cluster's mission is to support its members companies whatever their stage of development. To benefit from its services, companies must become members, which requires them to be based in Brussels.

#SmartSolutionsConnectedBusinesses #OurBusinessIsToHelpYours

www.software.brussels

hub.brussels software
smart solutions, connected businesses

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).

www.cenaero.be

Pôle MecaTech

Pôle MecaTech is a competitiveness Cluster in Mechanical Engineering based in Wallonia (Belgium), gathering 413 members (260+ companies, Research Centers, University labs). Our mission is to create an industrial dynamic that generates jobs by setting up, carrying out and leading technological innovation projects in support of Walloon companies, research centres and universities. The priority is to develop collaborative industrial and commercial projects with an international dimension.
With our network, more than 151 projects have been engineered since 2006.

Our focus is on innovative products, equipment & processes with high added value in 4 technological fields:

- Advanced Materials ;
- Advanced Manufacturing ;
- Mechatronics;
- Data Technologies (IoT, IA ...).

Many application domains are covered by our network and our projects, such as Energy, Medical Devices, Defence & security, Mobility, Construction or Industry.

Pôle MecaTech is involved in several European projects on the topic of Industry 4.0 such as the DREAM and GEMSTONE projects (EUROCLUSTER, Single Market Programme), or WALHUB, a European Digital Innovation Hub for Wallonia (EDIH, Digital Europe Programme). MecaTech is involved as associated partner in several projects on the topic of Materials such as ALLIHENTROP (INTERREG), FA-FIL (INTERREG).

Pôle MecaTech is responsible for the implementation of the regional circular economy plan Circular Wallonia on the fields of battery, metallurgy and mobility.
MecaTech is a network partner of EIT Manufacturing and EIT Raw Materials.

www.polemecatech.be/en

Multitel

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

Furthermore, with the passing years, Multitel develops and integrates emerging technologies into the industrial fabric at the regional and international levels in order to help companies to take up technological challenges.

Answering specific requests of companies and accompanying them in their innovation approach, 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)

www.multitel.eu

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