



# **Industry 4.0:** The Digital Wave of Sustainable Innovation

Technical Note #10 – a guide for and by EU|BICs

## CREDITS

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## About the European Business and Innovation Centre Network

EBN (European Business and Innovation Centre Network) is a not-for-profit that serves a pan-European, global community of people that use innovative business as a driver for regional (economic) development. EBN's initiatives include EU|BIC certification, development and distribution of quality business support programmes, facilitation and initiation of project collaborations, global networking and advocacy for excellent business support actors like the EU|BICs.

EU|BICs, quality-certified European Business Innovation Centres, are on a mission to drive economic development and wellbeing in their regions. There are now more than 130 certified EU|BICs and 46 Associate Members shaping our global community. Becoming an EU|BIC means responding to our mission to use business and innovation as a force for regional development with the best possible actions to create thriving startups and SMEs. In other words, EU|BICs take real steps to ensure that their services are as best as possible to their clients and best advantageous to their regions.

## About SmartEEs

Digital Innovation Hub (DIH) SmartEEs2 (2020-22), a European initiative promoting the adoption and transformation of Flexible & Wearable Electronics (FWE) into novel products, services, and business cases. SmartEEs2 is a follow-up project of SmartEEs (2018-20).

SmartEEs major target groups are SMEs, start-ups and Midcaps, which can be 'tech' (innovative companies) or 'non-tech' (traditional industries) companies from any application fields such as Health & Medical, textiles, sports, packaging & logistics, transport and energy.

The SmartEEs2 project is funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 872076.





# Making Industry 4.0 Possible, Fast

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Only a few years after the first ambitious goals on digitalisation and sustainability were set out by the European Union, EBN, its community of EU|BICs and SmartEEs are making well-developed efforts to support the digital and green twin transition. This paper taps into the discussion on the 4th industrial revolution, the potential of its digital wave of sustainable innovation, and how European Industry can attain efficiency gains in manufacturing and reach a smarter, more sustainable, and inclusive economy. What does this mean in practical terms for companies that shape the economy? What are the advantages, but also the challenges that come with the new technological era?

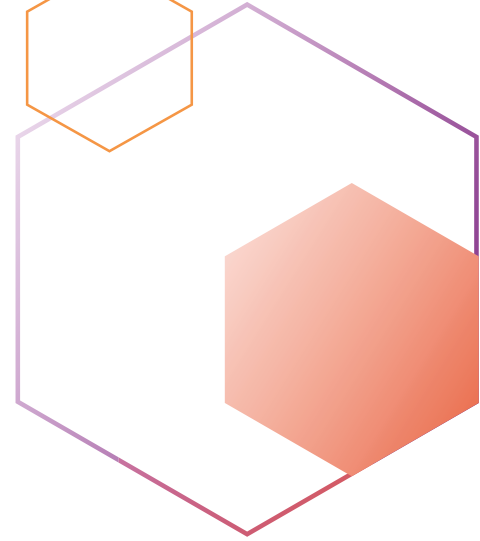
“The current geopolitical context shows that more than ever, European Industry needs to innovate”

- PhD Frederic Daumas, CEO at UPPERION and Smart Manufacturing SIG Chair

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The Smart Manufacturing SIG (Special Interest Group), organised by EBN, aims to help the emergence of innovations for industrial use to improve competitiveness and reduce net greenhouse gas emissions. As such the EU|BIC innovation community, facilitated by EBN actively contributes to the EU Green Deal and Fit for 55 strategies and catalyzes European regional innovation ecosystems. The SIG brings together different actors (private and public structures) who provide cross-cutting visions. As Chairman, I have the modest function of ‘spurring’ our members to make their skills and the innovations they support known.

In this first report, we will outline the EU|BIC, EU and SME approach to digital transformation and Industry 4.0: the “why now” question; and the characteristics that participants must understand to partake and thrive in the Industry 4.0 ecosystem.



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# Executive Summary

**Industry 4.0 essentially is a process of digital transformation leading to an improved approach to efficient manufacturing.** It utilises a complex combination of the latest technological advances, particularly those that enable the integration of physical and digital assets and the merging of IT and OT. By introducing the next gear change in manufacturing through the digital transformation of value chains it interconnects the physical, digital, and virtual worlds. This change presents new opportunities, but it requires new thinking in terms of value creation and business models in manufacturing.

**The manufacturing industry is in the midst of a digital revolution,** factories and whole value chains are becoming digitalised, connected and visible. As a result, innovation in manufacturing is speeding up and becoming more open. Like other digital markets, value can easily just flow to the top of the chain, leading everyone else to struggle as commodities. In this scenario, businesses lower in the value chain can invest in new technologies but still find themselves struggling to profit from innovation, as many manufacturers now are. The challenge is to understand how value is now created, capture its dynamics, begin to play by the new rules and secure a healthy return on investment and their assets.

**Successful Industry 4.0 ventures combine science, engineering, and design with strong business acumen** – this is what it is striving to cultivate and achieve. As the business world turns more and more digital, access to technology defines the success of an enterprise. Yet, for many small and medium enterprises (SMEs), the path to these much-needed solutions can be full of obstacles.

**Digital transformation is essential for Europe to remain competitive in the international economic context.** The European Union is investing in Digital

Innovation Hubs and industrial clusters as a way to support SMEs accessing digital technologies and data, via proper regulation and support for sustainable digitalisation. The main objective of the Digital Innovation Hubs is to achieve high levels of digital intensity, leaving “no one behind”.



**SMEs find it hard to grasp how opportunities can ease and accelerate their transformation.** This is especially so for those companies at the beginning of their digitalisation process. Fortunately, a network of European Digital Innovation Hubs (EDIHs) is under construction to connect European SMEs with the technological solutions they require for their growth. DIHs and EDIHs support companies, especially SMEs but also the public sector in their digital transformation process, working at a local level while they should be also connected at a European level.





**Digital Innovation Hub (DIH) SmartEEs2, is a rich ecosystem that aims at creating the best conditions for long-term business success** for all actors involved. The DIH consists of SMEs, large industries, start-ups, researchers, accelerators, and investors. SmartEEs2 services and partners help ensure that every company, small or large, high-tech, or not, can grasp the digital opportunities. Funded by the European Union's Horizon 2020 Research and Innovation programme.

**SmartEEs2 aims to create a pan-EU collaboration network of regional DIHs promoting the best quality level of digitalisation experience**, hence boosting the efficiency and effectiveness of the European flexible and wearable electronics (FEW) innovation ecosystems. Uniquely, it places the capacity for experimentation as a means to an end. This will require the engagement of the largest number of follower companies, the so-called 'early majority'.

**There is still a long way to go to fully realise the value of Industry 4.0** which has many potential advantages for a business. Within the integrated value chains that Industry 4.0 encourages, IP is becoming a primary means for appropriating value and securing a return on your investment in innovation. The complexities of Industry 4.0 implementation across the value chain could mean that a change in one organization may have an impact on other businesses across the network. To

succeed, your Industry 4.0 journey will have to be truly integrated and look at all parts as a whole, especially people and the commercial dynamics present in each area of the value chain.

**It is important to build transformative pace expectations into your Industry 4.0 journey.** Transformation, in contrast to slow and organic change, often involves getting five years of change done in six to twelve months. Transformation means leapfrogging a lot of the usual organic change steps. The path to Industry 4.0 has made the industry more resilient than ever. By way of illustration, the Covid-19 crisis demonstrated the survival capabilities of more digitalised companies.

**Digitalisation has the potential and is used as a driver of environmental sustainability** due to effect that digitalised processes offer better production monitoring possibilities for factories which in turn reduces waste generated by these processes.

**The next phase of industrialisation, Industry 5.0 is being heralded by the European Union's green and digital twin-transition.** The main objective of Industry 5.0 is to transition toward a more sustainable, human-centric, and resilient European Industry. In short, digitalising the industry should serve both people and their environment.

# Editorial

## INDUSTRY 4.0: DIGITAL TRANSITION AND TECHNOLOGIES DRIVING TRANSFORMATION

Author:  
**Marcos Kauffman,**  
Director of the Institute for  
Advanced Manufacturing and  
Engineering (AME) at Coventry  
University

Digital technologies dominate today's society in a manner that we could not have anticipated when the first digital computers emerged in the 1950s. Nowadays, we take for granted that personal computers, tablets, mobile phones and other digital devices are ubiquitous in our day-to-day lives. We do not think twice about streaming our favourite books, music and films, participating in online communities in which we create, share and consume content or through which we buy, sell and exchange goods at the click of a button. We also live in a world where we collectively generate huge volumes of data, which can be mined for patterns and from which algorithms can predict behaviour or generate new content. In short, we are amid a digital revolution – and have been for at least a couple of decades. It brings with it many opportunities and challenges to which the industrial sectors are not immune. This was pointed out by Klaus Schwab, the founder and executive chairman of the World Economic Forum, who in January 2016 declared that the world was entering the Fourth Industrial Revolution<sup>1</sup>.

'We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before<sup>2</sup>.'

- Klaus Schwab

1 [1] The Fourth Industrial Revolution: what it means, how to respond, World Economic Forum, 14 June 2016.

2 [1] idem



## THE DIGITAL TRANSFORMATION AND THE TECHNOLOGIES DRIVING INDUSTRY 4.0

Finding a consensus regarding the meaning of Industry 4.0 can be very difficult; people in practice tend to define it as ‘making the manufacturing industry fully computerized’ or ‘making industrial production virtualized’. A level of cohesion appears in the form of an agreement that Industry 4.0 ‘integrates horizontal and vertical channels. Despite this challenge in defining and giving practical examples of Industry 4.0, manufacturers are still keen to keep up with the rapid pace of change and hope to benefit from deploying the related technologies.

To offer some clarity, **Industry 4.0 can be seen as essentially a process of digital transformation leading to an improved approach to efficient manufacturing**, which utilises a complex combination of the latest technological advances, particularly those that enable the integration of physical and digital assets and the merging of IT and OT.

The Institute for Digital Engineering (IDE) has succinctly presented the distinction between various levels of digital maturity in the Digitalisation Roadmap published in early 2021 where it is emphasised that the level of digital transformation in Industry 4.0 requires holistic integration of digital technologies into all areas of business enabling fundamental changes in business models, enterprise architecture and culture (IDE 2021)<sup>3</sup>.

“Some experts forecast the end of manual labour within five to ten years. However, as we know well, automation did not work out quite that way and humans remain a critical part of manufacturing.”

The key objective here is to connect and manage the whole value chain process, improve efficiency levels across the entire product lifecycle and develop novel products and services that generate more value to customers through better quality and higher customizability but not at the expense of lower costs.

<sup>3</sup> IDE (2021) Digitalisation Roadmap. Available at: <https://roadmap.ide.uk/>





## FOUR COMMON FEATURES OF INDUSTRY 4.0

Despite the lack of a clear definition, the proponents of Industry 4.0 have been consistent since its conception to identify four main and distinct characteristics at its core:

### Vertical integration

To create smart factories, which are at the centre of Industry 4.0, smart technologies have to be deployed in a coordinated and purposeful manner. The smart factories must be connected in a coherent way to create a link between the products, the processes, the machines, the production lines, the factory and the business. At the core, vertical integration in this context is used to refer to cyber-physical systems (CPSs), which connect an entire factory and enable maximum efficiency and flexibility to react quickly to customer requirements unexpected disruption.

### Horizontal integration

The next level of integration is aimed at creating a network of vertically integrated and optimized businesses that enables efficient value creation across the value chain. An example of a horizontally integrated value chain that springs to mind is one where a car factory is connected to its customers and suppliers across the value chain. The customer uses an online vehicle configuration tool which allows the selection of customized options for the vehicle. Upon the configuration of the vehicle, the customized options are converted into product and process requirements which are distributed in near real-time across the value chain for the efficient production and assembly of the car. This level of integration also results in several opportunities for the creation of new business models across industries and countries, making for global networks.

### End-to-end engineering

The term end-to-end engineering, sometimes referred to in manufacturing as 'cradle to grave', is used in this context to describe engineering across the entire product lifecycle: from initial product concept, product development and product development, all the way to manufacturing, customer use, maintenance and end of life activities such as repairing, repurposing or recycling. This requires the whole engineering process to be connected, oftentimes across organizations involved in the process. One example of end-to-end engineering

in action is found in how new battery packs for electric vehicles are designed with the entire lifecycle and, in some cases, even with the second life in mind. This may involve the integration of an engineering house with expertise in battery design, the car manufacturer, the battery manufacturer and the recycling business to work together in designing the life of the product. So batteries are designed to have a second life, i.e., after its useful life in a vehicle, as part of a system for power storage for solar-powered homes.

### Rapid growth in manufacturing

The three characteristics mentioned above are associated with the fourth which is the increase in the pace of growth in manufacturing. This growth is realized by the improved speed of development and efficiency across engineering and operations across the value chain.

“Industry 4.0 brings the next gear change in manufacturing through the digital transformation of value chains interconnecting the physical, digital, and virtual worlds.”

## INDUSTRY 4.0: WHY NOW?

The phenomenon known as ‘the rise of the machine’ was popular almost half a century ago as a potential solution to address process variation by humans in manufacturing and caused concerns over the potential scenarios where automated machines and robotic systems would take over and completely replace humans in manufacturing. The approach had some initial success and resulted in the establishment of automation in the industry. Some experts forecast the end of manual labour within five to ten years. However, as we know well, automation did not work out quite that way and humans remain a critical part of manufacturing.

**Industry 4.0 brings the next gear change in manufacturing through the digital transformation of value chains interconnecting the physical, digital, and virtual worlds. This change presents new opportunities, but it requires new thinking in terms of value creation and business models in manufacturing.** The following advances in business practices can be associated with the emergence of Industry 4.0:

- The **development and an exponential increase in data volumes**, cloud storage, cloud computing, computer power, and ubiquitous device and network connectivity over the last decade have enabled the collection, processing, and analysis of data at a previously impossible scale.
- **Exponential growth in analytics**: engineering processes for product and process development require complex models, simulation, and extensive analysis. Traditionally, with better models and analysis an organisation can improve the confidence levels in the performance of a product, process, or service. The same complex models and analysis are also required to improve business operations and entire supply chains to, for example, accelerate time to market and reduce stock levels and obsolescence for a given product.
- The **emergence of new human-machine interfaces** for optimised human efficiency: these technologies include many forms of immersive technology such as mixed, virtual, and augmented reality technologies that make full use of touch interfaces, hands-free and other human enhancing systems.
- The **advancements in data transfer technology** to support executable and physical outputs: for example, the use of simple interfaces to link computer-aided design and engineering tools with robotics, additive manufacturing technologies and rapid prototyping technologies contribute to a faster pace of development and high customization potential.

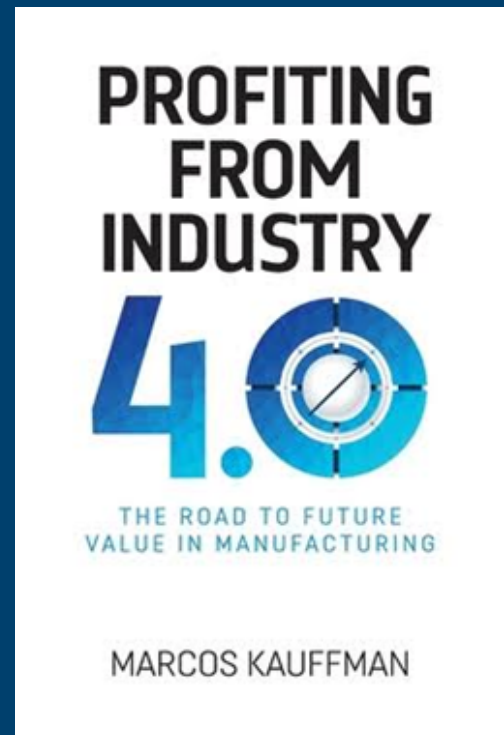
An unprecedented scale of technological innovation and industrial transformation has enabled these key advances in the way we do business and commerce today. Several key technological trends are still maturing and shaping the implementation of the new manufacturing paradigm.



Marcos Kauffman recently published his latest book **Profiting from Industry 4.0**. It focuses particularly on the manufacturing industry, which is amid a digital revolution, referred to as Industry 4.0, where factories and whole value chains are becoming digitalised, connected and visible. As a result, innovation in manufacturing is speeding up and becoming more open. Data is being shared and value is being created in real-time. Businesses' performance can be transformed, and new markets created either by existing players or by new disruptive ventures.

For all the excitement of Industry 4.0, the risks are too often overlooked. Like other digital markets, value can easily just flow to the top of the chain, leading everyone else to struggle as commodities. In this scenario, businesses down the value chain can invest in innovative technologies but still find themselves struggling to profit from innovation, as many manufacturers now are. The challenge is to understand how value is now created, capture its dynamics, begin to play by the new rules and secure a healthy return on investment and their assets.

This book gives those on the manufacturing frontline a holistic view, a set of tools and a series of guidelines to start capturing value from their investment in Industry 4.0 technologies and taking a commercial lead in their value chains.



Based on a comprehensive review of how manufacturing business models and contracts currently operate, it highlights several questions for manufacturers to ask and reviews their options for managing innovation, designing business models, managing intellectual property and gaining a lasting source of competitive advantage.



# Keys to adapting Industry 4.0 innovation: a guide for and by EU|BICs

Author:  
**EU|BIC CyRIC**,  
founder of Gravity the Venture  
Building Incubator, and  
coordinator of the Cyprus  
Digital Innovation Hub  
(CyDi-Hub).

## THE NEXT BIG WAVE OF INNOVATION IS POWERED BY PURPOSE-DRIVEN ENTREPRENEURS WORKING WITH EMERGING TECHNOLOGIES

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“Ideas might pivot or change, but pursuing an entrepreneurial journey under an incubation programme requires commitment and dedicated efforts. It requires competence and will to adapt to new methods, and courage to surpass all the difficulties that are thrown into our new venture. Investing in people first, and then in the idea is the critical lesson that we have learned.”

- Panayiotis Philimis, CEO, and founder of EU|BIC CyRIC.

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We believe that the next big surge of innovation is powered by emerging technologies founded by aspiring entrepreneurs that are driven by purpose and passion. EU|BIC CyRIC and its dedicated technology incubator [Gravity Ventures](#) provide a holistic and agile framework of tailor-made approaches to work, collaboration and value generation with Industry 4.0 startups. Industry 4.0 positively affects our ecosystem and helps us in multiple ways to move the ecosystem forwards in maturity, and technological value creation. Over the years, we have gathered the most important lesson learned. First, we do not invest in the idea itself, we invest foremostly in people. Selection and shaping of the founder profile that fulfils the expectations for a successful entrepreneurial journey is key to delivering successful KPIs.





“A potentially successful Industry 4.0 venture combines science, engineering, and design with strong business acumen, and this is what is striving to cultivate and achieve.”

**Founders and companies in Industry 4.0 are unique. So are their support needs.**

Industry 4.0 technologies are one of the latest additions to the startup industry and the ecosystem of innovative problem-solving oriented societies. With technology and innovation embedded in our core DNA values and competencies, we consider it important for an EU|BIC like CyRIC to provide technical support to Industry 4.0 startups, beyond business services. CyRIC has strong technological competencies. We can identify, pivot, design and develop advanced technological innovations in-house while investigating the business framework of such solutions. The main challenges lay in supporting “proof of concept”, technology validation and maturation in the wide spectrum of services that every EU|BIC has to offer.

Working with founders in the Industry 4.0 sector can be a challenge. As well as trying to provide tailor-made mentoring and properly convey the “pros” and “cons” of an entrepreneurial journey. Typically founders are not aware of the road ahead and what it takes to survive as a business. They typically focus on the technological aspect of their startup. A potentially successful Industry 4.0 venture combines science, engineering, and design with strong business acumen, and this is what is striving to cultivate and achieve.

“...all the in-house startups have asynchronous high-quality incubation that is adjusted to their needs...”

Rapid technological change has substantially affected our philosophy and approach when engaging with potential new ventures that are candidates for joining our incubation programme at [Gravity Incubator](#). “We support tech startups. We support aspiring entrepreneurs”. The next big surge of innovation is powered by emerging technologies founded by aspiring entrepreneurs that are driven by purpose and passion.



### A-synchronous, high-quality incubation

Our services, Idea Validation, Product Design, Testing, Prototyping, IP, Business Modelling, Financial Planning and Commercialization, are meticulously adjusted and delivered on-demand and case-specific. It is not “the service”, but rather “the depth and intensity” of each service at a specific level. Every incoming Industry 4.0 startup application is examined accordingly. After the case-by-case evaluation (e.g. on TRL status, team assessment and competencies, infrastructure, technical know-how, and road to market) we design a tailor-made incubation process. That means that all the in-house startups have asynchronous high-quality incubation that is adjusted to their need per se. Having the ability to be agile and “flexible” on the sequence and intensity of services offered to Industry 4.0 startups, is key for us.

“EU|BIC CyRIC is a private organization, one of the very few private EUBICs in the network, that invests heavily in deep tech startups so we are serious when it comes to innovative diagnostics and allocating financial and intellectual resources into any new venture.”

CyRIC's service value chain is tailored, and critically, not structured as a curriculum. There is no such thing as a “magic recipe” in our philosophy. Rather, entrepreneurial success depends on the persistence and aspiration of the Industry 4.0 startup founder, in combination with our strong technological arm and incubation guidance. We invest in maintaining and expanding our in-house competencies to be as flexible and as agile as possible. However, we maintain a network of high-end professional experts that are ready on-demand to provide advice and guidance in specific areas, such as Intellectual Property and Product Certification. We constantly seek to expand our in-house expertise and capacity.

Especially for early-stage Industry 4.0 startups ideation is the most crucial. **It takes a depth of knowledge and expertise to break down and challenge each element of any incoming application properly.** Our task is to evaluate, validate, justify, and of course, identify the real innovation potential. We provide state-of-the-art infrastructure and facilities for the incubation of startup teams. EU|BIC CyRIC is a private organization, one of the very few private EUBICs in the network, that invests heavily in deep tech startups so we are serious when it comes to innovative diagnostics and allocating financial and intellectual resources into any new venture.

Our EU|BIC has been one of the most influential and catalytic actors of entrepreneurship and innovation in our ecosystem since the early days. Hence through the Industry 4.0 wave of startups, we are dedicated to paving the way forward and providing valuable input to this effort. “For every action – there is a reaction”, Cyprus is a small country and our catchment area is nationwide we have noticed higher expectations. But also in terms of quality when it comes to startups and value creation “the bar is raised”.

Our track record in raising funds for Industry 4.0 startups exceeds 80% and typically ranges between 500k to 1.5M euros. **The Industry 4.0 wave positively affects our ecosystem and helps in multiple ways to move on as an ecosystem to the next stage of maturity, technological value creation and opportunity.**



## **System4M, supported by EU|BIC Technologické Centrum Hradec Králové (CZ) is a joint-stock company operating complex information systems for the healthcare sector**

**System4M** focuses on the development and provision of the information system for purchasing and logistics management in the healthcare sector NEOS, and the system for capacity management of operating rooms and outpatient clinics MEDICOS. It provides customers with a complete service including individual customization and user training at all levels.

Its customer base includes more than 45 major healthcare institutions in the Czech Republic. Among them are the Hospital České Budějovice, Masaryk Hospital in Ústí nad Labem, Regional Hospital Liberec, Health Holding of the Hradec Králové Region and others.

System4M was established in 2014 by spinning off from a division of MEDISYSTEMS located at Hradec Králové. It continues a long tradition of providing information systems, analyses, and consulting in the field of healthcare purchasing.

### **Role of EU|BIC TCHK**

System4M entered the business incubator Technologické Centrum Hradec Králové in 2017, where it took advantage of a subsidy for renting space, which allowed it to focus on expansion, business growth and further product development. During the incubation period, the company was invested and fully transitioned to a new owner, active in the medical device industry.

Technologické Centrum Hradec Králové played an active role throughout the whole incubation period. We provided System4M with advice, mentoring, technology tools (thanks to our partnership with Microsoft) and networking opportunities. In terms of marketing support, System4M participated in TC HK's series of podcasts related to startups.



## INDUSTRY 4.0 TECHNOLOGY COMMERCIALISATION IS FRAUGHT WITH DIFFICULTIES: EU|BIC CASTELLÓN PROVIDES ESSENTIAL SOLUTIONS

An interview with **Alexandra Badiou**, Business Advisor at EU|BIC (CEEI) Castellón

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**When supporting companies working with Industry 4.0 disruptive technologies, our experience tells us that there will be challenges related to commercialisation. Legal and industrial barriers to biosafety, food safety, and ethics, or if the technology breaks specific industry or cultural laws, are real challenges to be surpassed. Moreover, Industry 4.0 companies need more time (sometimes many years) and more financial support than traditional companies.**

**EBN: What is your perspective on the rapid technological change and how do you support the innovative companies in their process of digitalisation?**

COVID-19 crisis has brought about years of change in the way companies in all sectors and regions that we do business. Innovative companies have accelerated the digitization of their customer and supply-chain interactions and their internal operations. It is crucial for business supporters to adapt and learn, both tactically, in the process of making specific changes to businesses (which technologies to execute, and how), and organizationally (how to manage change).

“...the survival rate of our Industry 4.0 companies is higher than others, which makes us confident that we are doing a good job.”





EU|BIC Castellón supports Smart Manufacturing, Industry 4.0 companies through various programs:

- **ORBITA PROGRAM:** acceleration and financial support (6 months). Industry 4.0 companies' activities related to the space industry, health, blockchain, cybersecurity, biometrics, mobility etc.
- **CV INNOVA:** open innovation program (6 months). Industry 4.0 companies related with solutions for the logistics sector such as IoT, Big data or blockchain.
- **LLAMP AMES:** advanced and personalized business consulting for each company, networking (4 months). Deep-tech companies' activities related to inclusive chatbots, mobility etc.

**EBN: What are the critical steps in supporting a company working with Industry 4.0 solutions?**

1. Personalized business consulting for each Industry 4.0 company and assistance in the processing of public subsidies.
2. Connect companies from our programs with founders from previous programs and founders at every stage of the startup journey to exchange experiences, ideas, and best practices.
3. Use a global network of industry experts to help establish Industry 4.0 as a competitive player.
4. Raise visibility (interviews, news, prizes, TV shows).
5. Offer virtual and physical spaces for Industry 4.0 companies, including on-site facilities with a dedicated advisor.

**EBN: What is the impact of your current Industry 4.0 business support activities for your EU|BIC companies & ecosystem?**

What we see is that our activities and programs supporting Industry 4.0 companies are increasingly relevant. A growing number of Industry 4.0 companies seek to join our programmes, ask for business consultation, financial support, or want to rent physical or virtual space in our facilities.

“...finding interesting collaborations is a must in many Industry 4.0 projects doubled by an important amount of patience.”

Notably, the survival rate of our Industry 4.0 companies is higher than others, which makes us confident that we are doing a good job.

**EBN: From when you first started until now supporting Industry 4.0 companies, are there any success stories you would like to share?**

Industry 4.0 companies' pathway is not easy. It needs more time and resources than traditional companies, so they need a bigger effort from the EU|BIC community. As a takeaway from our experience, we see that finding interesting collaborations is a must in many Industry 4.0 projects doubled by an important amount of patience. Also, access to finance could be challenging and fitting in public financing programmes.

One of our Industry 4.0 companies, with whom we have a close relationship and who is active in our onsite facilities, is **Eyesynth**. Eyesynth brings the most powerful assistive technology for totally and partially blind people. It consists of a pair of smart glasses connected to a micro-computer that converts surrounding 3D space into intuitive sounds. The system records the surrounding environment in three dimensions and subsequently, the collected data is converted into understandable audio for the blind. The glasses send images to the micro-computer which processes them in real-time, so the user receives instant feedback. The environment is captured and processed in full 3D. This means Eyesynth product provides depth information as well. Uniquely, it converts all information into a series of sounds that interprets open spaces, shapes and obstacles.



## **MARKETS LACK SUFFICIENT SUPPORT FOR POTENTIALLY DISRUPTIVE TECH START-UPS. THIS IS WHERE EU|BICS STEP IN.**

An interview with **Dr Anna Torz**, International Cooperation Officer, EU|BIC Poznan Science and Technology Park (PL)

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”Our track record in disruptive technology programmes allowed us to grow our business support capacity, from science-based projects to scale-up companies.”

**Without support from EU|BICs the market will not provide sufficient offers to Industry 4.0 disruptive technologies. Startups working with potentially disruptive technologies are too early, and too risky to be interesting for investors. The main challenge in supporting this kind of venture is how to finance the development of the technology and who can afford to invest money that might be simply burned. It is important to understand that disruptive technologies usually require more time and development processes are more time consuming and cannot be easily accelerated just with more people or other resources. The client is either not always known, or the first target group turned out not to be the main customer.**

**With our current initiatives focused on supporting disruptive technologies, we entered a whole new level. We used to work with science-based projects. But our offer was addressed to early-stage projects. With the [ScaleUp Champions](#) and our Digital Innovation Hub (DIH), we understand better the specifics and complexity of working with disruptive technology companies. Moreover, we were able to test new approaches, processes and services and tailor them better to the (previously assessed) needs of deep-techs.**

EBN: How do you support innovative companies in their process of digitalisation? Which are your flagship initiatives programmes?

[Poznan Science and Technology Park](#) has two flagship projects – [ScaleUp Champions](#) and Digital Innovation Hub, DIH4Future.

[ScaleUp Champions](#) is an initiative that aims to scale up innovative businesses across the EU and help start-ups to achieve market success. Following the support of the European Commission, Scale-up Champions aims to connect different European disruptive technologies startup ecosystems and support cross-border activities to standardize the growth routes in Europe.

“One of the main innovations of the project is to standardize the growth routes and scalability of startups throughout Europe.”

It builds on the premise of equalising opportunities for scaling up for start-ups across Europe and connects less and more developed startup ecosystems.

We seek to:

- Increase the connectedness among members of disruptive technologies start-up ecosystems and their companies (start-ups and scale-ups) and to the larger European business ecosystem seeking maximum synergies.
- Increase access to customers, private and public, access to qualified employees, and access to the right combination of finance and prospects for scaling up across borders.

- Stimulate European investments in disruptive technologies digital sectors by increasing the number of cross-border investments.

One of the main innovations of the project is to standardize the growth routes and scalability of startups throughout Europe. And to get this, five European science and technology parks are working together on a single and unique cross-border acceleration program. Together we are fostering collaboration between all five ecosystems and their agents: startups, mentors, experts, companies and investors.

EBN: Which steps do you consider are the most important for an EU|BIC in structuring the process of digital transformation and supporting disruptive technologies adoption for companies?

**Partnership: technological partners** – that can help to develop technology, especially when disruptive technologies startups do not have enough funds to move forward with R&D; business partners – especially those, who can validate MVP and give feedback that will allow them to pivot swiftly, avoiding burning more money; institutional – to multiply access to business and technological partners

**Finance: access to investors** that are deeply interested in particular technologies, industry focus funds, Business Angels etc. and their investment policy allows /accepts investing into high-risk technologies, that understand specifics of developing deep tech business ideas and technologies.

EBN: What is the impact of your current digital transformation activities on your EU|BIC companies & ecosystem?

Our activities allowed us to work with new types of partners – industrial, corporates, international investors and mentors. We also joined forces with other ecosystem players (other science parks, universities) and engage already scaled graduated companies.

Our clients were given access to new services, especially the Investment Readiness Programme, where the assessment of fields of development was followed by opportunities of solving problems with the support of a wide network of international experts and mentors.

Companies were also allowed to pitch technologies to international investors, and as a result, they attract cross-border investments.

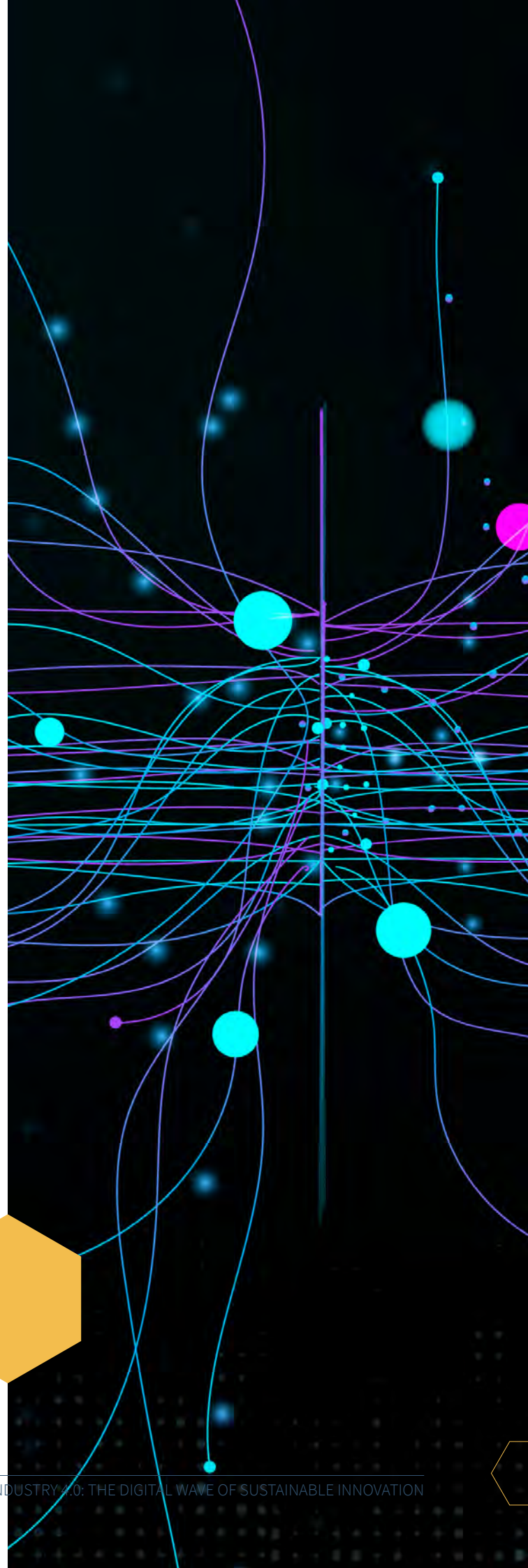
EBN: From when you first started supporting potentially disruptive technology companies until now, which success stories & best practices can you share?

**Investment Readiness Programme Methodology:** The Investment-Readiness Programmes consists of a set of training activities and networking events for a batch of pre-selected startups working in deep tech with two main objectives:

- To increase the fundraising capacity of the startups participating by providing them with tools and training.
- To connect entrepreneurs, corporates, mentors and investors to build sustainable partnerships and create new market opportunities.

**Startup Corporates Collaboration Methodology:** Corporate Collaboration Programme starts with a set of challenges put forward by corporates, followed by a call for startups to develop disruptive technologies that could provide solutions to overcome them. We carry out a selection of the best proposals and connect both types of entities to facilitate collaboration through an easy, agile guided proven methodology.

**Online Market Discovery Programme:** connects startups across Europe with local tech hubs to create new relevant contacts for new market discovery and expansion. Without the need for physical travel, startups get online support from local mentors and take part in workshops led by some of the big names in the international deep-tech scene. Moreover, thanks to the founder-to-founder learning, startups will be introduced to like-minded entrepreneurs, allowing them to inspire each other, and share their experiences and know-how.





# EU Digital Decade: Digital Innovation Hubs and Digitalisation Funding



“The European way to a digitalised economy and society is about solidarity, prosperity, and sustainability, anchored in the empowerment of its citizens and businesses, ensuring the security and resilience of its digital ecosystem and supply chains.”

– European Commission.<sup>4</sup>

If the past few years of the pandemic have highlighted the digital European environment is that our society is dependent on a few big tech companies and technologies, often non-EU based. Europe also witnesses a rise in cyber theft and a digital divide between those who can benefit from the well-defined digital environment in well-connected urban areas and those who suffer from misinformation and lack of digital coherence – often in more rural areas. This division also translates into businesses—as **some are fully able to leverage digital technologies, whilst others are lagging**. Therefore, as the recent pandemic uncovered the digital shortage of the European economy, it is highly relevant to ensure all businesses and people across Europe can properly adapt and digitally transform to improve their lives – and hence, the European economy. One of the key lessons brought by this crisis is that **proper digital infrastructures can open new opportunities to connect and learn beyond borders – allowing both individuals and businesses to grow** in the right direction.

<sup>4</sup> 2030 Digital Compass: the European way for the Digital Decade, EU Commission, 2021.  
Source: <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52021DC0118>



“...smart use of data can be a powerful lever to drive growth, create new jobs and open up new business models and innovation opportunities.”

The European Commission has proposed a Digital Compass, specifying concrete objectives to translate the EU's digital ambitions for 2030. Such objectives will follow EU's intent to set up a sustainable growth pace for digital transition – as well as the implementation of best digital principles.

In the case of business transformation, the EU support through the Single Market, Digital Europe and Cohesion programmes aims at incentivizing rapid and broad digital adoption, as well as the creation of important industrial ecosystems. In sum, “For Europe's Digital Decade to be successful, we will build strong international digital partnerships matching the four pillars of our Compass: skills, infrastructures, the transformation of business and public services.” – European Commission.

#### **Digital transformation for business and industries: EU Digital Innovation Hubs**

The European Commission defends digital transformation as essential for Europe to remain competitive in the international economic context. There should be high development on cutting-edge and disruptive innovation via the creation of new businesses, as well as full integration of digital technologies into business processes, products and services: “In particular, the **smart use of data can be a powerful lever to drive growth, create new jobs and open up new business models and innovation opportunities.**” – European Commission.<sup>5</sup>

There is space for the development of growing Startups and the production of unicorns in Europe. Even though Europe is already creating as many Startups as the US (as of 2021), it must create more favourable conditions for investment in financing new businesses – as there is a financing gap between European investment and the US or even China's investment in innovative companies.

With the highest representation amongst EU companies, SMEs are critical in the digital transition. However, only 20% of SMEs in the EU are greatly digitised. As such, the **EU is investing in Digital Innovation Hubs** and industrial clusters as a way to support SMEs accessing digital technologies and data, via proper regulation and support for sustainable digitalisation. The main objective of the Digital Innovation Hubs is to achieve high levels of digital intensity, leaving “no one behind”. The 2030 objectives set out by the Commission are ambitious:

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5 European Digital Innovation Hubs in Digital Europe Programme, EU commission, 2021. Source: <https://digital-strategy.ec.europa.eu/en/activities/edihs>

- 75% of European enterprises have taken up cloud computing services, big data and Artificial Intelligence.
- More than 90% of European SMEs reach at least a basic level of digital intensity.
- Europe will grow the pipeline of its innovative scale-ups and improve its access to finance, leading to doubling the number of unicorns in Europe.

“A European Digital Innovation Hub (EDIH) is a single organisation or a coordinated group of organisations with complementary expertise, with a not-for-profit objective that supports companies – especially SMEs and mid-caps – and/or the public sector in their digital transformation. The **Digital Europe Programme will focus on capacity building for five “Specific Objectives”**:

- **high-performance computing (HPC); artificial intelligence (AI); cybersecurity; related advanced digital skills; and digital solutions/interoperability for the public sector.**

EDIHs aim to help SMEs expand into different markets and connect with other companies – leveraging on supply chain cooperation, creating new business opportunities for companies or helping them to commercialise innovation pilots.

## AITAKES, Application Software Publishing Start-Up

**Founded in France in 2018, AITAKES soon won the prestigious Occitanie Invest award (2021) and has ever since expanded its reach to international markets, such as the UK, Canada and Belgium.**

Mistakes create and develop SVOD platforms (subscription video-on-demand platforms), as is already the case in niche sectors, such as hunting and fishing, extreme sports, or entertainment. The start-up is aimed at advertisers who own video content and want to monetize it through their platform.

## Role of EU|BIC Plein Sud Enterprises

“EU|BIC Plein Sud Enterprises positions itself as an external structuring and facilitating body for our client companies. Together, we determine a strategic roadmap with milestones, in which everyone has a clear role. The relationship of trust, regular exchanges and our joint reflection are the keys to success,” analyses [Anne-Sophie Vallade](#), Director at [EU|BIC Plein Sud Enterprises](#).

In the case of AITAKES, our advice on the development and fundraising strategies, supported by our networking capabilities, have been effective – from strategic advice to change of scale and financial records engineering.



## **DIGITAL TRANSFORMATION REQUIRES CONTINUOUS SKILLS-BUILDING FOR EU|BIC STAFF AND CONSULTANTS**

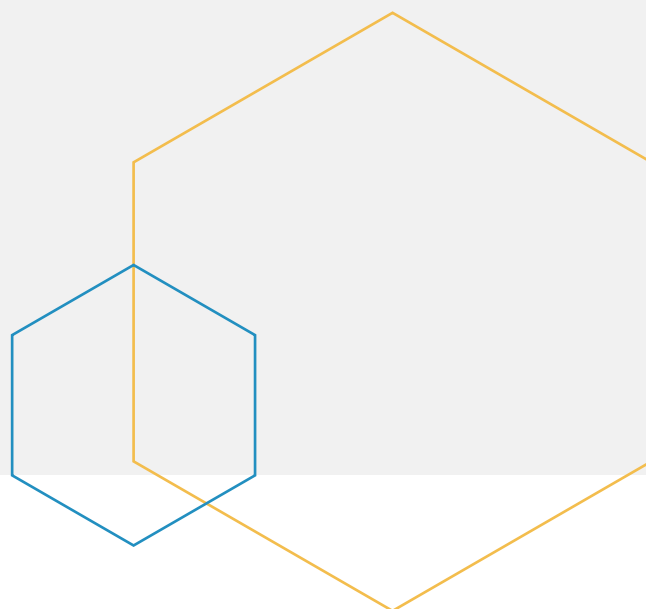
Author: **Alvaro Simon de Blas**, CEO, EU|BIC Euronova

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“Since 2018, we have established an EU|BIC Euronova Company Hall of Fame, with more than 12 companies nowadays, each one has created more than 100 highly-qualified jobs, set up an industrial manufacturing plant or has reached an international presence.”

At [EU|BIC Euronova](#) we currently have 41 incubated companies, 65% of which could be considered in the area of expertise related to Industry 4.0. As a recognition, since 2018, we have established an EU|BIC Euronova Company Hall of Fame, with more than 12 companies nowadays, each one has created more than 100 highly-qualified jobs, set up an industrial manufacturing plant or has reached an international presence.





To keep up with the changes that lay ahead, our vision at **EU|BIC Euronova strongly acknowledges the importance of continuous training for our consultants.** To keep up to date with the different changes that might be faced in their jobs and the **upcoming needs brought by companies working in or with Industry 4.0 technologies.** Our consultants have a direct connection with the companies so that they can understand the needs, tutor, and mentor them at best in the development paths the companies must take. These processes are carried out while the company is in the EU|BIC and are much more recurrent in the early stages of start-ups. Finally, the BIC Euronova business support team is prepared to be able to advise the companies commercially, helping and accompanying the companies in their communication through different business networks available within the EU|BIC, as well as offering and advising them in identifying public and private funding.

### **Vision on rapid technological change and support to innovative companies in digitalisation processes**

The year 2022 will be a disruptive year for information technologies and digitalisation. And, more than ever since the 1990s with the Third Industrial or Computer Revolution, ICT will have a positive impact on the economy, business, society, customs, habits, behaviours, norms, and laws. It will happen in the West (Europe, USA) in one way and the East (Asia, China) in a different way.

### **Key business support steps**

From our point of view, while bearing in mind that the initiative has to start from a very initial phase, we acknowledge four main steps:

1. Virtual incubation, in which the company begins contacting the EU|BIC, grasping and starting to understand its working methodology and installing itself in the innovation ecosystem that surrounds it.
2. Training and advice on the development of the company begins, together with EU|BIC consultants, intending to start the growth and development of the company.
3. We could consider the physical installation in our incubator located in Malaga Techpark, to have more direct and close contact with the company, and to continue with the advice.
4. Finally, it would be the incorporation into our commercial networks and identification financing.

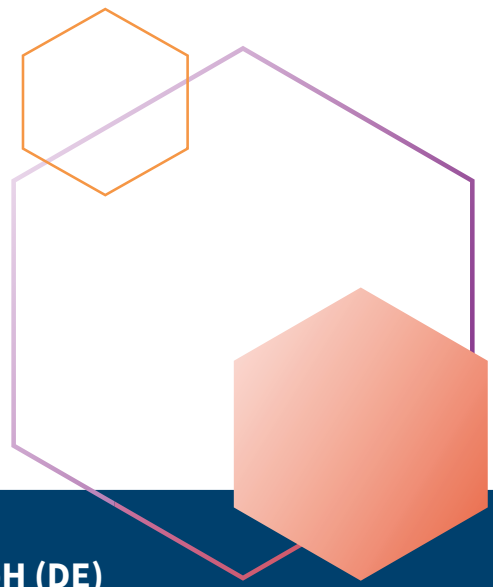
## Success stories

[DHV Technologies](#) is a company dedicated to the development of solar power units for low orbit satellites. They joined EU|BIC Euronova at a very early stage with very few employees, and now count more than 60 employees and over 100 successful projects.

Another success story is about [ANSOTEC](#). It is a company dedicated to Industry 4.0 using engineering and industrial control methods to optimise clients' production processes, making them more profitable and offering them sustainable long-term competitive advantages through their complete service package. [ANSOTEC](#) is currently located in the EU|BIC Euronova incubator.

Finally, I would like to highlight that the main lesson learnt while working with Industry 4.0 companies is that there is not always an exact model for business support. Rather it is a tailored one for each company, as it depends to a large extent on the company sector, the company's capacity, motivation of the employees, and the initial state of both the company and the sector.





## Best Practice by EU|BIC Associate bwcon GmbH (DE)

bwcon GmbH is a service provider offering **support to companies in the digital transformation process by managing ideas, designing new business models, stimulating matchmaking and open innovation and making innovation processes more flexible**. One of the services of bwcon GmbH is the development of methodological knowledge, which is necessary to initiate the digital transformation process. This includes the moderation of innovation processes and the subsequent consultation on business process development including financing, access to a new market, customers and investment. To support this, bwcon GmbH is actively involved in regional and cross-regional initiatives around the green and digital transformation, DIH and international business accelerator services and the matchmaking process.

Key flagships initiatives are the Mind4Machine and ReStartSME projects which facilitate cross-border and cross-sector collaboration and provide direct support for entrepreneurship and innovation in the field of smart ICT technologies for manufacturing and Industry 5.0, in particular for the entire digitalisation value chain, from IoT (hardware, software, services and connectivity) to Big Data, cloud computing, artificial intelligence, blockchain and cybersecurity technologies.

## LEITEK, innovative consultant for high-tech product engineering (PT)

**Winner of EU|BIC DNA Cascais' Business Ideas Contest, LEITEK dedicates itself to engineering consulting, commerce, and development of solutions for leading-edge and high-tech products with high potential growth for private and governmental customers. The company focus its business on the following main areas: Forest Surveillance and Early Wildland Fire Detection, Unmanned Aircraft Systems and Advanced Air Mobility, and Security and Defense and Drone Mapping Services applied to agriculture, forestry, and topography.**

Founded in 2016, LEITEK was awarded several contracts by governmental authorities from 2018 onwards. In the summer of 2018, LEITEK sold its first drone solution developed in-house called Dronesavior® for maritime rescue close to the shore and civil protection. The Dronesavior project was awarded the first prize of the DNA CINC Award. In 2019, LEITEK started drone aerial survey services, especially for the precise agricultural and forestry sectors, namely multispectral imagery analysis and image processing. In 2020, LEITEK expanded its business to Greece and Spanish markets. In June 2020, LEITEK installed an Early Detection System in the city of Athens (Mount of Granikos).

Presently, LEITEK is about to launch mid-2022 its SafeForest® system, a Smoke/Fire and multi-class detection-based system based on AI detection edge computing which is believed to be the first in the world with those characteristics to protect wildland from fire threats, with programmed security routines to detect several classes of objects. The SafeForest processing and control hardware and software, as well as the Advanced AI algorithms for smoke and target detection, are all developed in house.



### Role of EU|BIC DNA Cascais

DNA Cascais allowed LIETEK to get funding to hire human resources and invest in the acquisition of a VTOL drone and a LIDAR system for use in aerial surveys. DNA Cascais has also accompanied in person some Leitek initiatives with other institutional entities. One of these cases was a demonstration of Leitek's early fire detection system at the Forest Fire Studies Laboratory. What kinds of initiatives are important to develop networking with the strategic partners of supported companies, as well get valuable content to promote them on social media. In addition, Leitek was invited several times to DNA Cascais entrepreneurship panels, to talk about its project and its innovative solutions.

During the pandemic, DNA Cascais exempted companies with incubation services from paying the rent amount, a measure that also covered Leitek, and which was a considerable help, lowering its fixed costs, in a complicated phase of for instance reduced sales.

“Although DNA Cascais, in its genesis, is a sector agnostic incubator, entrepreneurial projects such as Leitek and others supported by DNA Cascais drive us to design and develop a cluster in technology and engineering, with a strong innovation component. Synergies are being created with another company supported and belonging to the entrepreneurial ecosystem of DNA Cascais, - [Optimal Structural Solutions](#) - making it possible to have a specific space for incubation with approximately 1000 square meters of technology-based companies, also with specific spaces for R&D. This fact will make it possible to attract and retain more technology-based companies to our municipality, that can benefit from the creative and technological capital of companies such as Leitek and Optimal,” reflects Pedro Lourenco, Project Manager at DNA Cascais.





## FUNDINGBOX: AN ONLINE PLATFORM WITH FUNDING OPPORTUNITIES AND 46K DEEP TECH COMMUNITIES

An interview with **Mayte Carracedo**, Chief of Development and Partnerships Officer at EU|BIC Associate FundingBox

The rapid technological change has set a series of challenges for the innovation capacity of the industry. SMEs in particular struggle not to be left behind in a fast-paced international context. At FundingBox, we have understood that technology is the key enabler to fostering a company's growth at two different levels according to its needs: from basic digitalisation to leveraging its know-how and skills, towards reliable business. This is aligned with the European Commission views described in its large-scale innovation programmes, from the previous period (2014-2020) to this one (2021-2027) and leading to EU 2030 objectives.

Within this context, the **Financial Support to Third Parties mechanism (FSTP), also known as Cascade Funding**, is an extremely valuable tool. Cascade funding works in the following way:

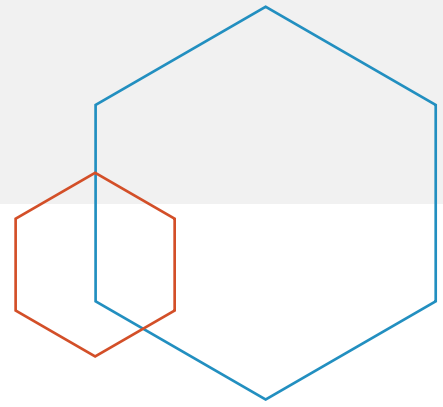
1. The European Commission sets a technological scope (e.g. industrial collaborative robots or smart mobility) to champion and invests in.
2. Then, next-generation intermediaries, public and private, appear on stage. They are in charge of discovering European innovators, screening them and, as FundingBox does, finally handpicking the most promising ones who will then be receiving funding.

Such a process follows four main criteria established by the European Commission: transparency, fair treatment, no conflicts of interest and confidentiality. FundingBox is today one of the biggest distributors of cascade

funding in Europe, with a total of 83M€ distributed until now through 104 open calls and 82,5M€ to be distributed in the next few years.

The **first level of our activity when managing cascade funding is focused on the digitalisation of SMEs, by creating awareness and fostering technology uptake through funding and mentoring schemes**. A good example of projects using this approach is those from the [I4MS initiative](#), the flagship European Commission initiative to support the manufacturing industry in its digital transformation journey. Here, FundingBox helps manufacturers with the distribution of cascade funding and the enrolment in tailor-made support programmes that allow them to “test before invest”. This means that they have the opportunity to experiment with digital solutions that are developed by European excellent competence centres and see whether they see any process improvement (productivity gain, better product quality, more sustainability, etc.).

The second level of Cascade Funding programmes is focused on giving **access to an open innovation system**, where startups, scaleups, and SMEs can leverage their technical know-how to go to market successfully and feed a deep tech ecosystem eager to be aware of the most recent technology advances for potential technology transfer and implementation. The projects that FundingBox manages demonstrate these innovation capabilities in various technological fields such as Artificial Intelligence (AI), Blockchain, Robotics, IoT or advanced manufacturing.



### Why are DIHs important in the process of digitalisation?

As the business world turns more and more digital, access to technology defines the success of an enterprise. Yet, for many small and medium enterprises (SMEs), the path to these much-needed solutions can be full of obstacles.

SMEs at the beginning of their digitalisation process find it hard to grasp how all of these opportunities can ease and accelerate their transformation. Fortunately, a network of European Digital Innovation Hubs (EDIHs) is under construction to connect European SMEs with the technological solutions they require for their growth. DIHs and EDIHs support companies, especially SMEs but also the public sector in their digital transformation process, working at a local level while they should be also connected at a European level. They act as the orchestrators that can connect those companies with all these opportunities for digitalization.

For this reason, FundingBox has always strived to maintain a special relationship with DIHs from all around Europe, as they represent a very valuable partner to put us in contact with the type of end-users we are looking for. Projects like [PhotonHub Europe](#), [BOWI](#), [DIH<sup>2</sup>](#) or [AEDIBNET](#) (including EBN as a project partner) are examples of networks that support SMEs through DIHs in specific technologies (photonics, robotics, etc.) and places (Europe, Africa).

The way we connect with those DIHs is also being made through one of our online tech communities: [DIHNET](#). Within this community, DIHs can connect and network with other European Digital Innovation Hubs to offer the best services to their customers. The DIHNET Community is now home to 1600 stakeholders from all over Europe helping companies in their digital transformation. The goal for the community is clear: become the central information and collaboration point for the Digital Innovation Hubs ecosystem in Europe. In the past three years, the community has transferred knowledge to Digital Innovation Hubs and other stakeholders in topics such as IoT, Digital Manufacturing, Artificial Intelligence and much more and established connections through webinars and events, as still available for spreading news and events of interest for DIHs.

**About FundingBox Communities** is an online platform for networking, mentorship and ideas exchange for key players in the areas of interest. This ecosystem is a one-stop-shop space for accessing information, stakeholders and collaboration opportunities, such as Expressions of Interest, Open calls and others, as the main support element for our projects. Our platform is made of a constellation of 46K deep tech communities on topics such as IoT, Robotics, AI, Blockchain, Circular Economy, Mobility, Next Generation Internet, Industry 4.0, EU partner search, funding opportunities, events, relevant news and much more.

## BOOSTING REGIONAL ATTRACTIVENESS AND ECONOMIC SUSTAINABILITY BY SUPPORTING THE DIGITAL TRANSFORMATION OF SMES

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Together with EU|BICs [Angers Technopole](#) and [Laval Mayenne Technopole](#), [Atlanpole](#) coordinates a Regional and European Digital Innovation Hub called DIVA for the Pays de Loire region, France. The DIH's ambition is to democratise the use of AI, data and robotics, and to support companies in increasing their competencies in the use of digital technologies by offering them a personalised support programme adapted to their needs

[EU|BIC Atlanpole](#) is a key driver of cross-sectoral innovation development, offering innovative startups and PMEs custom coaching for periods of 6 months up to 5 years, helping them turn an idea into an opportunity, to launch and scale up a business.

Atlanpole coordinates EDIH DIVA which **aims at supporting the digital transformation of SMEs**. It consists of a one-stop shop that provides **services for the implementation of green and human-centred Artificial Intelligence, data and robotics within companies and public administrations**. It addresses as a priority traditional SMEs implementing advanced digital technologies to meet the needs of Agriculture, agro-food, Energy, Health, Mobility, Aeronautics, Shipbuilding, Sailing, Vehicles, Tourism, as well as start-ups that design digital products and services. DIVA pursues a human-centric, ethical approach to accelerating the best use of technologies and adoption of trustworthy AI according to the values of the European Union.

The DIVA consortium brings together 11 partners – among them EU|BICs [Angers Technopole](#) and [Laval Mayenne Technopole](#) - from the regional ecosystem: technical centres and technology platforms, training

& research bodies, and competitiveness clusters. They will offer internal services (mutualized by consortium members), as well as a list of external services, to tackle the obstacles encountered when integrating AI and robotics into user activities, such as cost, lack of technical support and internal skills.

DIVA will collaborate with the Digital Transformation Accelerator network, in addition to facilitating its own complementary EDIH network. Thus, integrated into a larger network of EDIHs, DIVA aims at:

- Implementing AI and digital transformation projects that ensure an ethical and environmental impact
- Identifying technologies and tools that are adapted to the needs of the companies
- Finding the right providers and the best funding opportunities

Over the next three years, DIVA aims at raising awareness among 3,000 organisations, carrying out 480 digital maturity diagnoses and supporting 150 companies with “Test Before Invest” activities, including 50 experiments. The EDIH DIVA budget amounts to €5.9 million for a 36-month duration, representing 839 PM

EDIH DIVA's ambition is, firstly, to democratise the use of AI, data and robotics, and secondly, to support companies in increasing their competencies in the use of digital technologies by offering them a personalised support programme adapted to their needs.

The services offered by DIVA will take the form of a **tailor-made “data-oriented” support program, from awareness-raising, the study of digital maturity and transformation levers**, through to the implementation and monitoring of the transformation plan, including the four main types of services grouped in **Test Before Invest; Access to Finance; Skills & Training; and Ecosystem & Networking**, with an awareness-raising and prospecting phase.

## EU|BIC JIC AND INTEMAC (CZ) ASSURE DIGITALISATION WITH UP-TAKE OF INDUSTRY 4.0 TECHNOLOGIES UP-TAKE VIA DIH DIGIMAT

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DIGIMAT is a consulting programme designed for SME manufacturing companies based or established in the Czech Republic. By participating in the programme, companies will gain the latest knowledge in the field of manufacturing and digital technology. At the same time, they will gain experience from specialists or companies who are more advanced at implementing digitization.

This consulting programme is one of the activities of the DIH DIGIMAT platform, which is devoted to developing and implementing digital technologies in manufacturing companies. The DIH DIGIMAT platform comprises Brno University of Technology, INTEMAC, and EU|BIC JIC.

Digitalisation team members always work with the company individually on its specific project. Companies can join the DIGIMAT programme repeatedly. Individual projects are broken down into the following steps:

- Initial analysis of the company – opportunities to improve manufacturing
- The proposed solution – solution proposal compiled by experts
- The recommendation of the implementation procedure
- The recommendation of possible sources of funding

The DIGIMAT programme cooperates with specialists and technology companies in the role of programme partners to achieve maximum expertise during each of the above project steps.

### **DIGIMAT programme case study: Packung**

Company Packung from Horní Věstonice in Southern Moravia Region in the Czech Republic is specialized in packaging. Their focus is on the “box on demand” service. Thanks to the cooperation with DIGIMAT programme, they can deliver the paper box to the customer within 48 hours from the order placement. From batch size one. They are the only company in the Czech Republic providing such a service.

The service is called Box48.cz. Previously, Packung employees had to copy all the order information from their e-shop to the production system manually. The whole process was slow. There was no order tracking, generating a production order or tracking of raw materials needed for production. Packung needed to make an automatic connection between their e-shop and the production system to make the process efficient.

The company chose INTEMAC with DIGIMAT programme as a partner for choosing a system suitable to their needs. The next step after the initial analysis of the company was specifying the configuration of the ERP system and requirements for the system’s provider. Disinterested experts have made the choice of the ERP for Packung easier by reducing the time spent on in-depth research of possible solutions.





## Maturity level growth and cultures of continuous improvement

**Petr Minář, Head of the Digitalization support team at Intemac Solutions** stresses that companies preparing for the adoption of the Industry 4.0/digital solutions need to have a sufficient process maturity level. Paired with a culture of continuous improvement stand at the start to achieving the promised benefits of digitalisation. The key processes around the fulfilment of the business cycle need to have the necessary performance level and should be closely followed by respective staff members. Any deficiencies will lead to process re-engineering. Failure to solidify the process might yield to their premature digitalization, meaning that deficient processes, although digitalized, are unlikely to be followed by the employees.

Although it is a soft attribute, the company culture underlines both process optimization and digitalization by embracing the use of both initiatives. The top-down approach for pursuing digitalization might fail due to a lack of ownership of regular employees. Reciprocally, the regular employees have to feel empowered to introduce the changes they deem as beneficial for the bottom-up approach. Data have demonstrated the companies significantly benefited from implementing digitalization and the Industry 4.0 concept. Increase in productivity, availability of manufacturing assets so as the quality yield, have grown up. The plants have increased the throughput for the same theoretical plant capacity.

At the same time, we see great variety in the level of Industry 4.0 and digitalization concepts adoption among industries. Starting with actual awareness and resulting adoption of the Industry 4.0 and digitalization concepts, “some of the industrial segments have benefited from overall trend more than another. For the automotive industry, for example, the Original Equipment Manufacturer (OEM) has helped to disseminate these concepts through the supply chains where the lower Tiers follow the higher echelons. The digital skills, as well as actual Industry 4.0 and digital solutions adoption rate, have followed the suit. Some of the other segments are lagging, such as the production of goods for the construction sector, with relatively low levels of both awareness and adoption”

Large corporations typically possess the required resources, both capital and human, to systematically pursue the Industry 4.0 and digitalization paths. DIHs have been instrumental in closing the gaps, between the sectors and companies, with particular impact on SMEs, and the technologically less advanced sectors. Vendor-independent, the trusted environment was formed to increase awareness of not only actual solutions but also how they benefit the SMEs' operations.

## EU|BIC FUNDECYT-PCTEX: PROMOTING THE DIGITAL TRANSFORMATION OF THE BUSINESS FABRIC OF THE EXTREMADURA REGION (ES)

**EU|BIC FUNDECYT-PCTEX (CEEI Extremadura)** proactively supports the science, technology and Innovation ecosystem of Extremadura with a focus on new trends and strategies that are being developed in Europe with particular attention to SMEs, and entrepreneurs. Currently, the PCTEX houses more than 100 technology-based companies in its facilities in Cáceres and Badajoz, with more than 1,600 workers in total.

The PCTEX is also responsible for the Digital Agenda for Extremadura, and its elaboration at a technical level. A crucial part of our current work is represented by the Extremadura Digital Innovation Hub (DIH) - Tech4E, a new tool to promote the digital transformation of the business fabric of the region. The **DIH of Extremadura Tech4E is structured around four strands: energy efficiency, ecology and environment, equality, and economy.** This hub is open to companies and institutions, and it can offer infrastructures, digital tools, technological products or training activities as assets that can be included in the resources of regional institutions and companies.

The **objective is to have as many actors as possible working with a common methodology and catalogue** including all the assets that exist in the digital ecosystem of Extremadura to promote the digitization of the economy. As contemplated in the **Research and**

**Innovation Strategy for Intelligent Specialization (RIS3)** in Extremadura and in 'Extremadura 2030 Green and Circular Economy, specialisation in technologies related to the efficiency in the use of resources contributes to **improving the quality of life of citizens and the competitiveness of companies, while caring for environmental sustainability and helping to change the economic model**, all based on the resources and capabilities of the Extremadura System of Science, Technology and Innovation.

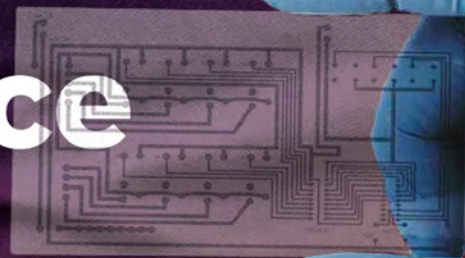
Tech4E's objectives include connecting the digitization needs of Extremadura SMEs and digital enablers to improve competitiveness, guarantee knowledge and the development of digital skills, promote the creation of collaborative development environments and design a catalogue of digital assets.

Likewise, Extremadura's DIH aims to promote the **development of a range of enablers, innovate methodologies for the implementation of digitalisation and technological modernisation processes** in companies and connect with digital ecosystems and national and international networks, in addition to promoting actions for the start-up of the digital transformation of the industry in the community and contribute to attracting talent and initiatives in the digital field.



# Technical marketplace offering

Flexible and Wearable Electronics (FWE) products, prototypes and services



**SMARTEES – BOOSTING THE EU INDUSTRY’S COMPETITIVENESS BY FORGING COLLABORATIONS AROUND INNOVATIVE FLEXIBLE & WEARABLE ELECTRONICS SOLUTIONS**

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“SmartEEs aims to establish a sustainable EU-wide network in the field of Flexible & Wearable Electronics (FWE). The objective of the project is to help European Industries accelerate their digital transition, offering them easy access to Flexible & Wearable Electronics technologies, products, and services throughout Europe”

- Jérôme Gavillet, Coordinator, DIH SmartEEs2



## SME and Mid-Cap beneficiaries

An Open Call was launched to support European SME and Mid-Cap companies in experimenting with FWE technologies through Application Experiments (AEs) lasting 9-12 months — a test before investment experience to promote the uptake of FWE technologies and their adoption by industrial actors. AEs1 were selected based on disruptive product ideas and business potential, for an average of 60k€ support per AE, supplied as a voucher.

## Sectors of application

Applicants were invited to submit their proposals in the areas of their choice, whether medical & health, textiles, sports, consumer electronics, packaging & logistics, safety & security, energy, or any other. The Open Call resulted in the evaluation, selection, contracting, execution, and delivery of 44 AEs during the 2021-22 period, for total funding of 2.84M€.

This comprehensive portfolio of digital AEs demonstrates the capability of the European FWE community to deliver unique and integrated innovation services to accelerate the digitization of various sectors of application. This is further evinced by the 44 ‘early adopter’ companies included.

## Boosting the efficiency & effectiveness of the European FWE innovation ecosystem

The core business of SmartEEs is to **boost the efficiency and effectiveness of the European FWE innovation ecosystem**, making the capacity for experimentation a means to an end. This will require the engagement of the largest number of follower companies, the so-called ‘early majority’. It is expected that the pioneering business exploration of early adopters will inspire this early majority, extending FWE adoption to more and new businesses and markets, thereby reaching critical momentum for substantial and long-term commercial and economic impacts.

In this respect, SmartEEs are entering a new period of marketing and outreach to companies throughout Europe - regardless of their technological maturity or sector of application - with a high potential for the digitization that FWE technologies could satisfy. Raising awareness of the absolute need for a digital transition of most businesses and the benefits FWE can bring, SmartEEs is engaging in the second round of test-before-invest opportunities, leveraging innovation services via the SmartEEs association this time.

## SmartEEs Marketplace

The SmartEEs team has developed a digital platform, with a Technical Marketplace showcasing a globally unique list of validated FWE products, prototypes and technical services. Currently, 160 of these services are made available, corresponding to the state-of-the-art applications in Organic Photovoltaics, Flexible Displays, OLED Lighting, Electronics & Components and Integrated Smart Systems.

The platform allows owners of these services to promote their capabilities inside a community and to connect with component & system suppliers, manufacturers, integrators, distributors and end-users. Besides, the platform integrates a Business Marketplace for complementary innovation services, including access to different educational materials (videos, trends reports, webinars, etc.) as well as an Organization Registry for the FWE community. Companies and organisations interested in promoting services and attracting more customers or value chain partners can freely register.

## SmartEEs European association

A legal entity has been created to sustain the action beyond the EU-funded project, which ends in December 2022. The European Flexible and Wearable Association was created and registered under Belgium law as an international non-profit association. It held its constituent meeting in June 2021, enacting its statutes and setting up its governance. The organization brings together Europe’s leading players in (FWE) based innovation services.

The association is end-user and application-driven proposing services on RDI & business development, access to finance, education & training, and guidance on electronics for a green and circular economy. The association is now open to serving its clients and welcoming new members across Europe.



Jérôme Gavillet is coordinating the Digital Innovation Hub (DIH) SmartEEs2 (2020-22), a European initiative promoting the adoption and transformation of Flexible & Wearable Electronics (FWE) into novel product, service and business cases SmartEEs2 is a follow-up project of SmartEEs (2018-20). SmartEEs major target groups are SMEs, start-ups and Midcaps, which can be ‘tech’ (innovative companies) or ‘non-tech’ (traditional industries) companies from any application fields such as Health & Medical, textiles, sports, packaging & logistics, transport and energy.

The SmartEEs2 project is funded by the European Union’s Horizon 2020 research and innovation programme under grant agreement No. 872076



## SMARTEES2 SUCCESS STORY: C.P. ALUART AND SMARTWORK-WEAR

### Innovative company description

C.P. Aluart is a company founded in 1992 to manufacture and innovate knitted technical fabrics and Personal Protective Equipment garments.

The constant research on new materials to meet the needs of a highly demanding market and the flexibility of our structure make C.P. Aluart one of the leading companies in the protection sector.

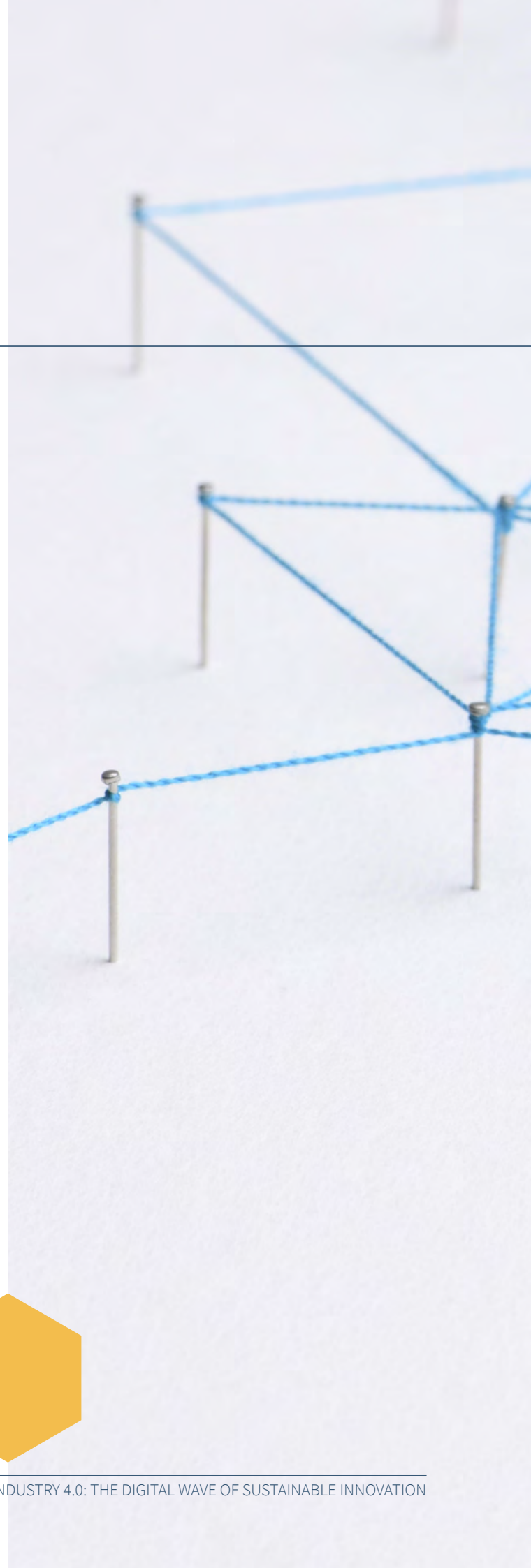
At C.P. Aluart we focus all our efforts and know-how to create new garments for the police and the military forces, the firefighting, sports sectors and workwear

### Application Experiment enabled by SmartEEs2

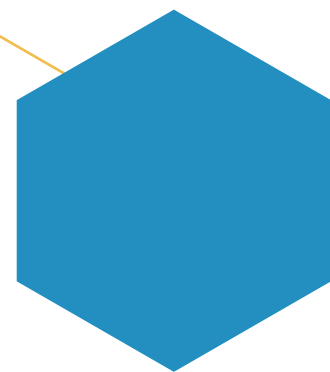
Harsh conditions, such as high temperature or moisture environments outdoor and industrial workers face, can accrue risks for workers causing fatigue or even heat strokes that can lead to accidents on duty. Heat exhaustion causes a significant economic loss of labour in sick days and healthcare costs.

The goal of the Application Experiment was to design and manufacture a smart workwear prototype using skin-contact garments (i.e. first layer t-shirt/polo for workers) that integrates a set of flexible sensors to assess the physiological strain index (PSI) connected with integrated wearable, washable, flexible conductor and with a raw data processing and visualization system for demonstration purposes. Moreover, the SMART-WORKWEAR project aimed to develop a comprehensive exploitation plan for commercialization and further scale-up investments.

C.P. Aluart has solved the problem with an active monitoring system embedded in the first layer of a comfortable garment to measure the physiological conditions in real-time. SMART-WORKWEAR products increase worker safety and reduce potential risks, enabling immediate action when a risk is detected.



# Conclusion



## THE FUTURE OF INDUSTRY 4.0

By: **Marcos Kauffman**, Director of the Institute for Advanced Manufacturing and Engineering (AME) at Coventry University

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We still have a long way to go to fully realise the value of Industry 4.0 which has many potential advantages for a business. Within the integrated value chains that Industry 4.0 encourages, IP is becoming a primary means for appropriating value and securing a return on your investment in innovation. As such, a tailored IP strategy is a cornerstone of your Industry 4.0 implementation. You can design it to account for differences between business areas and business models, generating a portfolio of IP assets, each with the necessary protection mechanisms and strategies for commercialization or sharing.

That IP is becoming increasingly important for manufacturers in collaborative settings is undisputed. It is leading to an alignment of manufacturing with other high-value Industries where technology development relies on complex collaboration and cross-licensing of IP rights. However, another challenge to manufacturers is that, particularly in the manufacturing value chain, the practices surrounding IP use and commercialization are somewhat immature and IP ownership can be seen as a drawback.

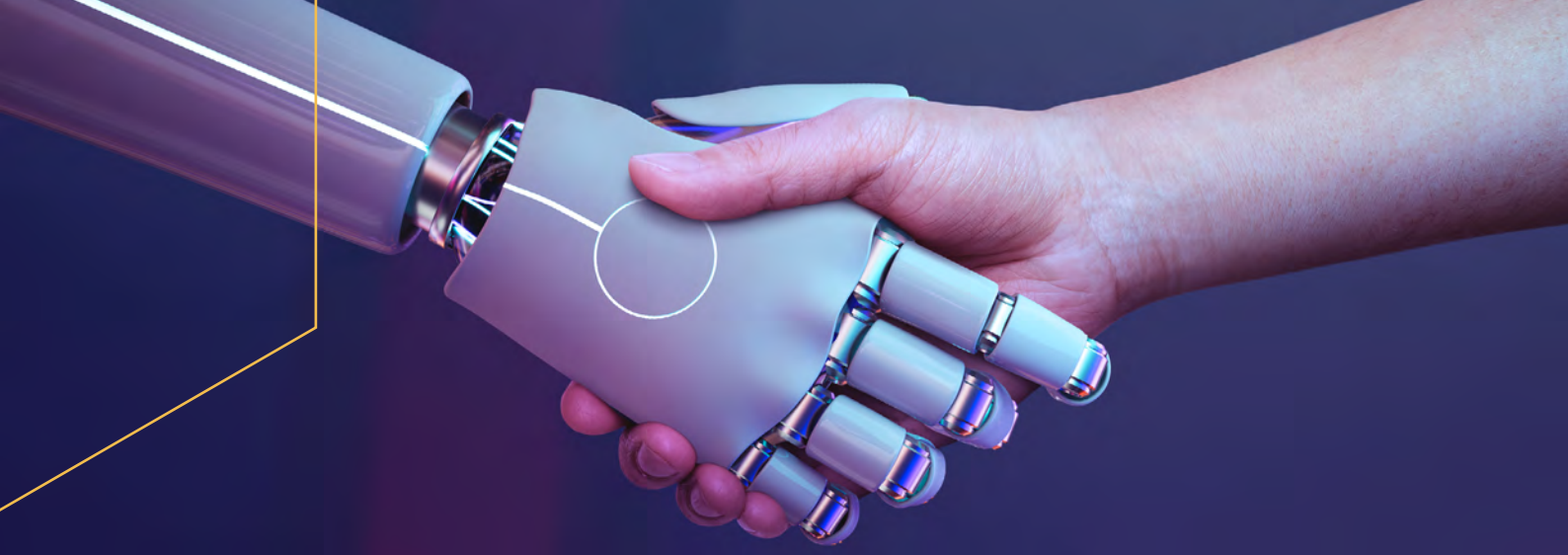
Recognizing the need for change and knowing when to take action is key. Often the symptoms show themselves long after the problem has taken hold: by the time an organization realizes a particular area or process is in trouble or, in this case, when your Industry 4.0 investment gives signs that there is little value to the business, the problems are already deeper than you think.

When this happens, improvement and transformation have to be made a priority. Figuring out what you need to do and where you need to be, can be one of the most difficult elements of transformation because it requires genuinely creative operational and commercial thinking, which can be a scarce resource.

Having a team prepared to take responsibility for implementing transformation is one thing, but never underestimate the importance of having a leader who knows what qualities are required, which ones they have and how to fill any gaps there might be.

The complexities of Industry 4.0 implementation across the value chain could mean that a change in one organization may have an impact on other businesses across the network. To succeed, your Industry 4.0 journey will have to be truly integrated and look at all parts as a whole, especially people and the commercial dynamics present in each area of the value chain.

Finally, change is normally slow and organic. Transformation, however, often involves getting five years of change done in six to twelve months, often leapfrogging a lot of the organic change. It is important to build this pace expectation into your Industry 4.0 journey and hopefully get your business on the right path to profit from Industry 4.0.



## TOWARDS INDUSTRY 5.0

By: **Mayte Carracedo**, Chief of Development and Partnerships Officer at FundingBox

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The path to Industry 4.0 has made the industry more resilient than ever. By way of illustration, the Covid-19 crisis demonstrated the survival capabilities of more digitalised companies. Digitalisation is also a driver of environmental sustainability as more digitalised processes offer better production monitoring possibilities for factories which in turn reduces a lot of the waste generated by these processes. Nevertheless, the rate of digitalisation in the manufacturing sector is slow, especially amongst SMEs (around 60% of EU manufacturing).

The European double transition, digital and green, establishes the next phase of industrialisation: Industry 5.0. The main objective of Industry 5.0 is to transition towards a more sustainable, human-centric and resilient European Industry. In short, digitalising the industry should serve both people and their environment. For instance, from a human-centric perspective, focus can be put on upskilling and reskilling workers while from a sustainability one, it can be put on a full life-cycle approach for industrial processes to make sure all environmental impacts are measured and taken into account. The development of AI and 6G technologies demonstrates well the importance of moving towards Industry 5.0 values, if many business opportunities arose, stakes related to cybersecurity and data protection emerged too.

Cascade funding will be a critical enabler here, as it was for the “Industry 4.0” approach. Digitalisation continues to be the way to go for companies, but the next step of capabilities, including AI tools and procedures within their processes, Big Data, IoT elements and cybersecurity-related issues.

The European Commission has launched a call to create a network of European DIHs to foster this evolution, with funding which will be employed to accelerate the digital maturity of SMEs. Besides this, Cascade funding will be an essential instrument needed as it will link technology partners (such as competence centres), facilitator agents for open innovation (such as FundingBox) with SMEs in need of digitalisation.

Industry 5.0 elements not only are a challenge from a technical implementation perspective, but they also require us to rethink training, collaboration (with machines), safety, and sustainability. In this sense, Cascade funding programmes allow us to generate new interdisciplinary solutions and ease their uptake.

And finally, Cascade Funding continues to be a fundamental instrument for innovators keen on deploying next-generation technologies. What about quantum technologies, increased cybersecurity, and interoperability of data spaces? Technology never stops evolving, companies will lead its market uptake to ensure our industrial and social evolution.

# Industry 4.0: The Digital Wave of Sustainable Innovation

Technical Note #10 – a guide for and by EU|BICs



Digital Innovation Hub (DIH) SmartEES2 (2020-22), a European initiative promoting the adoption and transformation of Flexible & Wearable Electronics (FWE) into novel product, service and business cases SmartEES2 is a follow-up project of SmartEES (2018-20).

The SmartEES2 project is funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 872076.



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