



# **INDUSTRY 4.0 AND COVID-19: WHERE DO WE STAND AFTER THE FIRST WAVE?**

Industry 4.0 survey

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# 1. INTRODUCTION

The first wave of Covid-19 has seriously impacted the industry. We are curious to find out how the pandemic has changed how companies look to the future and how it is changing their digital transformation initiatives. Are you still wholeheartedly embracing change? Or have your priorities shifted? In our survey, we tried to answer these questions.

2020 got off to a promising start and we observed how more and more Flemish companies were making an effort to digitally transform their organisation. Unfortunately, by the end of the first quarter, Covid-19 had struck and left a lasting mark on our society. The Covid-19 figures were rising week after week. More and more people became infected and ended up in hospital or worse... The government imposed a lockdown and people were forced to stay at home as much as possible. From March-June, on average, 911,628 employees in Belgium were temporarily unemployed. It was immediately clear that Covid-19 would have a huge impact. Not only on our economy, but on our entire society.

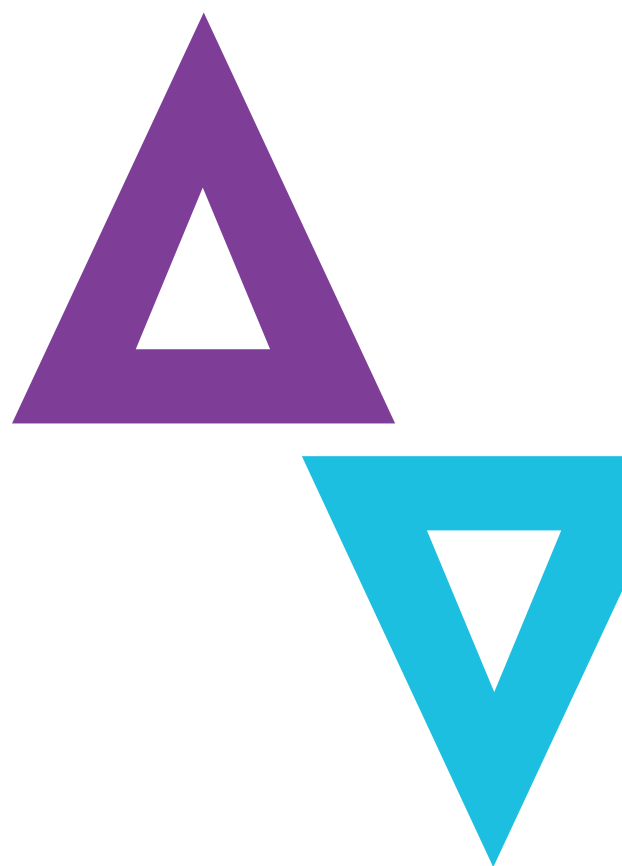
After our surveys in 2017 and 2019, we wanted to check how companies experienced the lockdown and how it has changed their view of the future. We still firmly believe that Industry 4.0 and the accompanying digital transformation is the way to go. Companies that made an effort to digitalise their processes will greatly reap the benefits of their labour.

The previous surveys indicated that the digital transformation was embraced to a greater extent by the large corporations than by SMEs. We therefore demonstrated that digitalisation can and should happen at all levels. Even smaller companies cannot afford to miss the boat.

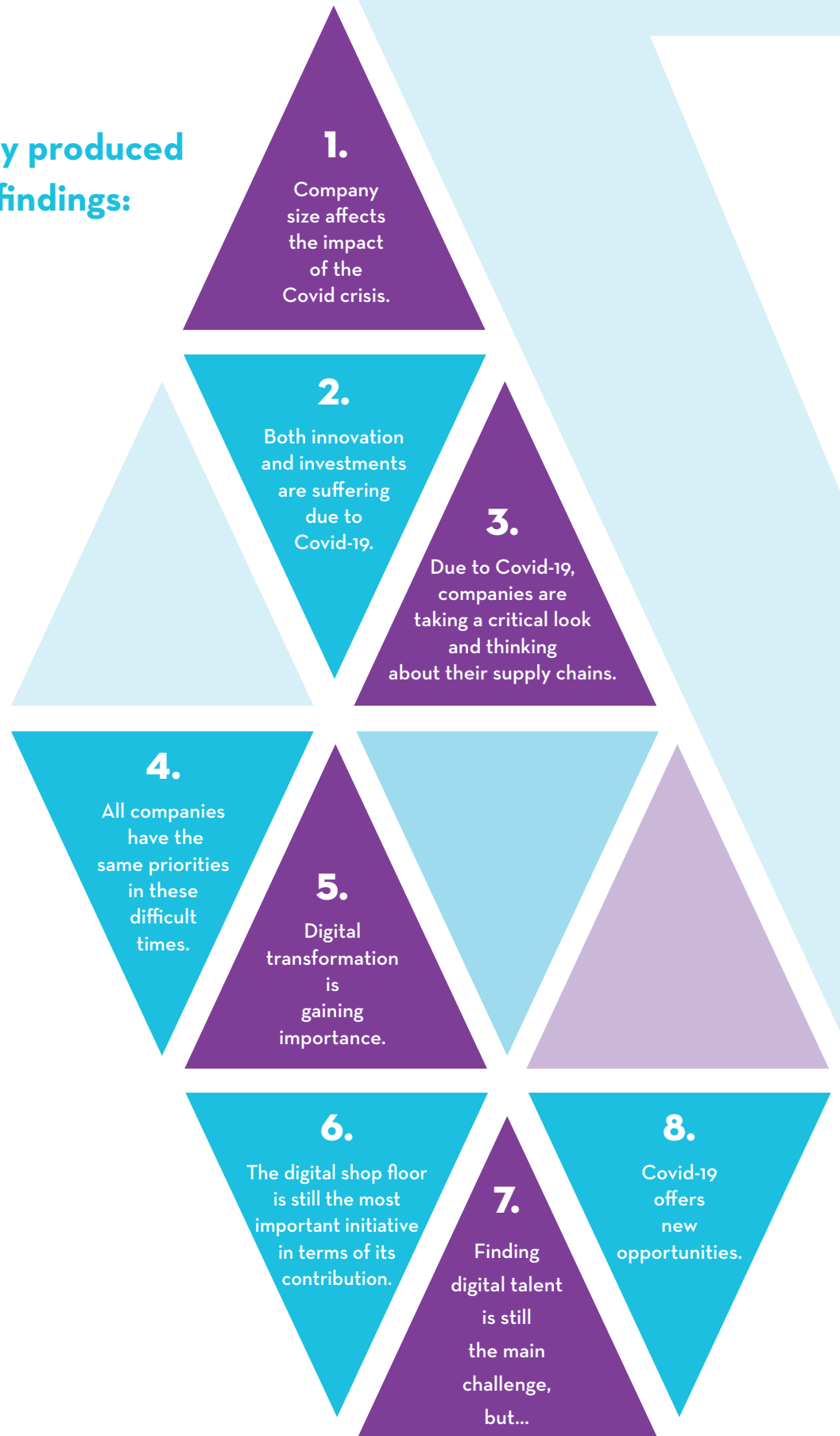
The results of this survey are clear: Covid-19 has been a severe setback for our entire economy. On average, companies expect to generate approximately 20% less turnover in 2020 and it will take them 2 years to recover. As a result of the second wave, the figures may change slightly. Companies are focused on surviving, while also exploring new offerings and markets, in order to recover their losses. Luckily, our industry has shown itself to be resilient and 75% of our respondents are optimistic about the future, as they are eager to embrace and even accelerate their digitalisation strategies.

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Source: RVA  
<https://www.rva.be/nl/documentatie/statistieken/tijdelijke-werkloosheid-wegens-coronavirus-covid-19/cijfers>



## Our survey produced eight key findings:



## 2. TECHNOLOGY AND SUSTAINABLE DEVELOPMENT @FLANDERS MAKE

**Flanders Make creates a funnel of research in line with the challenges and future needs of companies. Our research helps companies to become more competitive, by upgrading their products and production facilities, as well as assisting them as they move towards using digitalisation and Industry 4.0 technologies. This means upgrading functionalities, identifying accelerated product development methods, manufacturing customised products at a cost comparable to mass customisation and rolling out new business models.**

We create and manage a thriving innovation ecosystem, consisting of companies from different sectors, knowledge partners (including academic departments) and the government. Our goal is to deliver impact at different levels and for all stakeholders. In this ecosystem, collaboration is key. As well as researching initiatives driven by and aligned with companies so that we have an impact on the rapid development of smart machines and intelligent control systems. Not only today, but also tomorrow and the day after tomorrow.

The following digital technologies enable companies to develop new products, improve existing ones and optimise their production systems:

- » model-based technologies and digital twins for product developments;
- » artificial intelligence used to produce actionable intelligence and insights;
- » digital work instructions for flexible assembly/production environments;
- » digital shop floor technologies for creating lead factories;

enable companies to develop new products, improve existing ones and optimise their production systems.

In March 2020, our board of directors set aside €1 million for supporting or developing, as part of a fast track, solutions that support the care sector, including an intensive care respiratory unit (with the Vrije Universiteit Brussel), a remote lung measurement system (with UAntwerpen), face shields (Fablab Leuven), etc.) and enabling safe start-ups for production activities (social distancing alarms, thermal elevated body temperature screening for factory entrances, a vision system for monitoring social distancing behaviour in

office spaces, optimum capacity planning for event locations, remote support solutions, etc.)

This is how we contribute to the competitiveness of our region in times of Covid-19, while ensuring that Flanders continues to appeal to ambitious first-class talent – locally as well as abroad.

### 3. WHAT IS INDUSTRY 4.0?

**Industry 4.0 focuses on the end-to-end digitalisation of all physical assets and their integration into digital ecosystems.**

Digitalisation makes it possible to respond to change and shift gears quickly. This openness to new technologies and applications is paramount, both internally and in relation to customers. An efficient information flow is therefore vital. This also means that businesses cannot manage without a long-term vision, which gradually progresses towards an Industry 4.0 context.

Technology used to be the main focus for Industry 4.0 implementations, as it led to many trials and pilots. Unfortunately, most companies were not ready to implement and scale this new technology

within their processes. As indicated in a PTC report, many manufacturers are stuck in “pilot purgatory” because value is not at the centre of their transformation efforts. Manufacturers must adopt a financial-impact first approach that enables companies to implement I4.0 projects, which are aligned with corporate strategy/goals and can yield double-digit improvements in terms of cost savings, capacity, and asset efficiency.

<https://www.ptc.com/en/resources/solutions/report/double-digit-impact-of-industry-4-0>



Alongside the final-impact approach, installing a digital culture will be more and more important when it comes to ensuring that digital transformation efforts pay off. Openness and transparency between company departments and functions, as well as on the shop floor, are of utmost importance for accelerating the impact of digitalisation. Also, due to the speed of change, it will be necessary to obtain external knowledge and insights. This will not only help to boost digitalisation,

but also to transfer business and business models in line with changing customer (experience) needs, new technologies and organisational/business trends.

More than ever before, agility and adaptability are an accelerator for business success. IBM states that only few companies will recover from the Covid-19 pandemic on their own. Most businesses will need partnerships and ecosystems in order to recover. Therefore, executives expect large growth (over 300%) in partnering activity.

**Creating breakthroughs based on a long-term vision of excellence using digitalisation and Industry 4.0 will be key to creating a sustainable business environment.**

**This is necessary in order to stay ahead of the competition.**

**Disruptive times, combined with the speed of change in technology, require an appropriate approach for future competitiveness.**

**Digitalisation based on a well-defined strategy, making smart choices for scaling-up trials and an accelerated, broad roll-out of the successful trials will create the dynamics needed today and tomorrow. Innovation in production needs more attention without reducing the focus on product innovation.**

**This will create lead factories that will make superior (customised) products at an acceptable price level.**



## 4. EXECUTIVE SUMMARY

**Covid-19 has challenged our society, our health sector and our economy over the last six months. Flanders Make has reacted rapidly to these challenges by setting up a task force with our most experienced project leaders and our most talented co-workers.**

This task force allowed us to react quickly to the many requests for technical support that we received from hospitals and companies during the crisis. For example, with our colleagues from FabLab Brussels, we have completed a breathing device and even produced a first batch of 40 devices, which now are part of the strategic reserve.

But the question is: What is the impact of this Covid crisis on our economy, and more specifically, on our industry? What is the short-term impact? And how does it affect the investment strategy in the medium and long term?

By means of this survey, we studied projections for 98 representative companies from our industry. We found out that, on average, there will be an estimated loss in turnover of around 20%. It will take 2 years - until 2022 - to recover and compensate for this loss. As a result of the second wave, the figures might change slightly.

The impact on employment in our sector is limited for the time being. This is partly because of the technical unemployment measures implemented by the government. Companies are currently focusing mainly on surviving by searching for new clients and markets. This allows them to compensate for losses in turnover and guarantee employment in the near future.

With this in mind, to what extent does Covid-19 have an impact on the fundamental digital transformation that our industry is embracing? Well, 1 in 2 companies are continuing to invest at pace and keeping their budgets at the same level. The other half, which are mainly large companies, say that they have made cuts to their budgets. 1 in 3 companies are reviewing their supply chain management in order to improve their resilience in terms of dealing with these special circumstances.

More importantly, 75% of all companies say that they will embrace and even accelerate their digitalisation strategies. When it comes to Flanders Make members, the figures even increase to 90%. We think this is positive news and have seen that our SMEs and medium-sized enterprises are looking positively towards the future, as they are still investing in innovation and digitalisation.



## 5. KEY FINDINGS

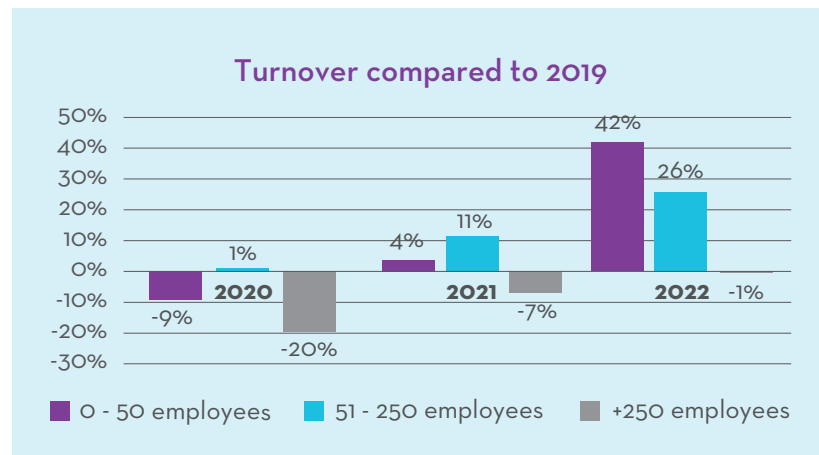
### KEY FINDING 1:

Company size affects the impact of the Covid crisis.

#### Turnover

In general, the respondents in our survey expect a negative impact of 18.6% on their turnover in 2020. This is in line with other estimates requested by the Nationale Bank van België. As this is quite a major setback, companies also estimate that it will take at least 2 years to recover from this loss. The biggest step will be taken in 2021, after which we will return to the 2019 levels in 2022.

If we take company size into consideration, we can see that SMEs recover much faster from the Covid crisis than large companies. It seems that the smaller the company, the easier it is to benefit from the changing times and digitalisation opportunities. Overall, smaller companies are already more digital in their DNA, which means they are likely to be more agile and use more digital technologies. Covid-19 will only affect SMEs with less than 50 employees in 2020, (they assume). They expect substantial growth over the next few years. Medium-sized companies with 50-250 employees experience little impact on their turnover. They expect to continue to grow in 2021 and 2022, albeit at a slower pace than SMEs with fewer than 50 employees.



The biggest setback due to the Covid crisis affects large companies. Companies with over 250 employees are seeing a significant fall in turnover in 2020. A decrease in larger production volumes, due to a smaller number

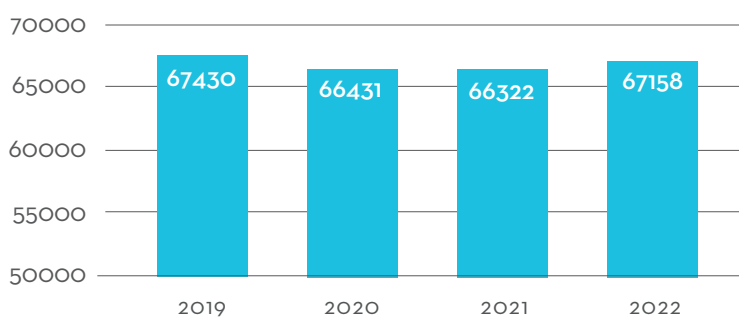
of customers, has a more lasting impact as it is linked to declining market dynamics. These products are often part of a value chain so that recovery takes far longer. They only expect to recover from the Covid crisis after 2022.

## Employment

In general, the impact on employment will be limited, but again, the limited decrease in 2020 (-1.5%) will only be compensated for in 2022 as no major changes are expected in 2021. Companies will first cut back on their flexible workforce (based on temporary contracts) in order to scale down.

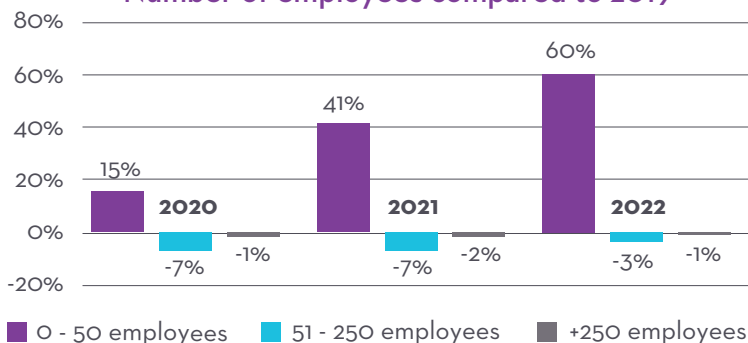
This will have no impact on the permanent staff. On the other hand, companies are reluctant to hire new personnel, which is why the employment level will only be up to par in 2022 (compared to 2019).

Total number of employees



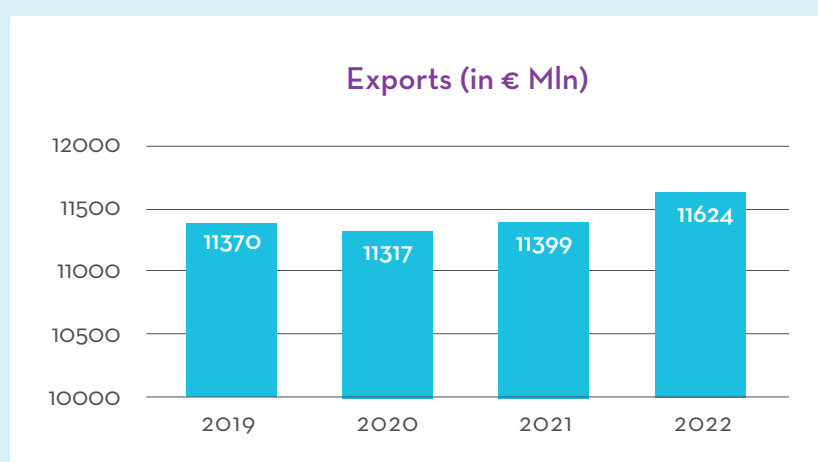
If we take a closer look and take company size into account, we can see that SMEs with up to 50 employees remain optimistic. They keep on expanding their staff, while bigger companies tend to be more careful and will only return to 2019 levels in 2022.

Number of employees compared to 2019



## Exports

The Covid crisis does not greatly affect exports for our respondents, although companies mention that there will be no major leap forward due to the Covid crisis. We have seen a setback due to the first lockdown in 2020, but apart from that, it is expected that numbers will keep growing steadily. A limited growth (+2%) in export figures is expected in 2022. However, it should be remembered that our respondents only have an export figure of 47%. This is not fully representative of Flanders, which usually reports an export figure of about 80%.



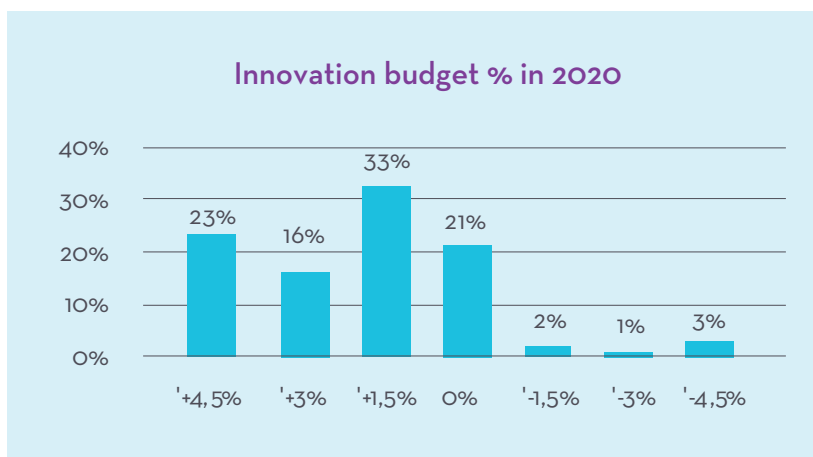
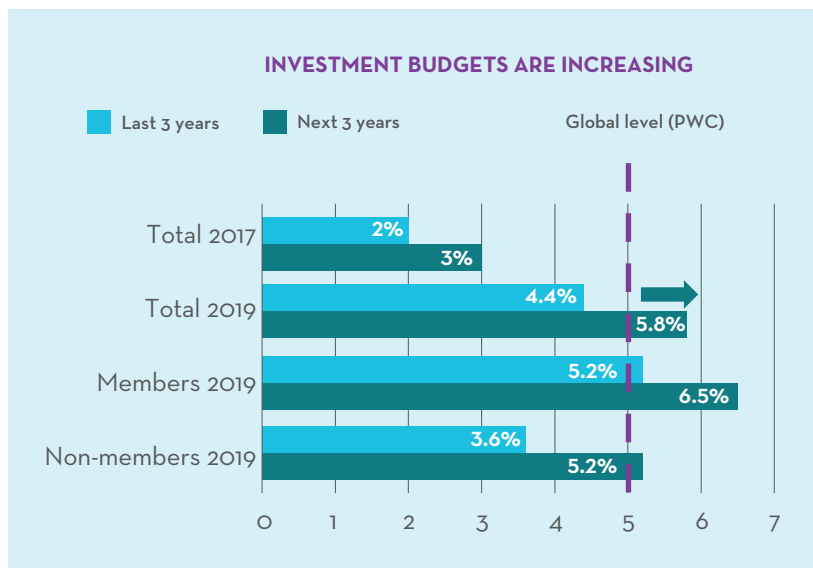
## KEY FINDING 2:

### Both innovation and investments are suffering due to Covid-19.

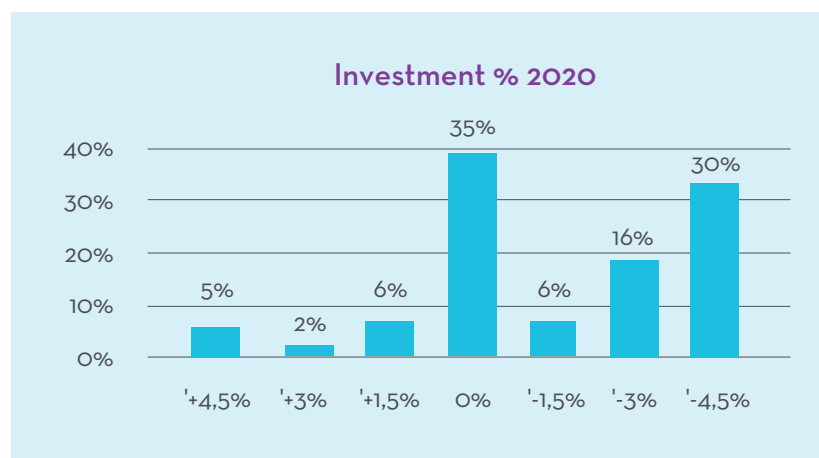
We asked companies how Covid-19 will influence their focus on innovation budgets (% of overall investment) as well as their investment budgets in 2020.

Previous studies from 2017 and 2019 indicated that innovation budgets increased by 3% (for the next 3 years) in 2017 to 5.8% (for next 3 years) in 2019.

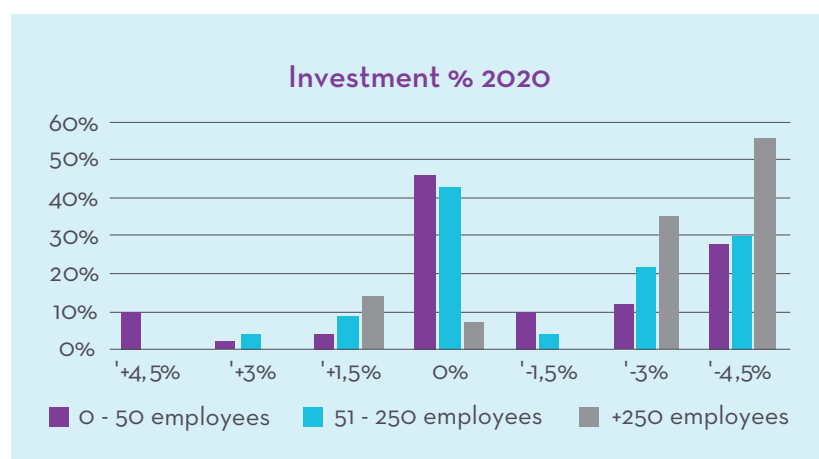
We can now see that only 1 in 4 companies are still on track in terms of allocating an adequate innovation budget (>4.5%). In general, there is a certain reluctance to stick to the previously expressed intentions on how to spend this innovation budget. Many companies are cutting their innovation budgets as they need to balance costs against revenues. However, the positive news is that innovation remains at a reasonable level given the actual situation.



If we look at the global investment budgets of companies, we can see that 1 in 2 companies are keeping their budgets at the same level or increasing them. Companies that decide to cut investments are significantly downgrading them; 30% of our respondents will cut their budgets by at least 4.5%.



If we take company size into consideration, we can see that 81% of large companies are cutting their investment budget by -3% or more. Other smaller companies still believe that investments are imperative if they are to support and expand their businesses. As Flanders has a strong network of SMEs, this is a promising result.

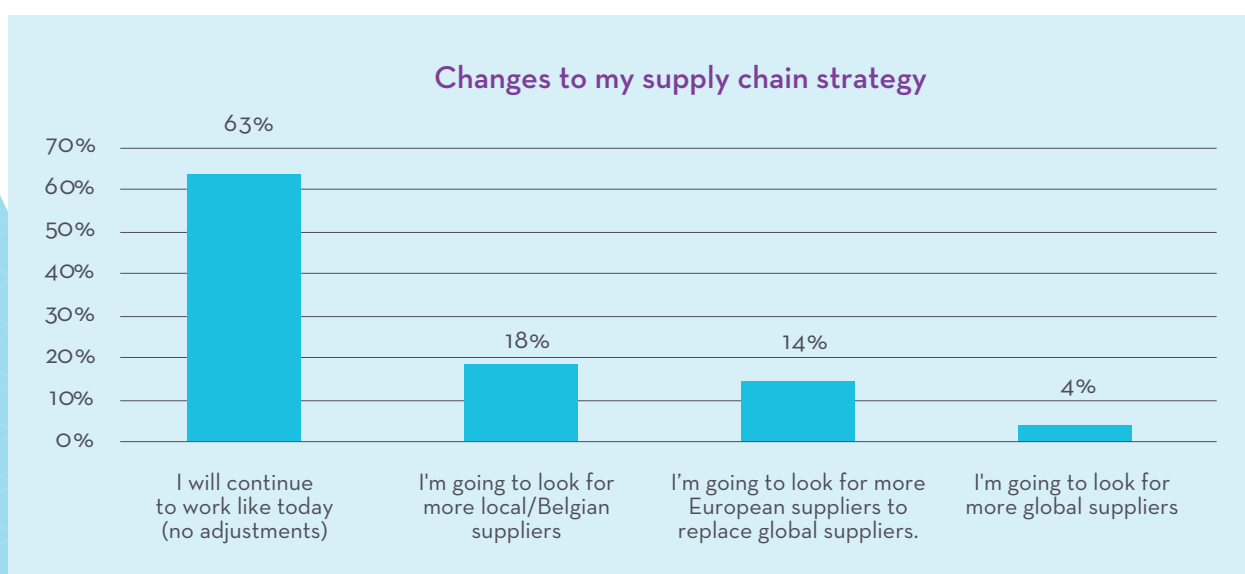


### KEY FINDING 3:

#### Due to Covid-19, companies are taking a critical look and thinking about their supply chains.

Because of the global character of the Covid-19 outbreak, a lot of supply chains were broken, which had a major impact on production environments. Borders were closed, logistics were interrupted or significantly delayed and value chains were therefore impacted.

Companies around the globe had delivery problems for incoming and outgoing goods. Despite this, about 60% of respondents indicated their intention to continue working as before. But we can see that, as a result, 1 in 3 companies are looking for new or additional suppliers. 18% are looking for more local suppliers, 14% are replacing global suppliers with EU suppliers and 4% are looking for additional global suppliers.



If we take company size into consideration, we can see that SMEs mostly want to keep on working as they did before, as they are probably less impacted by global supply chains. The biggest changes to supplier strategies can be found in large companies.

We can see that only 1 in 3 large companies intend to continue with the same supply strategies. As many as 44% of large companies are looking for EU suppliers to replace global suppliers.

This is definitely a result of the consecutive lockdowns around the globe. This trend could have a positive effect on manufacturing industry in Europe. It accelerates the implementation of a 'local for local' strategy. Moreover, it should have a positive impact on the economy, climate and welfare in Europe. These are the first steps towards a sustainable manufacturing environment.



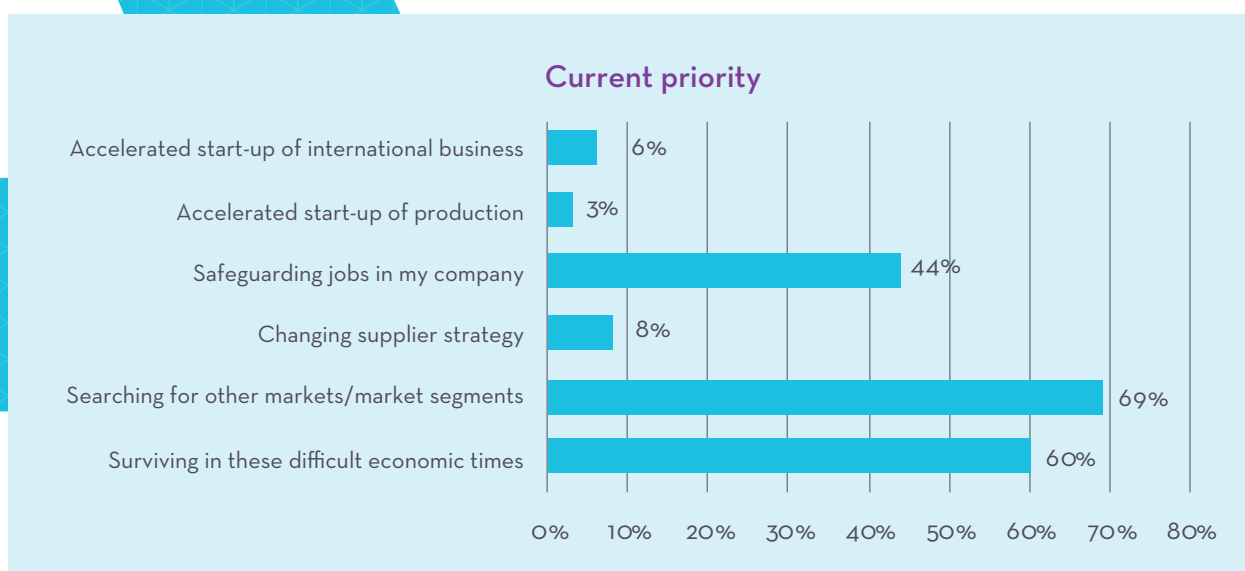


## KEY FINDING 4:

### All companies have the same priorities in these difficult times.

Regardless of the size of the company, the same priorities apply throughout the industry.

- 69% of all companies are **looking for different markets or market segments**.
- 60% of all companies are focused on **surviving** these economically difficult times.
- 44% of all companies are focused on **maintaining employment**.



Covid-19 has forced companies to think about other revenue streams based on:

- new **customers** in established market segments for existing products,
- new **market segments** for existing products or slightly adapted products (e.g. plexi protection screens for hotels, restaurants, post offices, call centers, retail, etc.),
- **new products** for established **market** segments (e.g. takeaway lunch boxes),
- new **products for new market** segments (e.g. face masks produced by Bioracer, Medimundi and Ducaju.  
From spirits and beer to hand gels made by Sterk Stokers, AB Inbev, Distilleerderij Bruggeman.  
3D printing of door handles and adapted masks/face shields made by Materialise, etc.)

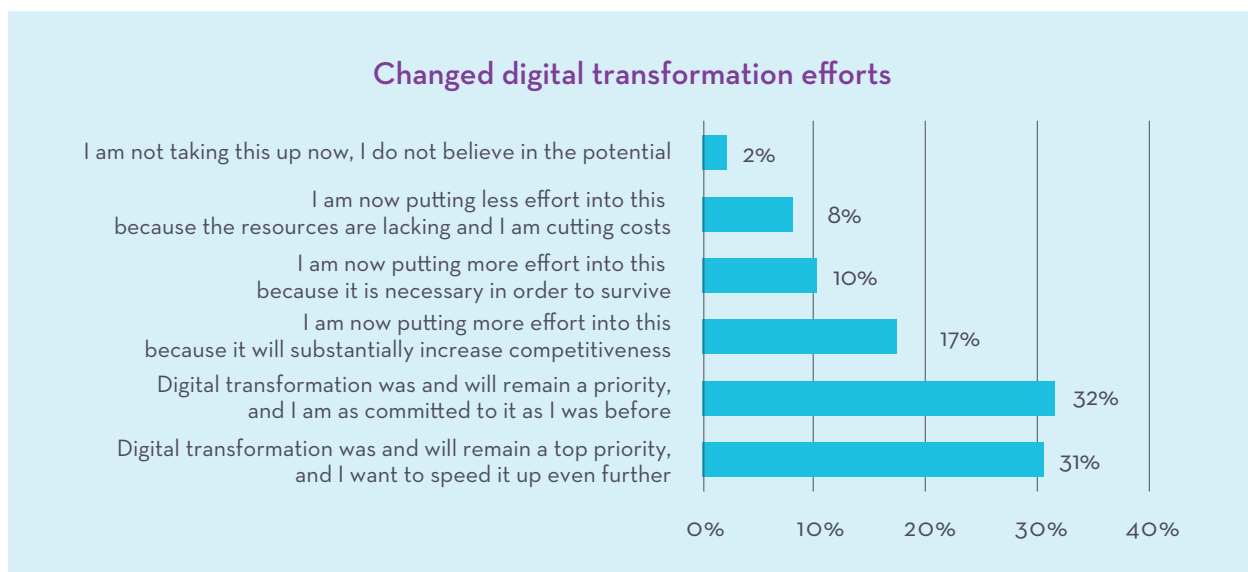
## KEY FINDING 5:

### Digital transformation is gaining importance.

The vast majority of our respondents see digital transformation as a priority. It is becoming even more important due to the Covid crisis.

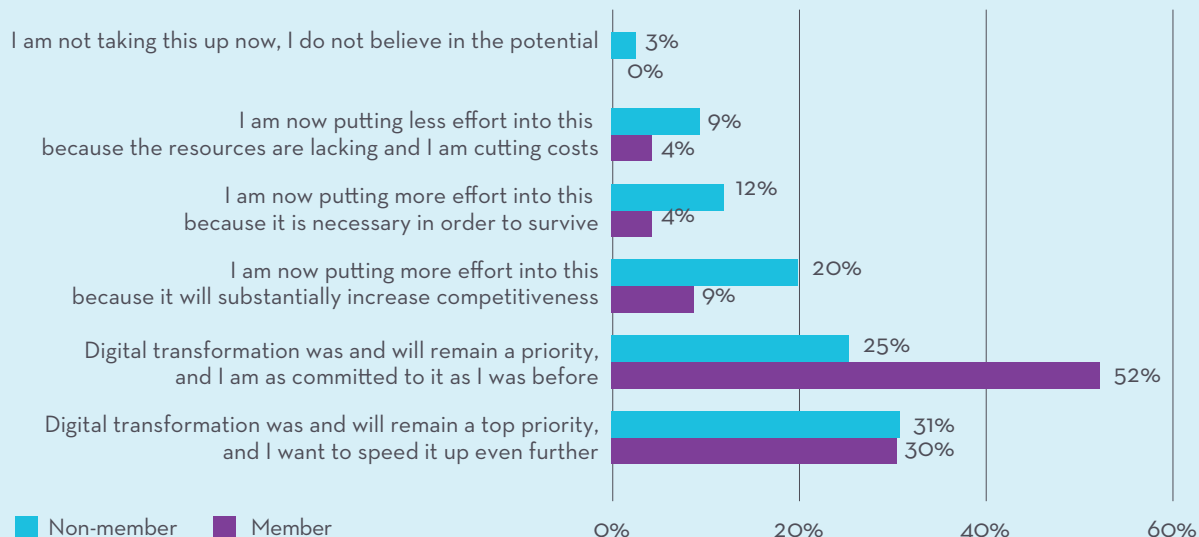
In terms of digital transformation efforts, these are the priorities:

- 31% of our respondents see their digital transformation as a priority and will increase their efforts.
- 27% of our respondents are increasing their efforts to improve their competitiveness or in order to survive.
- 32% of our respondents see their digital transformation as a priority and will maintain the same level as before.
- 10% of our respondents do not believe in the need for digital transformation or decide not to invest in it, as a way to cut costs.



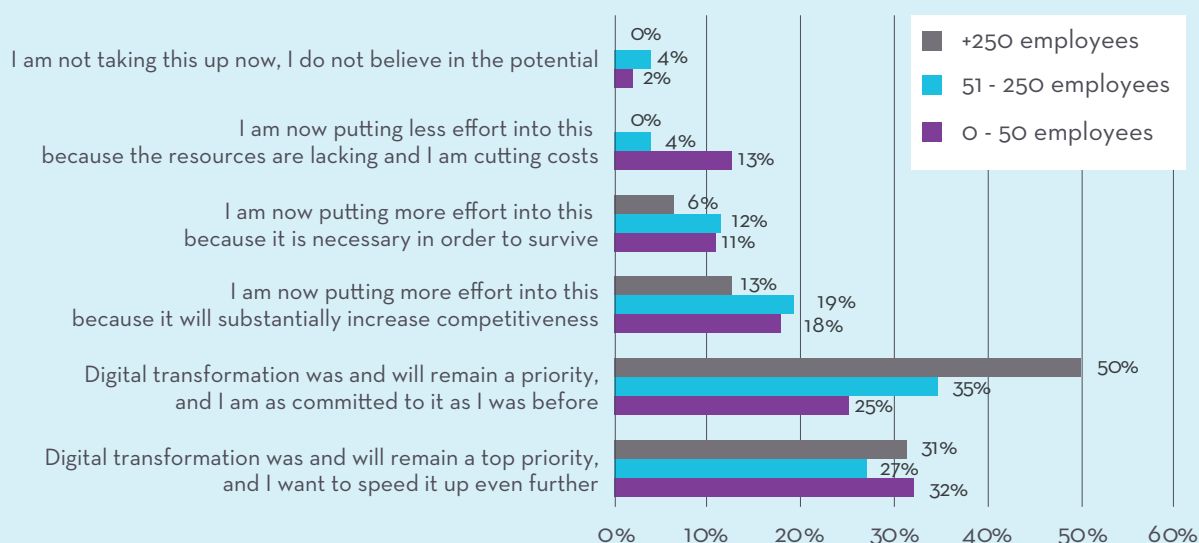
More than 95% of Flanders Make members are clearly convinced of the advantages of digital transformation and consequently continue to focus on digitalisation as an enabler for future business sustainability. 52% of our members keep their efforts on the same level. 30% even see it as an absolute priority in terms of increasing their efforts. Non-members, however, are starting to catch up. 20% are increasing their efforts, as they believe it will improve their competitiveness. They will be joining a group of 56% of companies already convinced of the need for digitalisation in order to develop their business.

### Changed digital transformation efforts



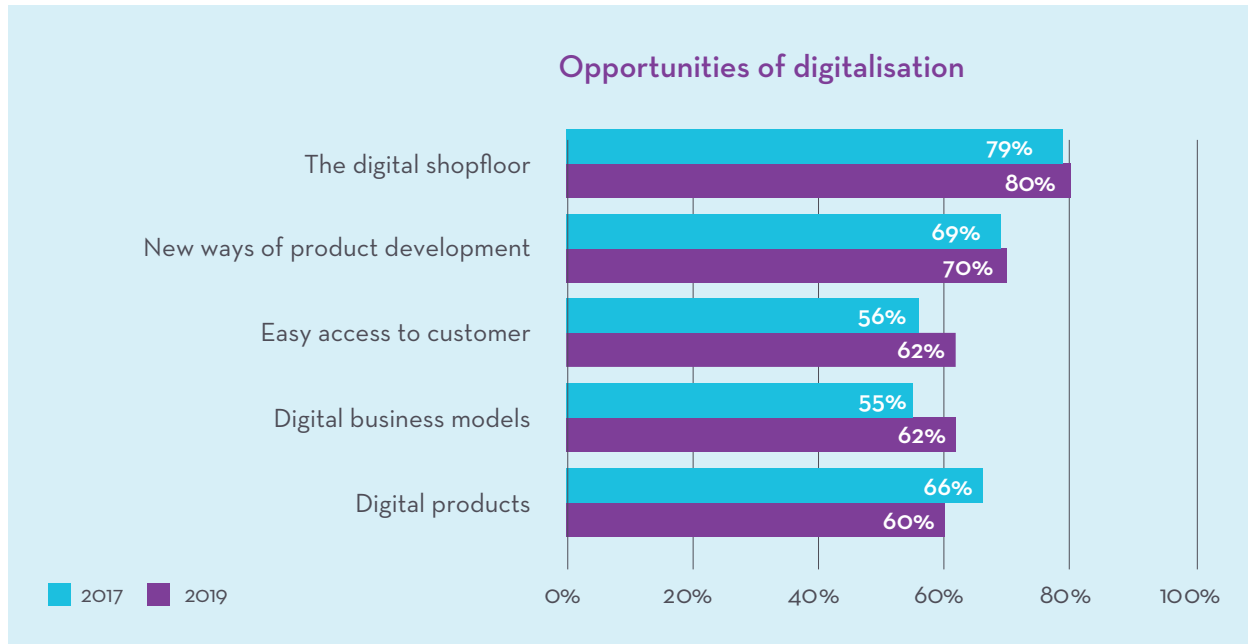
It is clear that large companies put more effort into digital transformation than SMEs, but the gap is getting smaller. It is remarkable that 6% of SMEs still do not believe in its potential. Unfortunately, 13% of companies with less than 50 employees state that they will reduce their digital transformation efforts in order to save costs. We are convinced that by doing so, they are putting their business continuity at risk.

### Changed digital transformation efforts



## KEY FINDING 6:

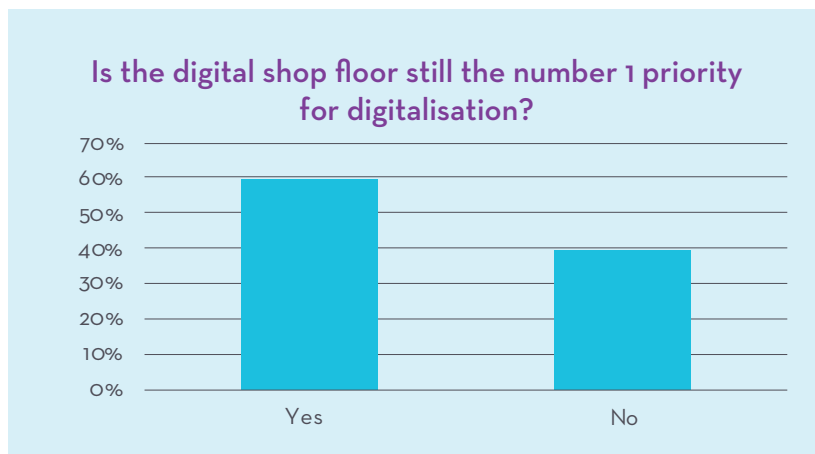
The digital shop floor is still the most important initiative in terms of its contribution.



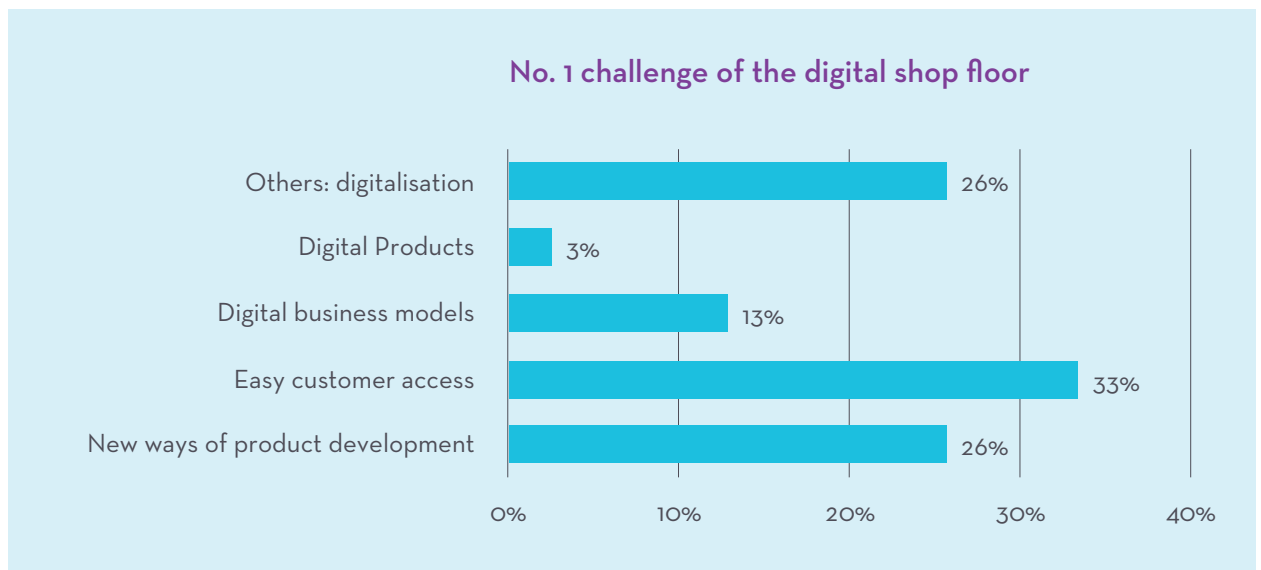
In 2017, the respondents already rated the opportunity to develop towards a **digital shop floor** as very promising. This has been confirmed in 2019.

A digital shop floor implies:

- Optimisation and efficiency of communication
- Transparency of processes and resources: increased accountability and commitment at all levels of the organisation
- Implementation of standards: clear visual digital instructions and reporting/monitoring dashboards



In our latest survey, only 60% of respondents confirmed that the digital shop floor is still the number 1 priority for digitalisation.



Those who shifted to another priority are now focusing on these alternatives:

1. Easy access to customers was highlighted by one in three respondents.
2. New approaches to product development and digitalisation were mentioned to the same extent in 26% of the responses.

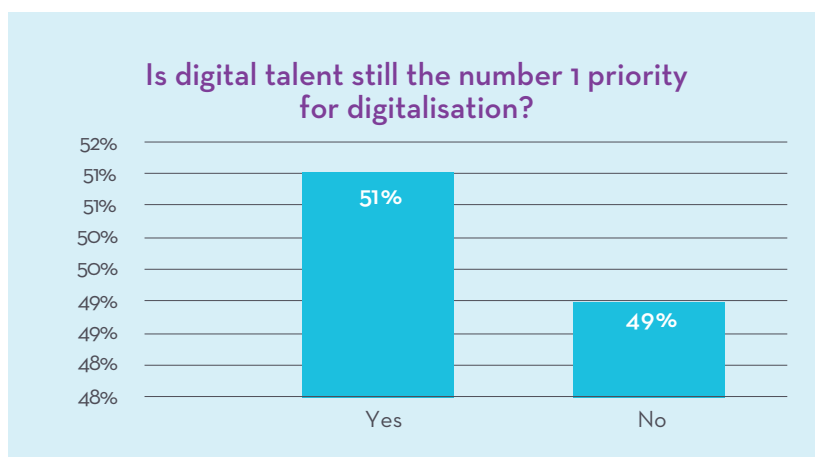
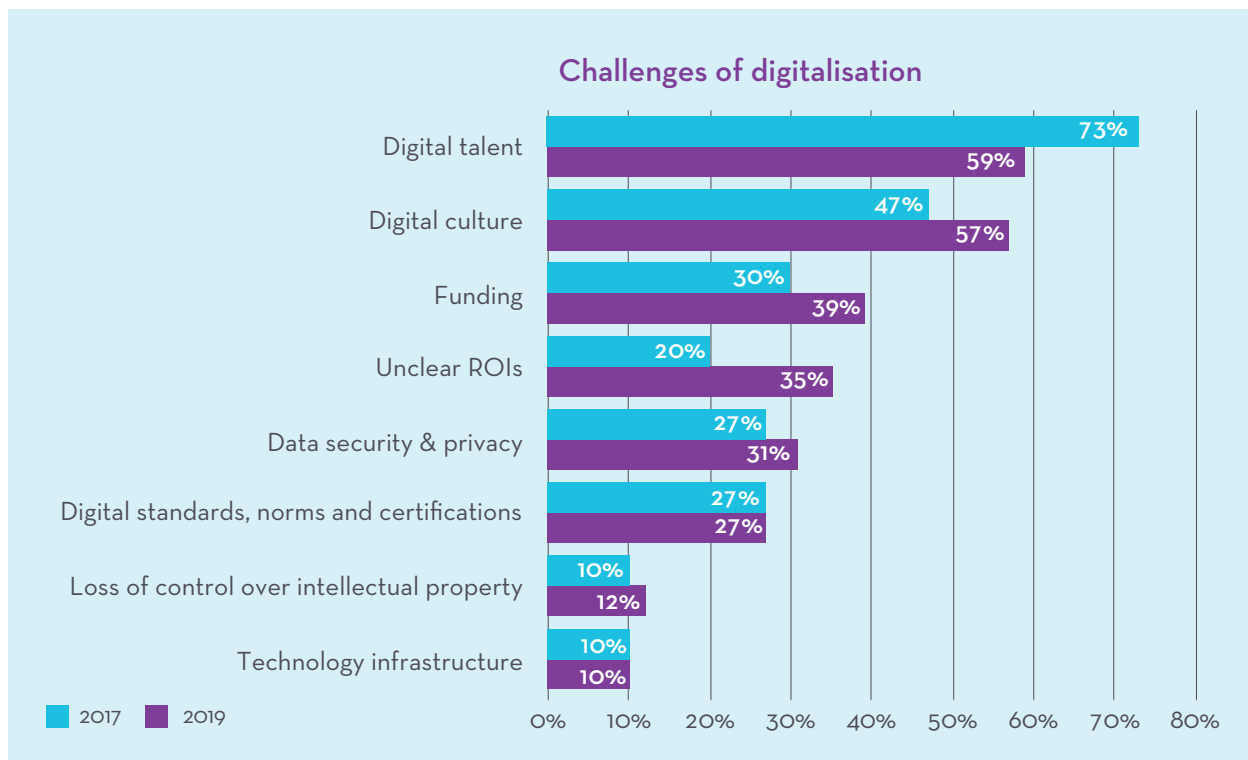
Only 3% of respondents opted to switch to digital products, which makes it possible, for example, to provide X-as-a-service. This clearly shows that the interest in this subject is still very limited.

The IBM Institute for Business Value also concludes, in a recent study, that customer experience management will be a major priority over the next two years, based on statements made by 84% of executives in the study.

It is likely that they, at first, see more potential in upgrading their current portfolio with digitalisation: data enabled, remote supervision and service, and creating actionable data for better performance and a longer lifespan.

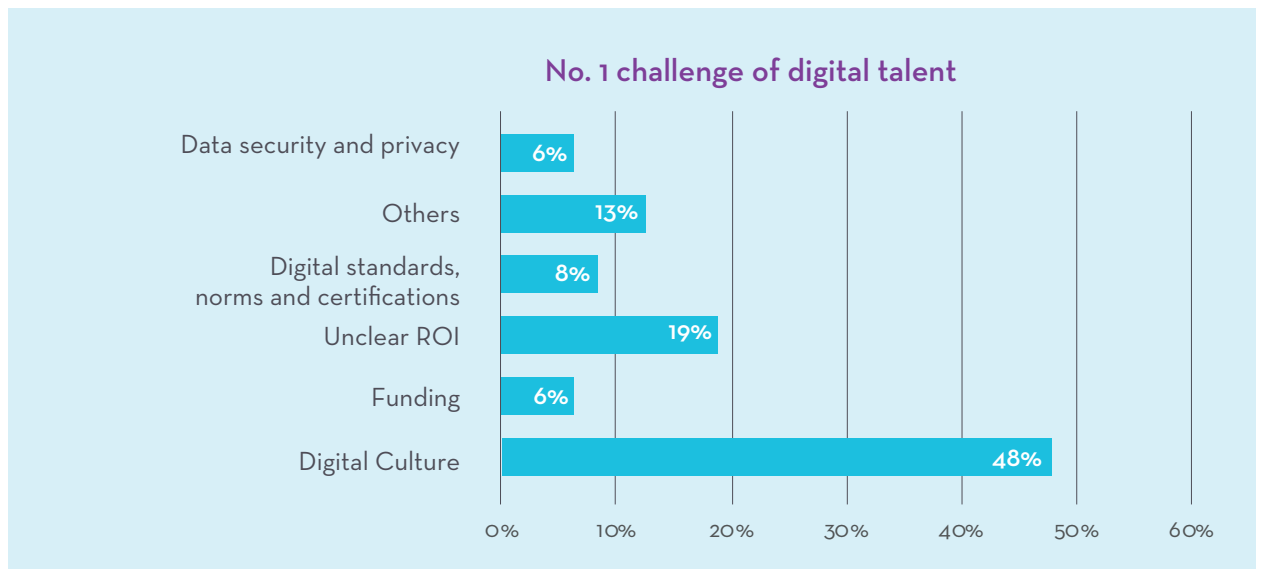
## KEY FINDING 7:

Finding digital talent is still the main challenge, but...



Compared to 2017 and 2019, we can still see roughly the same challenge. Finding digitally skilled talents remains the main priority for 51% of our respondents (compared to 73% in 2017 and 59% in 2019). This confirms the trend of a gradual shift in importance from digital talent to digital culture.

Establishing a digital culture is the number one challenge for 48% of respondents who do not consider digital talent the number 1 priority for digitalisation. This applies to 24% of all our respondents.



This clearly shows that companies are well aware that people are key to unlocking the digital future. Indeed, without talented employees who can work with the new digital technologies and are equally able to adapt to changing methods, companies will struggle to stay afloat.

In our experience, digital talent on its own is not sufficient. Companies also need to transform their cultures into digital cultures. This means:

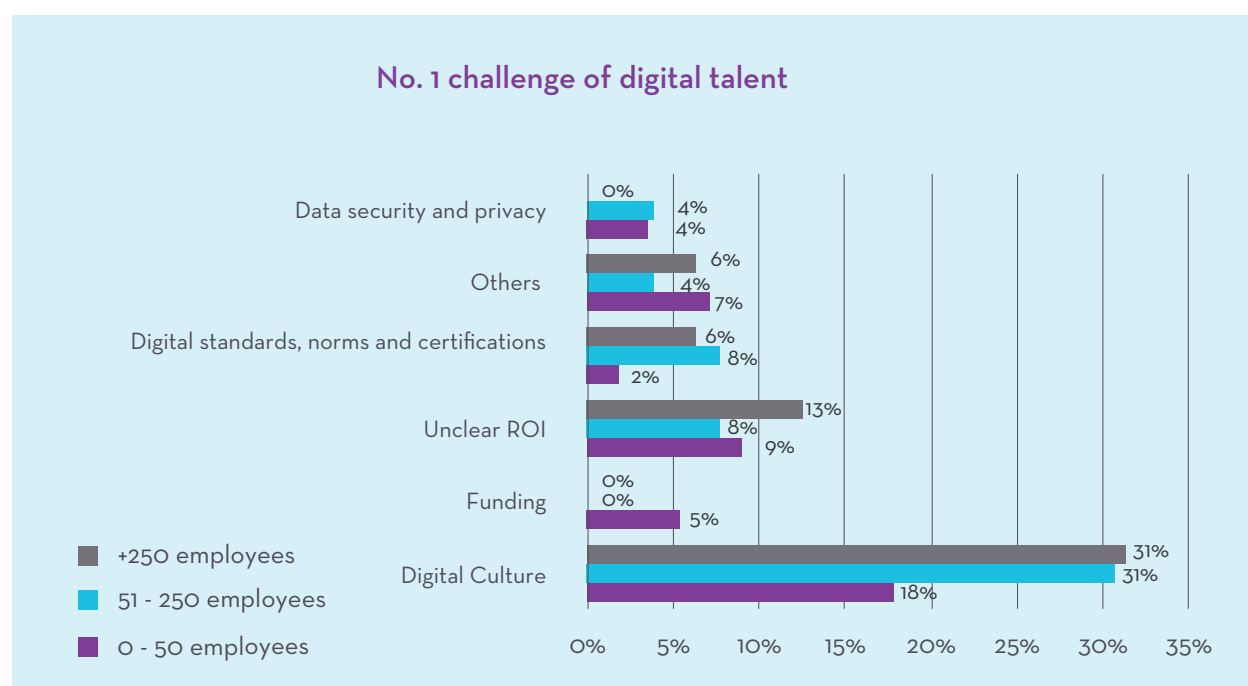
- Close and intense collaboration between all departments from marketing, R&D to production and after-service;
- Sharing common data sources to gain maximum insight into products, development for functionality – sustainability – manufacturability – maintainability – recyclability – development for optimum use by customers, etc.

Data from beginning to end is the fuel for gaining insights and creating actionable intelligence, but also for supporting the core business using the customers' products.



In order to attract, develop and retain highly sought-after digital talents, organisations need to adapt in multiple areas, including the way in which they operate, interact and think. A digital culture will contribute to the accelerated implementation of digitalisation and retention of digital talent.

### Shortcomings in the organisational culture are a barrier for large companies.



31% of small- and medium-sized companies and 18% of companies with +250 employees are worried about their lack of a digital culture. This number has fallen from 69% in 2019, which means that major steps have already been taken. SMEs with up to 50 people are less worried about having a digital culture. It is very possible that the business culture within smaller companies is better suited to the current needs. This may work to their advantage in the battle for talent.

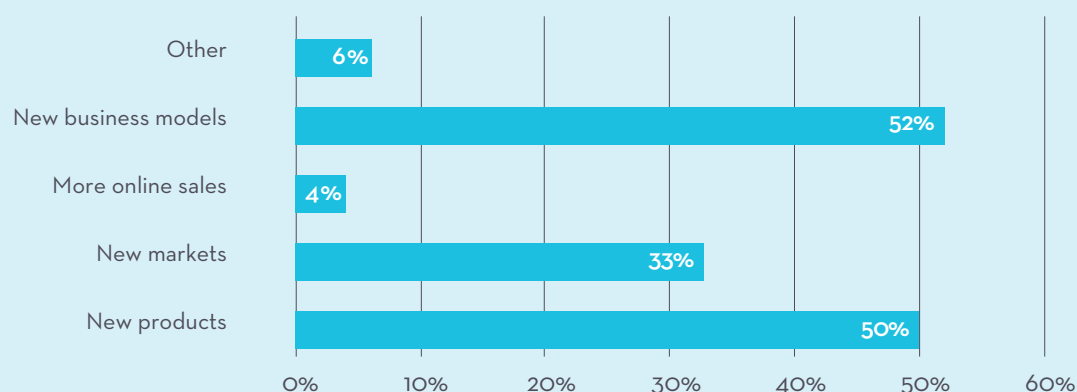
## KEY FINDING 8:

### Covid-19 offers new opportunities

Covid-19 forces companies to be creative and investigate alternative directions. We all know the saying that when one door closes, another one opens. Covid-19 brings new opportunities.

52% of our respondents are exploring new business models, while 50% are expanding their product range to meet new demands (possibly due to Covid-19). 1 in 3 companies are also broadening their target markets.

#### New opportunities thanks to Covid-19



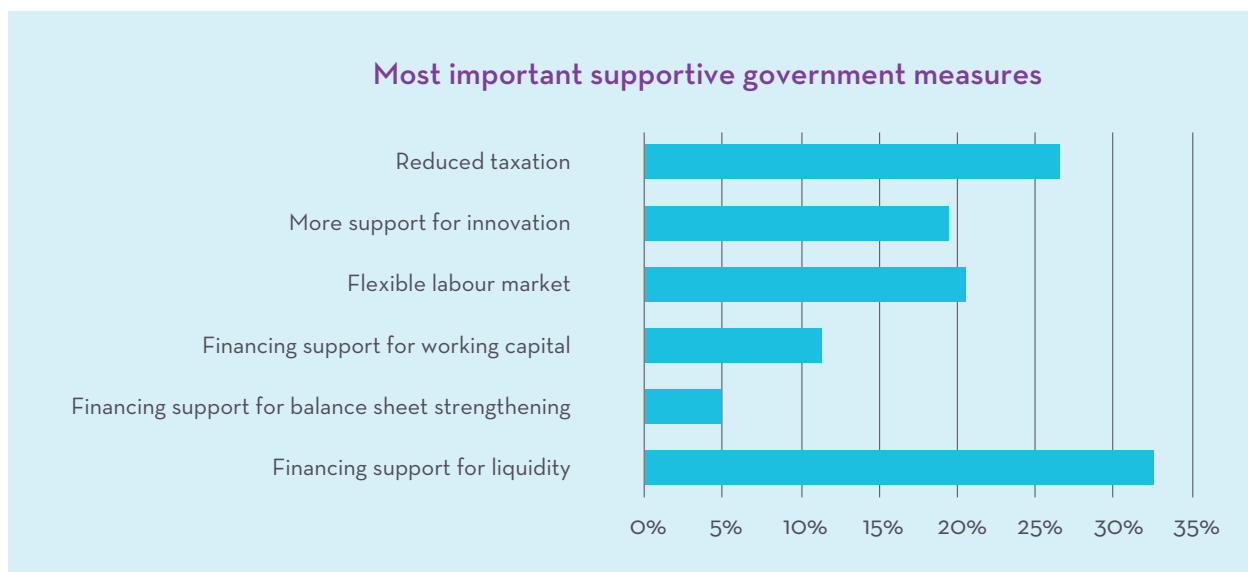
Examples of companies broadening their activities:

- **De Tiense Suikerraffinaderij** began to produce disinfecting gel at the end of March.
- **Bioracer** (cycling clothing) is manufacturing face masks.
- **Medimundi** - Cartamundi and Cloostermans joined forces in Medimundi to manufacture face masks.
- **Ducaju** has prepared to manufacture face masks.
- **Materialise** is not only developing products for the healthcare sector but is also manufacturing hands-free door handles in order to prevent Covid contamination.
- ...

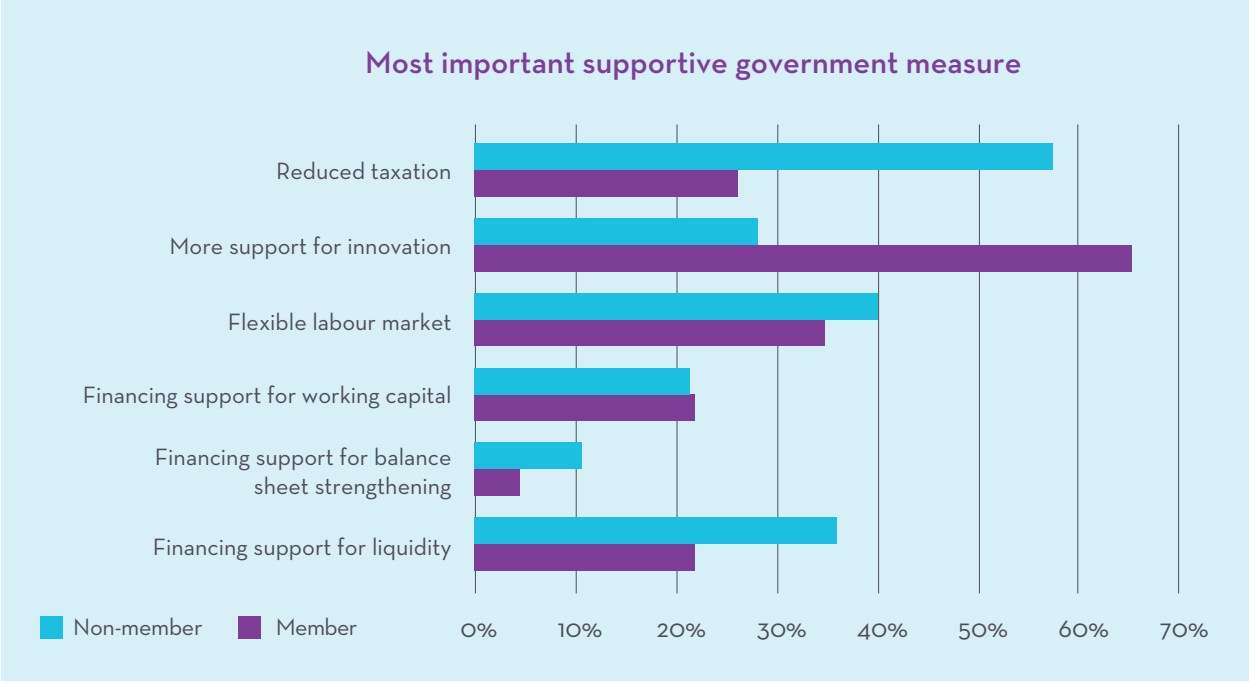
## 6. SUPPORTING ROLE OF THE FLEMISH GOVERNMENT

As a research institute supported by the Flemish government, Flanders Make is interested in finding out which government measures would be most appreciated by companies.

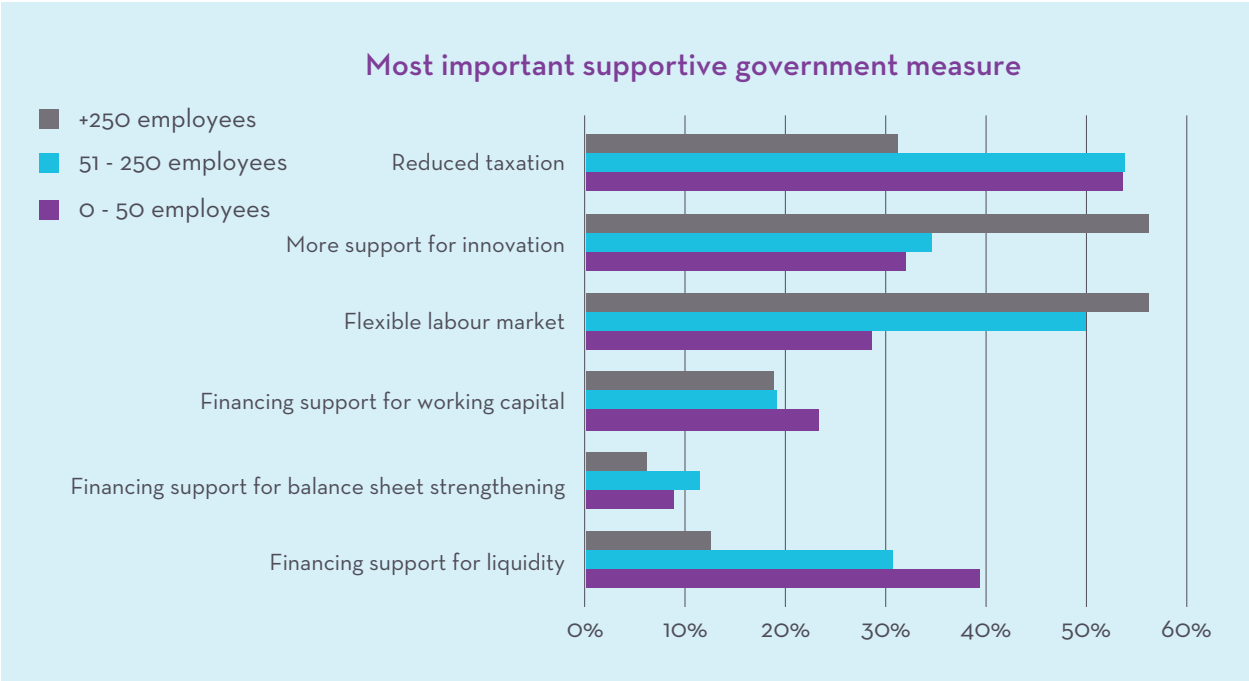
Respondents from companies of all sizes mainly indicate that funding support for liquidity and lower taxation are key for the future competitiveness of the Flemish manufacturing industry. These factors are closely followed by flexible employment and more support for innovation.



If we look at our members, we can see that they value support for innovation the most, while non-members see lower taxation as priority number one.



If we take company size into consideration, it becomes clear that SMEs are expecting government support in the form of lower taxation, flexible employment and financial support for liquidity. Larger companies tend to look more at the long term, as they want more support for innovation and flexible employment possibilities. Financial support is less important for them. In order to meet this demand, the government should not just have a clear strategy in place for nurturing new products and processes, as it also needs to facilitate the effective scaling of new business ideas.



The Flemish government has clearly stated its positive intentions in the 2019-2024 Coalition Agreement:



*Flanders is known for its zest for work, innovative capacity and technological progress. The challenges are great, but we are convinced that we can do better tomorrow than today. We believe in our own capacities. The future of Flanders lies in our creativity and our ability to reinvent ourselves. Everything starts with education. The latter must be of the highest quality, give our children wings and prepare our young people for a rapidly changing future. We want Flanders to stay at the forefront in terms of innovation, digital transformation and technology. We give our companies every opportunity to grow into international players.”*

Key principles related to economy and innovation:

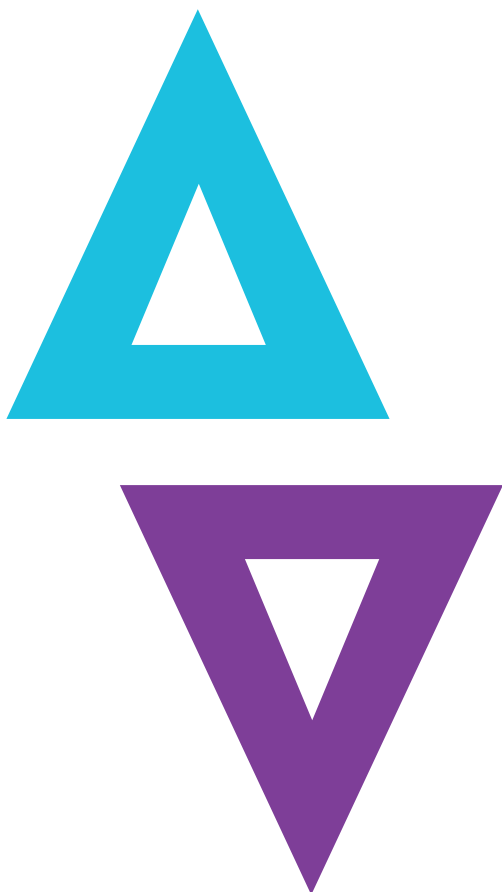
- Providing companies with opportunities to conduct business, innovate and internationalise
- Investing in favourable ambient factors for the Flemish R&D&I system
- Continued investment in the interaction between enterprises, knowledge institutions, public authorities and citizens within the R&D&I system.

**The intentions of the government are fully in line with the mission and activities of Flanders Make.**

As a concluding question, we ask:

### **What kind of answer do you expect from the government in the short term?**

1. Relaunch plan aiming at supporting investment and entrepreneurship
2. Decisiveness, decision-making, making clear choices, creating a clear and stable framework in order to provide the certainty necessary for business
3. Support R&D and innovation
4. Create a flexible labour market, support job retention, unemployment framework
5. Focus on a policy with a vision of the future, e.g. sustainability



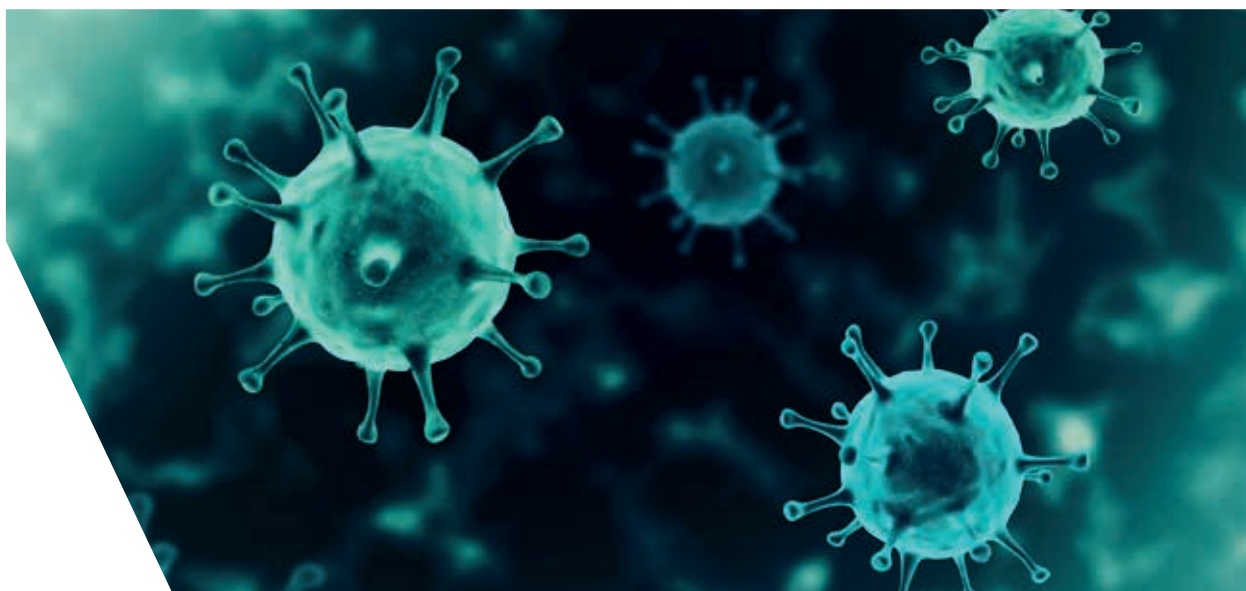
## 7. MAIN CONCLUSIONS

**Although we intended to report the results when the worst Covid period was over, a new second wave struck us. At the moment (November 2020) a new lockdown is in place; the difference being that companies are prepared and can continue their activities while, in a safe way, respecting the rules of good Covid practice.**

Many companies survived the first wave without going bankrupt, but we sincerely hope that the second wave will not lead to companies going bankrupt. Liquidity has been slowing down so that another negative impact could trigger negative effects.

Nevertheless, we have seen companies react to the disruptive effect in a resilient, agile, adaptable and creative way. Companies have been looking for new markets, creating new products, as well as new business lines, such as e-commerce, and reflecting on how to adjust their business to make it more resistant to current effects, e.g. those linked to supply chains.

The pandemic has not only shown that we need to embrace digital transformation, but also that it is even more essential for business continuity and in order to be ready for the future. Most companies have opted to work towards digitalisation. Starting with products and production, sometimes as a digital business, companies are now convinced that a digital culture is necessary in a digital organisation, in order to create the required environment for success. Digital talent is needed in order to create effective and efficient organisations. When talking about talents we should not only think about younger employees, but also make sure that the entire workforce is ready and prepared to walk and run on the digital highway.



## 8. CONCLUSION BY DIRK TORFS

### CEO Flanders Make

**“Like Covid patients, our economy is facing a long and difficult recovery.”**

#### May 2020

This pandemic is not comparable to the 2008 crisis, which was mainly financial and disruptive with an impact on physical property. High expectations of returns were at the root of ever-increasing risks that ultimately led to an implosion of the housing and financial markets. The ECB and governments in European countries took measures that ensured the negative impact on the economy would be short-lived. Above all, it was necessary to restore confidence in the financial system. Of course, there was collateral damage affecting companies and individuals, but this did not have a structural, lasting impact. The economy did temporarily decline in size, but supply and demand were never interrupted. As a result, the domino effect and contagious effect on the entire economy came to an end, so that the impact was limited.

The current situation is completely different: it is an all-encompassing structural economic crisis, combined with a behavioural crisis due to the fear of contagion, which affects the entire economy and slows it down sharply. Apart from the health and food sector, the “lockdown” disrupted the entire economy, not only locally but also globally. Many people were unaware of this, which led to disbelief, uncertainty and despair.

The health impact has made everyone cautious and especially governments. The further infection (expansion, pandemic) was all-decisive for behaviour and actions (e.g. lockdown). Each nation, each country (beginning with China, then all of Europe, the USA, etc.) is following a policy of lockdown and easing measures, depending on the local situation. People are afraid of being infected and only consume essential products, while companies are forced to rely on teleworking and employees prefer not to travel to their workplaces.

The government has quickly taken measures to provide a “basic income” during unemployment due to Covid, financial support as compensation for the lockdown, etc. The lockdown for a long period of time in almost all countries caused all the domino blocks to fall; and this makes it so difficult to restart things smoothly. We are experiencing the effects of globally connected supply and demand value chains.

For example, we supply weavers with textile machines; the weavers manufacture for middlemen who, in turn, supply clothing products ordered by fashion houses. A few months without any activity in this sector also has an impact on seasonal activities (or actually means that a season does not happen). Are we going to buy summer clothes if we have to stay at home and cannot go on holiday?

The dominoes now need to be put back in the right order and this will take time, as well as resources. And this is certainly a major setback for Flanders as an export region. If we cannot export (the borders are closed for travel and therefore for closing trade deals, hiring machines, assisting customers, etc.), we do not have any income. In addition, supplies are no longer available (goods coming from abroad are not produced by foreign companies as they are closed, combined with obstacles affecting transport). We also must take into account the fact that our customers’ customers are unable to do business, while our suppliers’ suppliers are also subject to the same restrictions.



A restart means that all the blocks have to be straightened out in the right order. It's like a complex machine, which continues to work if it is regularly maintained while it's running, but if it stops, we need to find an expert who still knows about the design assumptions and how it was built. Companies can complete their confirmed orders when they restart, but new orders remain uncertain and are not easy to obtain because, for example, there is no possibility of face-to-face consultation with the customer. Ordered products cannot be sold due to travel restrictions. This makes doing business extremely difficult. In other words, there is little or no supply and demand market. When all this will start up again remains unclear and this is disastrous for entrepreneurs. Without clarity, there will be no investments, employment or income for the state. It is therefore not surprising that VOKA has been waiting in the wings to restart companies. Only through active companies will we maintain and create prosperity.

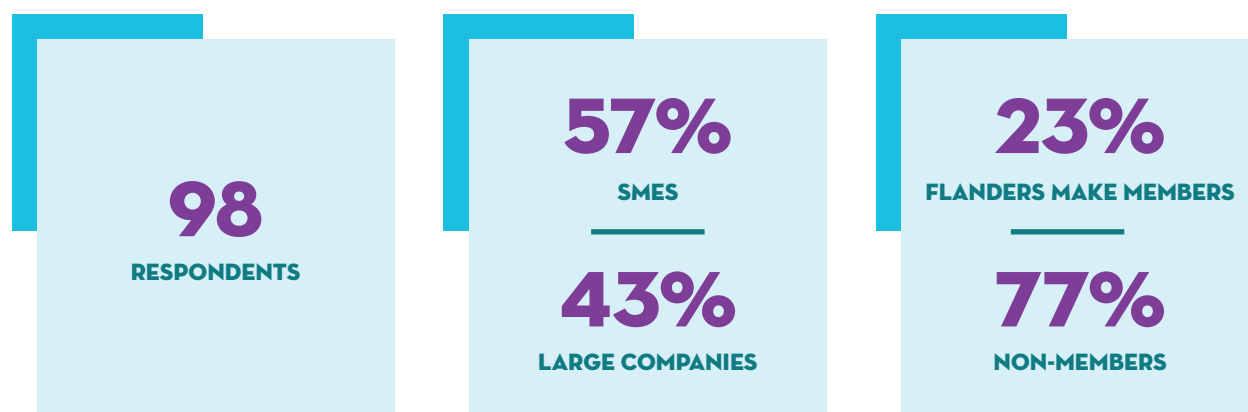
Despite all this, companies must continue to invest in research and innovation, as this makes them more competitive on an international market. Firstly, they will have to focus on a sustainable economy, which is circular and green, with local (= European) supply chains and global supply chains as a backup, in order to reduce dependence on imports. Secondly, accelerating the digital transformation is more than necessary when it comes to maintaining our position as an export region. To this end, an agile, flexible organisation with a digital culture and sufficient digital talents is essential. This will lead to the accelerated roll-out of digital pilot projects that demonstrate their impact and will be scaled up, first in one factory and then across multiple factory sites. At the same time, we will have to rethink how we manufacture and how production lines are designed to meet social distancing regulations. Thirdly, in order to maintain this pace, collaboration with other companies and knowledge partners in an innovative ecosystem is extremely important. If we focus on these 3 key elements, we - as a knowledge region - will emerge strengthened from this crisis. Our innovative strength and action-oriented entrepreneurial mentality will play an important supporting role in this process.

This will lead to a positive dynamic, with new products and the development of new market segments. Examples include ECA (car upholstery), Vanheurck (safety clothing), Bioracer (bicycle clothing) and Ducaju (specialist chocolates boxes), which now make face masks, restaurants that sell meal boxes, Stokerij Rubbens (gin) that produces disinfectant alcohol, etc. All these fine and valuable initiatives are the result of creativity in these disruptive times.

**Dirk Torfs,**  
CEO Flanders Make

## 9. ABOUT THE SURVEY

In 2017, Flanders Make and PwC interviewed 30 leading Belgian companies on their Industry 4.0 readiness. Two years later, Flanders Make wanted to determine the current Industry 4.0 maturity level, in order to optimise the support measures aimed at digitalisation. In 2020, Covid-19 struck and global markets faced the biggest crisis since World War 2. Companies around the globe faced problems that they have never seen before. This seemed a good time for us to update our 2019 survey. To this end, we conducted an online follow-up survey in August-September 2020, in order to explore the priorities, challenges and perceived opportunities that companies face today.



## 10. HOT TOPICS ADDRESSED BY FLANDERS MAKE



### DIGITAL WORK INSTRUCTIONS HELP OPERATORS TO MAKE CUSTOMISED PRODUCTS

Following the shift towards mass customisation, companies need digital work instructions that help their operators to make customised products. Whereas mass production used to be the norm, the emphasis in the industry is shifting more and more towards mass customisation, with small series of products being tailored to the customer's specific requirements. As a result, operators increasingly need to perform less repetitive tasks and become increasingly flexible. This makes their work a lot more complex.

Therefore, companies need digital work instructions that can be created/adapted as part of a swift process and easily consulted. "A plastic folder with a few documents" does not suffice anymore - not by a long chalk.

#### SEVERAL DIGITAL TECHNOLOGIES

Several technologies can be used for digital work instructions. For example, Informed Reality (IR) trains operators while they perform their tasks. These operators can, for instance, wear glasses on which short messages, pictures or video clips can be shown in one of the upper corners whenever needed.

With Augmented Reality (AR), you can take it another step further. Concrete instructions can be projected onto an image of the actual object, such as a workbench, machine or product. You can, for instance, use an arrow to point at a screw that has to be tightened or highlight a pushbutton that needs to be pressed.

Finally, Virtual Reality tools can also be useful, but mainly for training purposes or validating workplaces before a production line is set up. Because, with VR, you do not have a real image of your current environment, you cannot use it for instructions on the actual production line and this would not be safe.

#### PREVENTING TECHNO-STRESS

Flanders Make has the necessary know-how - not only to develop such instruction methods but also to keep them up-to-date in an automated way. We also adapt the instructions to the level of experience of operators because a starter needs different information

from someone with many years of experience. And we ensure that operators always remain in control in order to prevent techno-stress and consider their feedback when developing new instructions. With the 'Flexible Assembly' cluster, Flanders Make focuses primarily on assembly plants but the insights on digital work instructions could also prove invaluable for almost every industrial sector.

#### BETTER DEPLOYMENT OF EMPLOYEES

Digital work instructions can considerably improve the performance of operators. Another benefit is that new employees will master their jobs much more quickly. Furthermore, they make it possible to deploy low-skilled workers for these jobs so that employees with different profiles can be used for more complex tasks.

We also notice that people in all age categories are good at picking up these digital instructions. Sometimes, people are a bit reluctant but, in general, their fears are rapidly overcome.



## THE IMPACT OF DISRUPTIVE TECHNOLOGY ON PRODUCTS AND PRODUCTION

Belgian companies put artificial intelligence and big data analysis at the top of their list of the most disruptive technologies for their processes. This was revealed by a study of 122 companies that we conducted at the end of 2019. We are definitely not alone in this. Worldwide, 92% of companies indicate that their expenditure will mainly focus on the collection and analysis of in-house data – for example, from production and logistic processes, how their products are used by the customer and similar – and subsequent actions resulting from this.

Investments in smart sensors and the Internet-of-Things complete the top three. These three technologies are clearly inter-linked and all of them contribute to digital transformation.

Digital transformation is the incremental and disruptive adaptation of products and/or production to the digital age. The use of digital technologies, such as artificial intelligence or smart sensors, leads to new business processes and new customer experiences. In this way, organisations can meet changing market demands and ultimately create new business models.



On the other hand, equal attention should be paid to a new corporate culture and the recruitment of digital talent. This is necessary in order to reap the long-term benefits of the comprehensive digital opportunities that are available today.

We tell you more about these three disruptive technologies.

### **1. BIG DATA ANALYSIS AND ARTIFICIAL INTELLIGENCE**

Big data is about collecting data generated, for example, by machines or vehicles while they are being used. After structuring this big data, artificial intelligence algorithms can generate insights on this data. This takes place at different levels, but the ultimate aim is to predict what will happen when and why based on (historical) data. This knowledge makes well-informed (though autonomous) decisions possible and thus enables companies to benefit as much as possible from opportunities and avoid risks. In this way, data is transformed into actionable intelligence. Potential applications include zero-fault production, operator-supporting functionalities and conditional maintenance.

### **2. INTERNET-OF-THINGS**

It is not only people that are almost continuously online, but also systems. A smart thermostat measures when the temperature drops and will respond accordingly. It makes sure you come home to a warm house in the evening and can be controlled remotely. This is no different in a production environment. Machines can be connected with one another and with the cloud. The industrial Internet-of-Things (IIoT) not only makes it possible to programme or control machines remotely, as these machines can also exchange data with one another.

The IIoT is expected to boom in the next few years. The results of the study show that awareness about it is growing. Furthermore, the price of chips and sensors is falling drastically, which improves their implementation. Thanks to IIoT, actionable intelligence will become the new standard.

However, we are still facing several thresholds that are impeding total market penetration. First of all, we need a sufficiently fast and reliable Internet connection. 5G will play an important part in this. Without this new communication technology, digitalisation is not possible because 4G is often not strong enough. In order to maintain our technological edge, industry and associations alike are calling for the rapid introduction of a 5G network.

The first industrial applications in Belgium are scheduled for the end of 2019, in the Port of Zeebrugge and other locations.

Secondly, IT (information technology) and OT (operational technology) must grow towards one another, with OT taking the lead. If we connect machines, they are no longer just part of the operational side of the business, as IT has to connect/secure data and implement the cloud system. As a result, any failure in an industrial compressed air plant is no longer just an operational problem but also requires assistance from IT. It is crucial that organisations wishing to implement the IIoT break down barriers between these two sectors.

### **3. SMART SENSORS**

So that systems can be connected, they are equipped with sensors. Their role is that of detection, in the broadest sense of the word: they detect any changes in the system/environment and send this information to the cloud or another system, such as a processor. Therefore, sensors form the building blocks of any smart, cyber-physical system. Other building blocks include the actuator, energy system (e.g. a battery) and controller.

Sensors are not only becoming less expensive (see above), their performance has also improved significantly. Examples include hyperspectral cameras used for quality control in the food industry. As they combine spectroscopy with digital image processing, they can “see” far more than an ordinary camera and detect certain deficiencies, including even quasi invisible fungi.

In order to prepare companies as well as possible for all these changes, we have worked out a roadmap, which enables them to start making their products and production future-proof. The use of disruptive technologies, such as artificial intelligence, IIoT and smart sensors, is of crucial importance in this context.



## BY WORKING WITH A CIRCULAR INNOVATION ECOSYSTEM: THIS IS HOW FLANDERS MAKE TACKLES AN INNOVATION PROCESS

An innovation process is a careful balancing act between a company's goals, people's skills and the potential of resources. Flanders Make is a partner that listens to these needs, based on its expertise, and guides the company purposefully through the innovation process.

Innovation is not a goal in itself. It must respond to market needs in order to win over new customers and gain the loyalty of existing customers by means of valuable products and services. This is possible in many different ways. Usually, people think of tangible innovations, such as faster cars, a more practical robot or an autonomous machine. Yet innovation is often found in things that you do not immediately see. Did you know, for example, that an electric drive becomes up to 40% more powerful if you use the right cooling system? Or that using models to design product families achieves significant time and efficiency gains?

Flanders Make works intensively with companies in a variety of ways. We will look at 4 of them in greater detail below:

### 1. PRECOMPETITIVE RESEARCH PROJECTS: NOT AGAINST BUT WITH EACH OTHER

As part of a precompetitive research project, several companies are working together on a shared technological challenge. Flanders Make identifies, together with companies and research institutions, highly specific technological domains, on which the research will focus. We look at the potential for the industry, possible practical applications and the expected obstacles to wider implementation. Companies that take part in this kind of pre-competitive research project are at the forefront of the innovation train.

They can immediately validate the new technology or application for their company-specific situation. This lowers the threshold, at which they wish to start working with the technology after the project. As a result, several companies sit around the same table and work together on one project. However, there is no direct competition: afterwards, each stakeholder goes its own way and the research outcomes take on a company-specific form.

Bringing companies and researchers together means that the research outcomes can reach companies more quickly. In addition, companies learn from one another about the implications of using new technology.

Pre-competitive research projects are supported by the Flemish Government through VLAIO (Flemish Agency for Innovation and Entrepreneurship).

### 2. TAILOR-MADE INNOVATION: ALL EYES ON YOU

Companies can turn to Flanders Make for the development or improvement of a specific technological solution, from an idea to a fully functional product or process. As part of this approach, we work together one-on-one. All our knowledge and resources are at your company's disposal.



Sometimes, however, it is not so clear where the shoe pinches. In this case, a feasibility study will provide the answer. In this kind of study, we look for growth potential, identify gaps and draw up an action plan. Support mechanisms, such as the Innovation Boosting initiative, are also available for these projects.

### **3. LIVING LABS: EXPERIMENTING WITH INDUSTRY 4.0 TECHNOLOGY**

In order to inspire and guide companies towards Industry 4.0, we use living labs. These are industry-relevant set-ups, which companies can use to experiment with new technology. This provides them with insights into the potential for their company and helps them to identify opportunities for their own innovation processes.



**MAKE LAB - Exterior**







MAKE LAB - interior



SmartFactory

We have a variety of living labs: from smart connected systems to operator-supporting technologies.

#### 4. DEMONSTRATION PLATFORMS: THE POWER OF INTERNATIONAL COLLABORATION

SmartFactory stands out as an Industry 4.0 demonstration platform. By means of this initiative, we join forces with companies, in order to provide answers to the challenges of our production companies within the Benelux countries. In this way, we are building a mobile production unit of the future that, thanks to the efficient use of new technologies and methods, will be able to produce made-to-measure mass products. Flanders Make creates the perfect framework for these partners so that they can communicate and conduct joint research, development, testing and implementation activities. Eight companies have already jumped on the bandwagon. They can now watch their own technologies at work with those of other partners, as well as those of SmartFactory Kaiserslautern. Thanks to technology transfer, they can not only develop a vision of the future for their company, but also implement it.

Last year (2019), Flanders Make together with DFKI (SmartFactory KL, Germany), and Brainport Industries (The Netherlands) founded the European Economical Interest Group SmartFactory EU as a non-profit organisation, in order to combine forces and support the rebirth of European manufacturing industry.

### How should CEOs prepare their companies for the switch from traditional manufacturing to intelligent manufacturing?

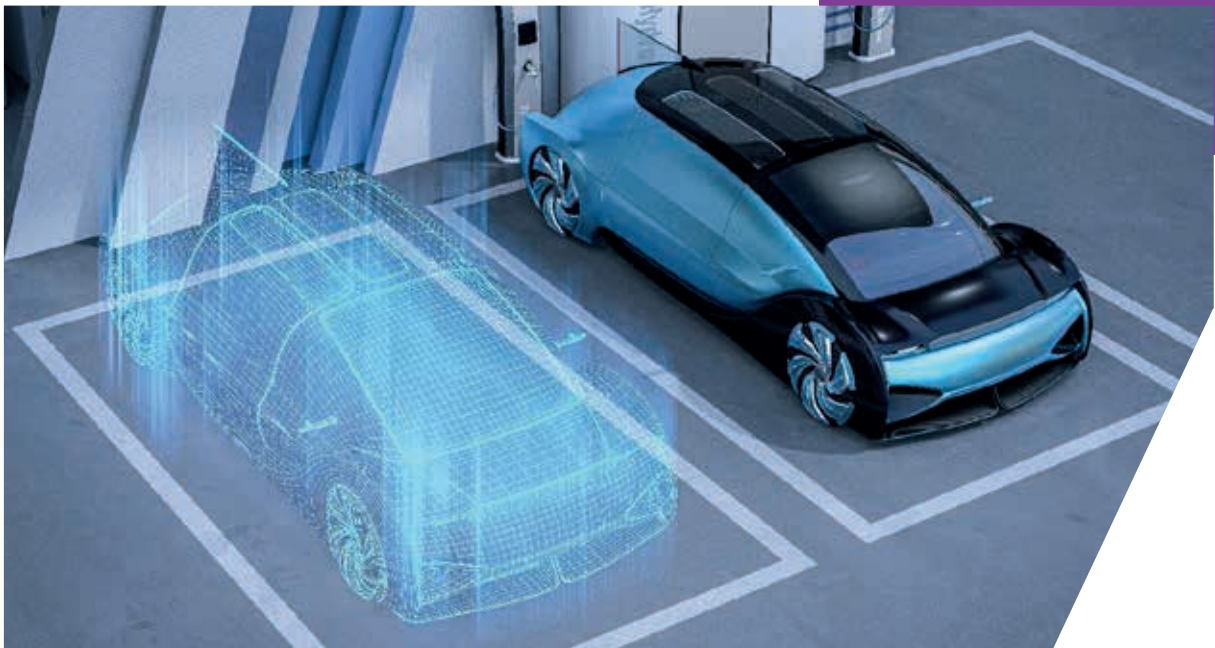
CEOs should prepare their organisation and its people for the changes brought about by the digital transformation. A high level of digital maturity can only be achieved by excelling and accelerating in terms of products, production technologies and welfare policy to the same extent.



- In the digital era, products and production are no longer two different worlds.
1. Businesses usually focus on products or production innovation. Combining the two increases complexity, but is a lot more efficient and generates stronger results.
  2. Businesses often invest more in long-term product developments. Production is considered more as a short-term investment, with an ROI within only a few months. In the future, the importance of flexible production will only increase. Businesses that have a long-term vision for production innovation are also in a much stronger position.
  3. Production close to the customer is growing in importance. Indeed, thanks to digitalisation, it is possible to make customer-specific products within considerably shorter production times. This time saving should not be offset by longer delivery times. Therefore, a solid strategy for digital transformation starts with extensive market research and often results in new revenue models, based on local needs.
- An open company culture that nurtures and stimulates change is the key to any successful new strategy.
1. It is essential to have a culture of agility (adapting to the new world, needs and technologies) and collaboration between departments, as well as with external parties and knowledge actors. The inflow of new ideas accelerates knowledge development and leads to win-win-win situations.
  2. People play an important part in unlocking the value of digitalisation, as technology is used by people. But a lack of digital skills or the failure to embrace new technologies can hinder the roll-out of an effective Industry 4.0-strategy.
  3. Cooperation between departments and with external parties in the value chain is essential. The influx of new ideas accelerates knowledge development. Collaborative innovation ecosystems, large and small, ensure that businesses fare well in a rapidly changing world. These broad partnerships only make sense if there is sufficient respect for intellectual property.

## HOW ARE DIGITAL TWINS GUIDING THE FUTURE OF MANUFACTURING?

Digital Twin is much more than a 3D model. The digital twin is a virtual representation of a physical product that includes all static/dynamic behaviour and processes all available information about its entire life cycle. In a similar way, digital twins can also be developed for a production environment.



Nowadays, the digital twin is often considered as a design aid and associated with simulations and 3D models aimed at marketing products more quickly.

However, the possibilities are a lot broader:

- understanding and optimising product performance throughout the entire life cycle
- support for the optimum product use and maintenance
- facilitating the re-use of product sub-assemblies and information concerning product variants and new products
- facilitating production training in virtual reality
- faster introduction of new production lines
- acquiring insights into the operation of systems, based on factors that were previously not measurable: friction coefficients, wear & tear, remaining useful lifetime, etc.

For each product, component or system, there is one digital twin, which enhances effective cooperation between all the departments involved: product development, IT, operations and maintenance.

The digital twin is constantly fed with new information from the physical product or production system. This ensures synchronisation between the physical and digital halves of the 'twin'. Indeed, a digital twin is not an exact copy of the actual object, because the performance and behaviour are not entirely predictable and therefore include a certain level of uncertainty. Thanks to their connection with the cloud, businesses can accurately monitor their products after sales and implement updates remotely. This also provides useful information about external factors that have an impact, such as ambient temperature, airborne dust particles, etc.

The digital twin enables businesses to offer services based on their products, instead of just selling products. Output-based services (x-as-a-service) are becoming increasingly important.



## 11. ABOUT FLANDERS MAKE

Flanders Make concentrates on industry-driven technological research and innovation, together with and for the benefit of both SMEs and large companies within the Flemish industry. The focus is on open innovation through technological research in the field of mechatronics, product development methods and the technology used to make them. This contributes to specific product and production innovations in the motor vehicle industry, mechanical engineering and production environments.

The research outcomes can be applied by a wide range of companies, which often face similar technological challenges. Together, they can innovate better and faster. Flanders Make also attaches great importance to international cooperation in the field of innovation and participation in European research projects.

Flanders Make consists of three co-creation centres (in Lommel, Leuven and Kortrijk), the Flemish drone federation EUKA and labs at the five Flemish universities: KU Leuven, University of Antwerp, Ghent University, Hasselt University and Vrije Universiteit Brussel.

[WWW.FLANDERSMAKE.BE](http://WWW.FLANDERSMAKE.BE)



**Urbain Vandeurzen,**  
Chairman of Flanders Make

**Dirk Torfs,**  
CEO of Flanders Make

Flanders Make consists of three co-creation centres,  
the Flemish drone federation EUKA  
and labs at the five Flemish universities:

**Co-creation centre for machine development**

Gaston Geenslaan 8  
3001 Heverlee

**Co-creation centre for the vehicle industry**

Oude Diestersebaan 133  
3920 Lommel

**Co-creation centre for Industry 4.0 production**

Graaf Karel De Goedelaan 5  
8500 Kortrijk

**The Flanders Make - EUKA drone community**

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