



# Case study on Digital Startups & Clusters, Austria

Case study contribution to the OECD TIP  
Digital and Open Innovation project

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**Case study on Digital Startups & Clusters, Austria: Case study contribution to the OECD TIP Digital and Open Innovation project**

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*Table of contents*

<b>Executive Summary .....</b>	<b>4</b>
<b>Introduction .....</b>	<b>6</b>
<b>1. Development of New Business Models.....</b>	<b>7</b>
<b>2. The Effect of Digital Transformation on Innovation Ecosystems.....</b>	<b>13</b>
<b>3. Policies and Activities to Improve Digital Transformation .....</b>	<b>19</b>
<b>4. Bibliography.....</b>	<b>28</b>

## Executive Summary

Digital technologies have a substantial disruptive potential and can fundamentally change market structures. They can alter the products and services of companies, methods of production, ways of cooperation with suppliers, interaction with customers and the organisation of companies. Above all, digitisation can enable new business models with which companies can open different strategies to create value and sustainably strengthen their market positions.

Cooperation between cluster companies and digitally-oriented startups can prompt considerable economic potential and opportunities for both parties. To identify these potentials and success factors at the interface, and to be able to initiate particular topics and implementation measures, the Federal Ministry for Digital and Economic Affairs (BMDW) commissioned a study on “Digital Startups and Clusters”. This report represents the basis of the following case study for TIP Digital and Open Innovation project of the OECD.

Digital technologies enable the development of new business models that can give specific competitive advantages and change existing market structures. Different options offer high potential in this context and include smart products and related business models, personalisation of products, leverage customer data, digital platforms, sharing economy, smart data solutions, cloud computing business models and business models particularly for mobile applications.

New digital business models are applicable in a variety of ways in the strong fields of Austrian clusters. In mechanical engineering, for example, there is a trend towards personalised production whereby the manufacturer develops a primary product to expand with customised (selectable) components. In the food industry, data can be provided via digital platforms not only for the retrieval of food but also for the provision of additional information on products, customers or other business partners. Significant drivers for new, data-driven business models in the automotive industry are the increase in networking of vehicles and customers and the widespread use of big data and smart data analyses.

In the era of digitisation, innovation ecosystems are changing and established companies are confronted with many different challenges, including internal modifications, the speed of transformation and the constant adaptations of customer needs and expectations. Innovation ecosystems are constructs that enable peers to build relationships amongst each other and reinforce innovative capabilities. Start-ups are critical drivers of innovation processes. Based on their specific characteristics (e.g. greater willingness to take risks, unconventional approaches), young companies can exhibit greater innovation activities than established corporations. Start-ups can also be a source of inspiration for established companies and their innovation activities.

An online survey was carried out as a part of the study "Digital Startups and Clusters" with cluster managers and representatives of the Austrian startup community to identify the potential and opportunities for new business models of digital startups and cooperation with the Austrian cluster companies.

More than half of cluster managers surveyed believe that the importance of startups for established companies will increase over the next five years.

From their point of view, cluster corporations can benefit in particular from cooperation with digital startups by getting access to new technologies, developing or improving products or services and the development of new business models.

Regarding digital technologies as the basis of new business models of startups, both the cluster and the startup communities are of the opinion that big data or smart data have the highest potential for this development. Mobile computing, robotics, augmented or virtual reality and the Internet of Things are also perceived to be important technologies for new business models. Smart products and related business models together with data-based services and the exploitation of customer data are crucial potential areas for cooperation between startups and cluster companies.

The main obstacles to collaboration between cluster companies and digital startups include the difficulties in making contact with each other and their different ways of working.

To address the topic of digitisation and the collaboration between startups and established companies, there are several policies and activities on both regional and national levels. The Austrian innovation and economic policies regard digitisation and start-ups as fields with high potentials for successful development in Austria.

## Introduction

Digitisation looks to be a current trend central to industrial and economic policy. Digital technologies have a substantial disruptive potential and can fundamentally change market structures. They can alter the products and services of companies, methods of production, ways of cooperation with suppliers, interaction with customers and the organisation of companies. Above all, digitisation can enable new business models with which companies can open different strategies to create value and sustainably strengthen their market position.

Often, though, digital technology is not one of the core competencies of corporations and many companies tend to implement them in collaboration with external specialists. In this sense, digitalisation has enormous market potential, notably for innovative start-ups that have the technological knowledge to offer expert solutions. However, market entry is not an easy task as, in particular, it is necessary to identify potential customers, anticipate their needs, and develop appropriate solutions.

Cluster initiatives form industry- or technology-specific platforms for companies, especially SMEs, and have established themselves as cooperation and innovation networks in Austria. Around 60 cluster initiatives with some 7,000-member companies are currently active in various fields in Austria. They represent the strength of Austria as an economic and innovation location, stimulate research and innovation projects and provide a supportive environment for young companies. All these clusters work through the activities of the National Cluster Platform of the Federal Ministry for Digitalisation and Business Location (BMDW).

Cooperation between cluster companies and digitally-oriented startups can prompt considerable economic potential and opportunities for both parties. To identify these potentials and success factors at the interface, and to be able to initiate particular topics and implementation measures, the BMDW commissioned a study on “Digital Startups and Clusters”. This report represents the basis of the following case study for TIP Digital and Open Innovation project of the OECD.

The recent analysis, “Digital Start-ups and Clusters”, focuses on the following issues. Firstly, the study gives an overview on essential digital technologies (e.g. big data, cloud computing, Internet of things, artificial intelligence, and augmented and virtual reality) and different application areas of digital technologies in companies. Secondly, the analysis gives an insight into digital business models in general and new business models in different cluster sectors. The central part of the study highlights how young digital companies can collaborate with mature cluster companies in various industry sectors (automotive, food, engineering, energy, and health). Further information was gathered by conducting an online survey to identify the potential of collaboration between start-ups and cluster companies in the context of digitalisation.

The following case study focuses on the results of this analysis. It addresses the development of new digital business models and the effects of digital transformation on innovation ecosystems in the context of established cluster corporations and digital startups, and examines the potential of collaboration between those two groups. Also considered is the role of public policies in Austria to enhance the digital transformation.



## 1. Development of New Business Models

### 1.1. New digital business models

Digital technologies enable the development of new business models that can give specific competitive advantages and change existing market structures. Four central questions or dimensions arise in the development of business models: Who are the customers? What is the customer offered? How is the service provided? How is the financial value achieved? If at least two of these dimensions change, a business model innovation takes place and, if these changes are based on the usage of digital technologies, a digital business model is developed.

Within the recent study, “Digital Start-ups and Clusters”, different topics that have a high potential for the development of new business models in the context of digitisation have been addressed. Summary of the topics is below.

#### Smart products and related business models

The combination of physical and digital components creates hybrid products or smart products that no longer have the classic value-added pattern, in which the sale of a product completes the value creation for the manufacturer. Hence, the manufacturer can offer the downstream customer services through the digital components in the product and thus a new or added benefit. For instance, during the use of a product or after its delivery, its performance can be increased or optimised, problems solved, and new functions installed via software updates or software upgrades. Mechanical engineers, for example, can offer various data-based services in addition to the delivered machine to support customers in their value-added activities.

There are lots of different revenue models suitable for smart products and related services. For example, pay-per-use models that do not sell the product itself, but the service used, and pay-per-function models in which specified functions of the product can be activated as needed. Other features include physical freemium and digital add-on models, where the physical product sells relatively cheaply, and the customer can purchase high-margin “premium services” (Bosch Internet of Things & Services Lab, 2014).

#### Personalisation of products

Digital technologies allow higher individualisation of products according to the particular requirements of the customer. Various principles are valid for this, such as Configure To Order (CTO), where the customer can configure the product according to his wishes, or Engineer To Order (ETO) processes, in which products are manufactured outside of pre-designed or standardised configurations. The personalisation of products can also be accomplished in the context of smart products through software rather than hardware (e.g. pay-per-function) (SAP, 2016).

During digitisation, mass customisation is repeatedly used as part of the personalisation of products. It is one of the core ideas of the Industry 4.0<sup>1</sup> initiative to customise the personalised product in mass production. For this purpose, the production must be made more flexible so that the order-specific configuration automatically passes through the production planning process to the machine control. The machine reconfigures itself to process the individual order. Also, 3D printing can represent a significant enabler technology within this context (Kaufmann, 2015).

#### Leverage customer data

In this business model, the multi-use of customer data generates revenue. The business model does not focus on the improvement or added functions of products but the direct exploitation of data resulting from the use of products or services. Data is collected, analysed and sold, or used by the company for market analysis. Data can be collected via the Internet or generated by smart products (Sensor as a Service) (Gassman, 2013).

#### Digital platforms

In the context of digitalisation, new business models are increasingly showing a transition from value chains to value creation networks. Such value networks are often built on digital platforms that allow a large number of companies to offer their products and services. Companies benefit from a provided infrastructure, as they do not have to build, maintain and develop one (Begleitforschung Mittelstand-Digital WIK GmbH, 2017).

Digital platforms orchestrate the exchange of services between two or more parties, so the value proposition of such platforms consists of bringing supply and demand together and receives a mediation fee. The distinctive features of this business model can be online trading platforms, supply chain platforms for networking the value chain, service platforms for optimising operating processes and innovation platforms. Furthermore, digital platforms allow frictionless access for all parties and facilitate matchmaking even with large user groups. Service offers can be transferred to the customer regardless of time and location (VDI/VDE, 2016).

#### Sharing economy

Closely related to digital platforms are the business models of the sharing economy, where products or services are not purchased, but there is "shared" use of the service. Internet platforms take over the mediation between customer and provider and receive commissions.

#### Smart data solutions

Business models in the context of smart data or big data can be designed differently. Depending on the application scenario and the target group, these may relate to the storage of data, the development of data itself, the quality of data and the analysis of data. Services may include providing data in an appropriate form, developing existing solutions through smart data technologies, industry-specific data services, and operating data infrastructures (FZI Forschungszentrum Informatik, 2015).

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<sup>1</sup> The term "Industry 4.0" is commonly used in German-speaking areas and is a generic term for digital technologies. Other countries use for instance terms like "advanced/smart/digital manufacturing" or "smart factory".



### Cloud computing business models

There is a distinction between four different business models in the area of cloud computing.

- Infrastructure as a Service (providing digital infrastructures)
- Platform as a Service (providing application infrastructures such as databases and middleware)
- Software as a Service (customers obtain a software application via the Internet)
- Business Process as a Service (customers outsource their business processes to the cloud).

Customer benefits can be either innovation benefits in the form of new products or services, or cost benefits when it primarily comes to cut costs. In particular, revenue models of cloud computing business models may be a pay-per-use model, a base rate model with usage-based components, or a flat rate model (Bitkom, 2013).

### Business models in the context of mobile applications

New business models based on solutions in the context of mobile applications and end devices are divided into two areas: Mobile applications for internal use in companies (e.g. mobile assistance systems) and solutions for uses in the business-to-consumer (B2C) area, such as applications for an active customer communication (Aichele, 2014).

## **1.2. New digital business models in different cluster sectors**

New digital business models can be used in a variety of ways in the strong fields of Austrian clusters; those within the cluster fields of automotive, engineering, food industry, energy and health are highlighted below.

### ***1.2.1. Automotive***

Widespread use of big data and smart data analyses, and the increasing interconnectedness of vehicles and customers are significant drivers for new, data-driven business models in the automotive industry. An essential component of digital business models in this industry is digitisation in the aftersales sector. The focus here lies on personalised aftersales offerings, predictive maintenance, online platforms and online shops, e.g. for attachments. The introduction of telematics functions also enables new approaches in the aftersales area. In addition to the collection of general condition data, the usage behaviour of the vehicle can also be recorded. This information enables the derivation of drivers' intentions and permits the design of tailor-made offers. Other digital business models in the aftersales area include predictive applications to inform customers of the emergence of acute service demands (Deloitte).

The basis for personalised online services as well as product and aftersales offers are big data analyses. Among other things, the collection of the corresponding data takes place online from the networked vehicle, from dealers and brand workshops as well as from social networks. Trends, customer needs, usage habits or customer preferences can be calculated from this information. For example, embedding big data into the business model enables analytic customer clustering and the collection of customer information from driving data, garage data and social media, allowing individualised offers, more targeted product development, and more.

Through the analysis of garage and vehicle data, a more targeted customer service, an optimised technical product design, and better utilisation of the workshop can be realised (Bain & Company, 2014).

Rosenbauer, an Austrian manufacturer of systems for firefighting and disaster protection and a member of the automotive cluster in Upper Austria, supports local fire-fighters with a mobile operations management system. The information system for operational forces, called EMEREC, provides all application-relevant data in digital form. This system combines digital data, standardises it, integrates independent sub-applications and consolidates them into dashboards. For instance, object data, water supply points, electronic fire protection plans, images of surveillance cameras and measurement data from sensors are displayed or visualised in digital form.

Another digital business model in the automotive industry concerns the sales channels, where a trend is indicated towards omnichannel retailing, seamlessly connecting digital and classic communication and distribution channels. The customer's research phase usually starts on digital channels before visits to local dealers or original equipment manufacturers (OEMs). Virtual showrooms are expanding business models to present the extensive range of vehicles in these models. Meanwhile, physical locations are designed to complement the digital world of experience, turning increasingly into test driving centres. This new business model is used for the distribution of new vehicles, where customers inform themselves about new cars online and buy them offline (at the local car dealer). Second-hand car dealers, such as the American company Carvana, are already going one step further, by offering the entire buying process from search to purchase online (Deloitte, 2016). The extension of traditional business models to include digital distribution channels or omnichannel retailing provides an interface for start-ups that offer digital platforms for sale or software such as a used-vehicle management system for managing vehicle inventory.

In addition to the increasing digitisation of the traditional core areas (chassis, interior, drive), digital services are another critical element of digital business models, such as pay as you drive (PAYD) services, environmental information or shopping opportunities (Iskander Business Partner, 2016). Digital service enhancements like driver information services provide an interface for cooperation to continue information services, especially with start-ups, possibly via an app on the smartphone (Bain & Company, 2014).

Digital service platforms are another type of business model in the automotive industry. For instance, travel platforms combine the availability of OEM vehicles and other mobility alternatives (taxi, train) into one account. Existing companies can, among other things, use digital offers from start-up companies. The startup company, ally, that developed a mobility app for Volkswagen as an intelligent solution for multimodal transport chains is an example (The Hundert, 2015).

### ***1.2.2. Mechanical engineering***

New digital business models in mechanical engineering are being implemented by collaborating with start-ups or by building digital units themselves (Bitkom, 2017). The new business models concentrate on the personalisation of production; digital platforms and the use of digital technologies (especially cloud offerings, mobile applications, and big data analysis).

During digitisation, the trend in mechanical engineering is towards personalised production. The manufacturer develops or produces a primary product that can be expanded individually with individual interchangeable (digital) components.

It is then possible to adapt the product to customer-specific needs and add flexibility to systems. This modular principle is straightforward to develop or extend a modular machine control system.

Another focus of new business models in mechanical engineering lies in smart products, cloud offerings, big data analytics and mobile applications. Data collected via sensors, for example, is sent to the cloud via a mobile connection and will be evaluated by the machine manufacturer. Afterwards, the evaluated information is forwarded to the mobile devices of the employees (Dr. Wieselhuber & Partner, 2016).

Digital platforms in mechanical engineering aim to facilitate the exchange of products, services and information. In this context, two possible options can be distinguished: interaction platforms and ecosystems. On interaction platforms, the machine-builder can connect with (several) customers and both sides can view the respective order stage at any time (Bitkom, 2017). Digital ecosystems enable companies to network and promote the further development of products and applications (McKinsey & VDMA, 2016).

Due to the shift of industry boundaries, cross-industry partnerships, e.g. with IT businesses, are relevant to expand business models by digital services (Cecimo Magazine, 2017). Hence, mechanical engineers increasingly penetrate the IT industry. An example is the business unit of the Austrian IT firm, Catalysts GmbH, which comprise the development of custom software, penetration testing (controlled systematic attacks on software systems to detect potential security vulnerabilities) and solutions for the Internet of things and artificial intelligence. Catalysts GmbH offers, for instance, a platform for predictive maintenance, which enables remote monitoring of industrial machinery, interactive analyses and automated alert.<sup>2</sup>

Within the mechanical engineering field, business models with a stronger service orientation are gaining more and more ground. Physical products are equipped with digital features to maximise customer value. By extending the business model to smart products, mechanical engineers are in contact with their customers through service orientation even after the sale of the machines. Machine builders receive data from the purchased equipment, enabling service-oriented offers, such as predictive maintenance to identify and correct possible machine problems before they occur (CISCO, 2015).

Also, the increasing service orientation in digital business models is intensified by product-as-a-service models, which means the leasing of machines and equipment (Bitkom, 2017). In this context, "pay-per-use" or "subscription-based" models are used, generating constant revenue streams for machine builders, instead of one-off sales revenue.

### ***1.2.3. Food industry and food trade***

In the food industry, the constant availability of information, access to digital marketplaces, product comparisons in portals and experience reports in social media have become standard. These resources have been made readily available mainly by digital technologies such as cloud computing, smart data and social media.

Data, e.g. for tracing food and supplying additional information about products (like origin and processing steps), can be provided via a digital platform. Customers scan the codes of products with their smartphones or manually enter the product numbers on the platforms to obtain the required information.

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<sup>2</sup> [www.catalysts.cc](http://www.catalysts.cc)

New business models in food trade relate to the expansion of sales channels, with a particular focus on the supply of goods via cross-channels or omnichannels. The store business will be supplemented by an online shop as a digital sales channel and integrated into the static business (Fortiss & TU München, 2016).

In addition to the expansion of sales channels, digital start-ups and grocers are creating new collaborations. For example, a retailer can display an assortment of goods through an app that is developed or purchased respectively in collaboration with a start-up or purchased and reach its customers without having to develop their own app (EY, 2014). An example is a cooperation between the German start-up company Umoli and the Bio Company based in Berlin-Charlottenburg. The developed app combines recipe inspiration and shopping in the supermarket (The Hundert, 2015).

#### ***1.2.4. Energy sector***

A core element of digital business models in the energy industry is data-based analysis, planning and diagnosis based on data points. Energy companies can offer new digital services through cooperation with start-ups. Energy companies could, for example, leverage cloud-based platforms that integrate all customer relationships, smart metering, billing and a range of other services to enhance their business models digitally (pwc, 2016).

The digital business model of multichannel platforms in the energy industry should bundle customer interactions across all channels (online, mobile, call centre, on-site sales) while simultaneously analysing customer behaviour along all nodes. These platforms also allow targeted measures to improve customer processes, such as the early identification of possible change intentions based on customer behaviour (Peters & Mohr).

The energy sector could use three different digital business models (Q\_PERIOR):

- Digital broker (creating an interaction platform to convey products)
- Virtual power plant (establishment of a central marketing and control platform for all components and services of virtual power plants)
- Smart home orchestrator (development of an internet platform including online shop and mobile apps for controlling the smart home components)

#### ***1.2.5. Health / medical technology***

New digital business models also shape the healthcare industry. Mobile applications and interactive websites are used, among other things, for remote consultations; that means that the medical consultants are available to the customer or the patient at any time. In this context, the artificial intelligence is used for the first contact. In addition to virtual consulting, digital diagnoses and treatments are finding their way into digital business models as well. Cognitive behavioural therapies are held online, allowing patients and therapists to communicate via digital technologies regardless of location (GP.Bullhound, 2015).

Digital health platforms and networks are used for a lot of different options. Patients can use digital networks to find doctors in their immediate vicinities, read evaluations from other patients, and make appointments online. Other platforms allow interaction with peer groups (patients get in touch using a platform with other people who have similar health backgrounds) and interconnection of nurses and patients.

Mostly, these health platforms are divided into three types: A freely accessible platform, a one-time payment (e.g. for an appointment) and a continuous fee (e.g. in the form of a membership fee for the service) (GP.Bullhound, 2015).

The healthcare sector is also benefitting of developments in smart and big data services, for instance to improve clinical decisions by providing medical information at that moment when treatment decisions are made. Thus, physicians can be supported by case-specific linkage to specialist information (Digital Gipfel und DIV, 2017)

## 2. The Effect of Digital Transformation on Innovation Ecosystems

### 2.1. Change of innovation processes within companies

In the era of digitisation, established companies are confronted with a variety of challenges, such as internal modifications caused by new digital technologies, the speed of change and the constant adaptations to changes in customer needs and expectations. Established companies need to develop their R&D methods further as the digital transformation changes innovation processes within firms by expanding the horizon of possible new products, services, business models and internal processes. Firstly, the digital change affects the speed of innovation because the development and testing of new products can be much faster and cheaper – e.g. through 3D printed prototypes or digitally enabled simulations (BCG, 2018). Also, digitisation facilitates the introduction of products (such as apps and portals) on the market as fewer investments are necessary to develop a new software product compared to hardware; a product can be launched with a beta-version or prototype with the intention of continued development.<sup>3</sup>

Due to digitisation and the associated start-up boom, new methods for innovation characterised to be agile, iterative and user-centric, enable a step-by-step approach to reach the “perfect product”. As it is critical to understand the customers’ needs and to integrate the users’ perspective, they are playing an important role in the “new” innovation cycle. Another crucial factor is the instant testing of prototypes to generate feedback of the user; this flows into the development process and learning via trial and error loops.<sup>4</sup>

Digitisation has certain effects on organisational structure and companies may need to rethink this too. Digital transformation asks for a shift from a traditional, top-down approach to an inclusive perspective involving everyone. Diverse perspectives need to be integrated, and responsibility for the achievement of business’ goals shared in order to improve the pace and scale of innovation (MWD Advisors, 2017).

In order to enable idea generation and exploration, important issues within the innovation process in the context of digitisation are the identification, usage and delivery of data and software. Hence, the question of how to get access to necessary capabilities should be addressed. Technical skills are of course an essential requirement. Data analytics need data

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<sup>3</sup><http://www.inknowaction.com/blog/innovationsmanagement/digitale-transformation-innovation-was-steckt-wirklich-dahinter-5732/>

<sup>4</sup> <http://www.inknowaction.com/blog/innovationsmanagement/wie-die-digitalisierung-das-innovationsmanagement-veraendert-6374/>

scientists to use and work with the generated data. Another crucial factor is industry knowledge, and corporations need people with digital expertise (BCG, 2018).

However, innovation ecosystems are constructs that enable peers to build relationships amongst each other and reinforce innovative capabilities. Start-ups are important drivers of innovation processes. Based on their specific characteristics (e.g. greater willingness to take risks, unconventional approaches) young companies can exhibit greater innovation activities than established corporations – major innovations are often launched by new firms. Start-ups can also be a source of inspiration for established companies and their innovation activities. Often corporations acquire innovative start-ups to get access to specialised knowledge and develop their innovation activities further (Handelsblatt Research Institute, 2016).

Corporations need to engage on a broader playing field because the boundaries between industries become blurred through digital technologies. As a consequence, the collaboration within heterogeneous networks are valuable and provide particular opportunities for the companies' innovation processes. For instance, connected cars already have drawn automakers into the IT and software business, and autonomous cars are linking the automotive sector with the IT industry (BCG, 2018). As a result, of this shift of industry boundaries, cross-industry partnerships, as with IT-companies, are of relevance to expand existing business models by digital services.

Because of digitisation and the blurred industry boundaries, innovation ecosystems are being created that may result in collaborations between established firms and digital start-ups. Within this context, corporations can benefit from such partnerships by identifying and working on new and innovative topics, where the time factor plays an important role. Start-ups often act for instance in test markets and usually have significantly shorter development processes than larger corporations. Also, as a result of cooperation with start-ups, established firms can get access to a new market, possibly addressing new customer groups (Kailer & Hora, 2017).

Established corporations can benefit from innovative start-ups and build up digital skills through different forms of cooperation (RKW Kompetenzzentrum, 2017).

- **Development of partnerships:** Companies cooperate with each other to jointly develop new ideas for products and platforms or to develop product, service and process innovations.
- **Supplier relationships:** Established firms can purchase products with digital components from start-ups and integrate them into their own products.
- **Conventional customer relationships:** Established corporations buy products or services to use them in their production or business processes – e.g. software development or marketing.
- **Sales partnerships:** Start-ups might offer platforms or other digital sales channels for the products of established companies.

## 2.2. The collaboration of start-ups and clusters

Start-ups are relevant drivers of the innovation process in the economy and can be a source of ideas for established companies. Innovative products and new ideas not only resonate in the start-up scene but also give mature companies essential impulses for their digitisation

activities. They can also support established corporations directly in their innovation and business activities (TU München, fortiss, 2016).

The interaction between established companies and digital start-ups can, for instance, lead to the development of new business models in mature companies, or business models of start-ups can act as drivers of digitisation. Established companies can increase their competitiveness with innovative solutions and technologies that are provided by start-ups. Start-ups that are using big data and smart data solutions can help established businesses to make better use of existing data and reduce the growing complexity of an interconnected and digitised world. Start-ups can also significantly intensify customer relations and communication of established companies by offering advanced customer interfaces (Kailer & Hora, 2017).

Start-ups can profit from cooperation with established firms by sales and corporate growth. A startup can gain, for example, through enhanced reputation, increased awareness and improvement of the company image as well as through expanded sales strategies and an enlarged target group.

An online survey was carried out as a part of the study "Digital Startups and Clusters" to identify the potential and opportunities for new business models of digital startups. Also included were questions about the status of cooperation between Austrian cluster companies and digital startups. Within this survey, cluster managers from Austria were invited as representatives of the cluster community to participate. Likewise, on the cluster community side, representatives of AplusB<sup>5</sup> centres and other incubators, investors, relevant consulting companies and public authorities were contacted. Both groups received separate questionnaires. Twenty-six representatives of the cluster and start-up communities took part in the survey.

- **General assessments of the cluster community regarding digitisation and cooperation with start-ups**

Most cluster managers are of the opinion that digitisation will bring new contestants to the member companies of their clusters in the coming years, and digital products will significantly challenge their competitiveness. They also believe that companies that play a leading role in value creation networks, such as platform providers, will gain a lot more power. The cluster managers also agreed that digitisation would entail both great opportunities and equally considerable challenges for companies at the same time.

The majority of these managers said that cooperation between Austrian cluster companies and start-ups does exist, but only a few realise an intensive collaboration. The first contact with start-ups usually takes place through a targeted approach by the cluster companies via intermediaries or trade fairs and events.

Almost half of the Austrian cluster managers indicated that a significant proportion of their member companies are financially involved in one or more start-ups. The purchases of start-ups or the foundation of own start-ups seem to be unusual.

The most mentioned objectives explaining why cluster companies cooperate with start-ups are the provided access to new technologies, the development or significant improvement

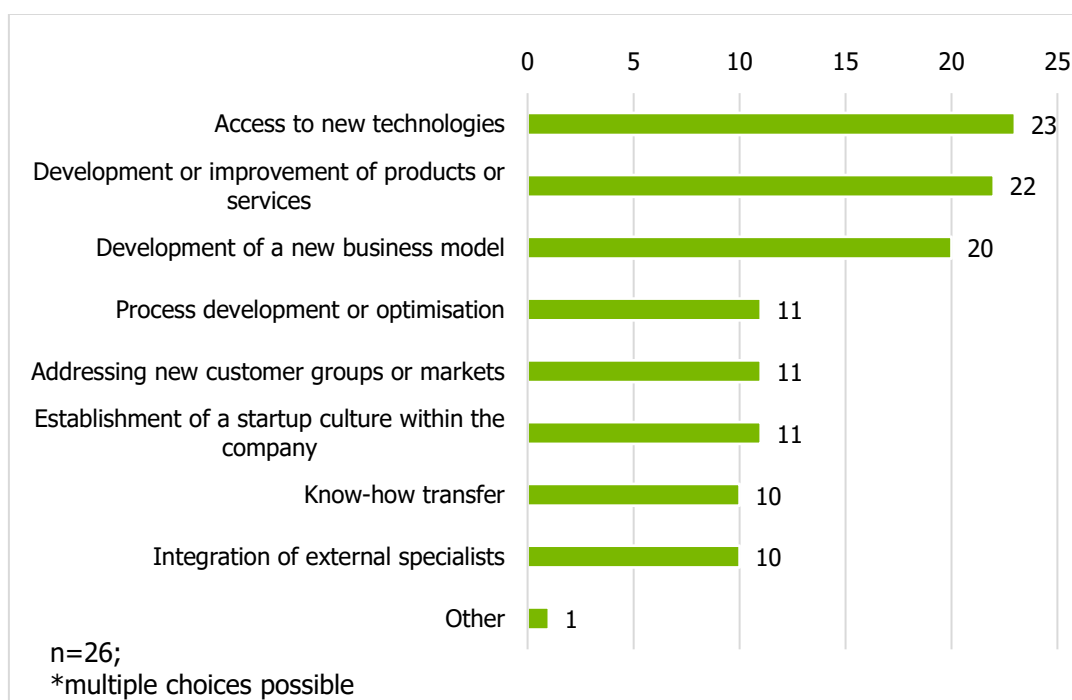
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<sup>5</sup> Academia plus Business: Austrian funding programme that supports startups from universities, colleges and non-university research institutions



of their products and services as well as the creation of new business models. The following figure visualises the goals of cluster corporations for collaborating with digital startups.

**Figure 1: Objectives of cluster companies working with startups**



More than half of the cluster managers surveyed agreed that the importance of start-ups for established corporations would increase over the next five years. A significant proportion further believes that the role of start-ups for cluster companies will not or hardly change over the next few years, and only a minor portion thinks that start-ups will not be of crucial importance to cluster companies in the future.

- **Assessments of the start-up community about digital start-ups**

Digital start-ups, i.e. young companies with competencies or business models that focus on digital technologies, differ on several levels from other “traditional” start-ups. The participants of the online survey from the start-up community hold the opinion that digital start-ups have higher growth potential because their business models are often scalable and less dependent on fixed physical infrastructures and facilities. Moreover, the representatives of the start-up community perceive that digital start-ups are more internationally active than other young companies, but at the same time, they are also experiencing much more competitive pressure from global competition.

The start-up community believes that a notable feature of digital start-ups is that they can serve as a source of inspiration for established companies and as impulse generators for their digitisation activities. Half of the participants also certified that digital start-ups have more innovative business models than “traditional” start-ups.

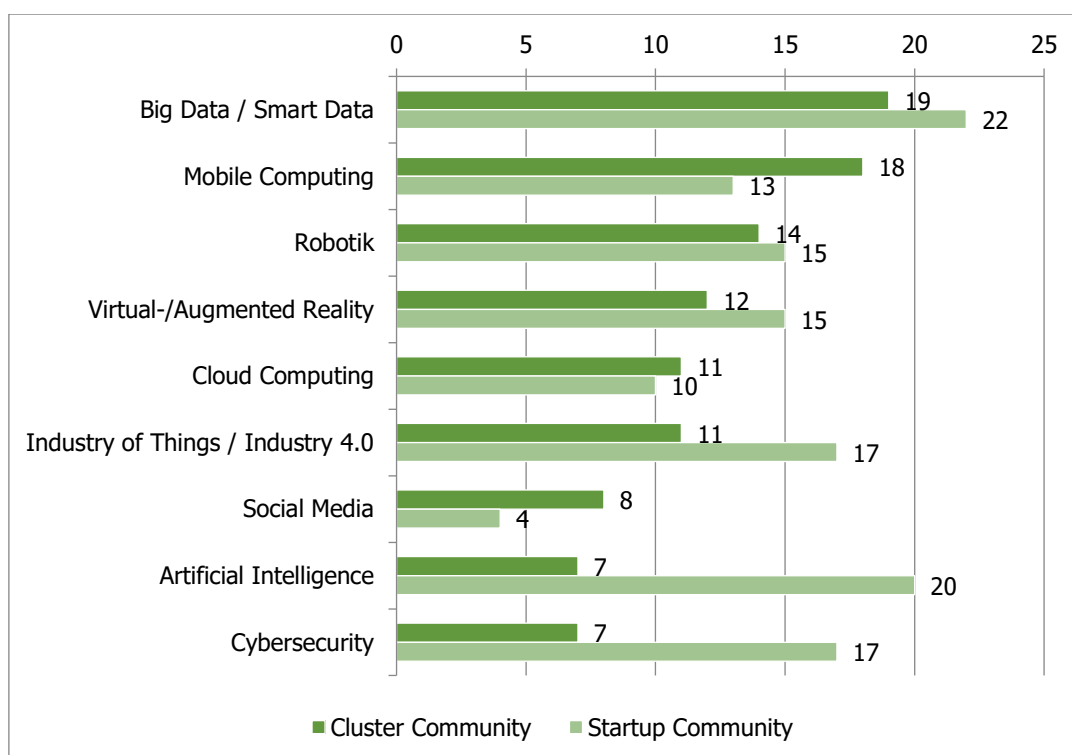
- **Application fields and potentials of new business models of digital start-ups**

Cluster managers concur that the best potential for collaboration between established cluster companies and start-ups lies in the development of digital business models. Further

potentials for cooperation are listed as areas of research and development and production or service provisions. Therefore cooperation with start-ups can have positive effects on core areas of companies. The fields of logistics and shipping, marketing, purchasing or accounting were expected to offer fewer potentials for cooperation opportunities.

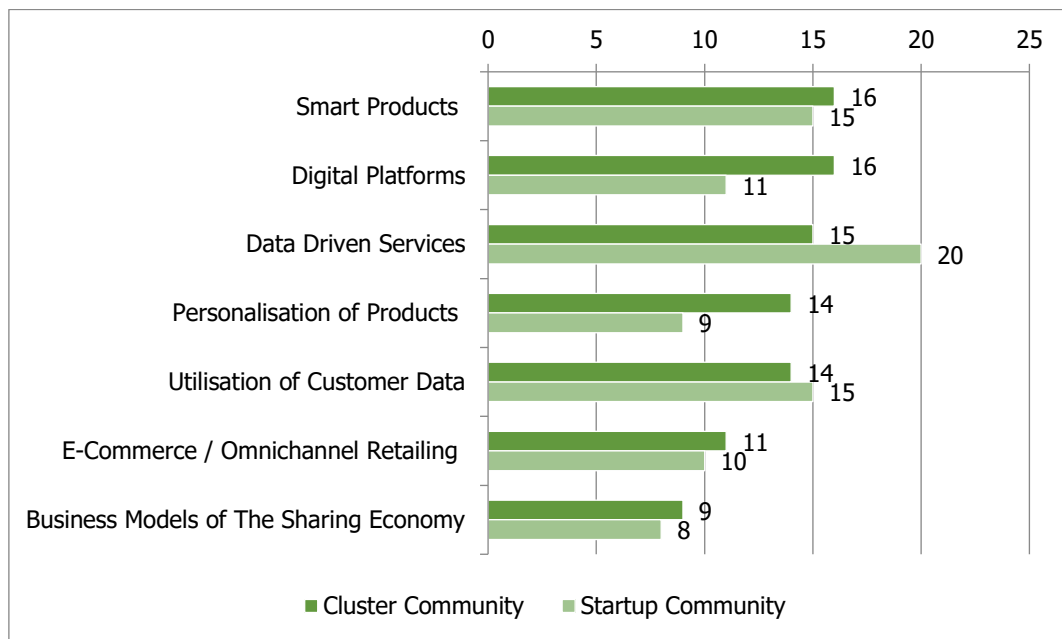
Regarding the development of new business models based on digital technologies, there are some overlaps between the cluster and start-up communities on which digital technologies are of importance. Both groups consider big data and smart data technologies as the areas with the highest potential for developing new digital business models. Other crucial technologies for new business models are perceived to be mobile computing, robotics and augmented or virtual reality. The noticeable difference lies in the areas of artificial intelligence and cybersecurity. These play a relatively minor role in the development of new business models for cluster companies but are perceived by the start-up community to be promising technologies.

**Figure 2: Potentials of different technology fields for new business models**

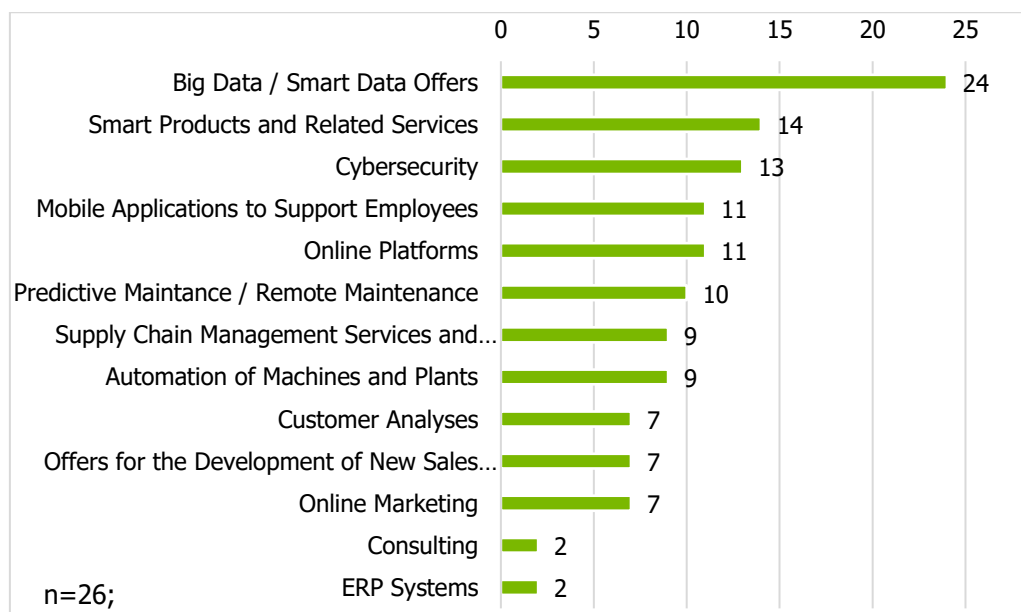


The survey asked both groups which digital business models had, in their opinion, the particular potential for cooperation between digital start-ups and established cluster companies.

Both sides estimated that the collaboration potentials were relatively similar. Critical potential areas for cooperation were smart products and related business models, data-based services, the exploitation of customer data and digital platforms. The start-up community considered data-driven services to have the highest potential for collaboration, whereas the cluster community assessed digital platforms and the personalisation of products to have the best prospects.

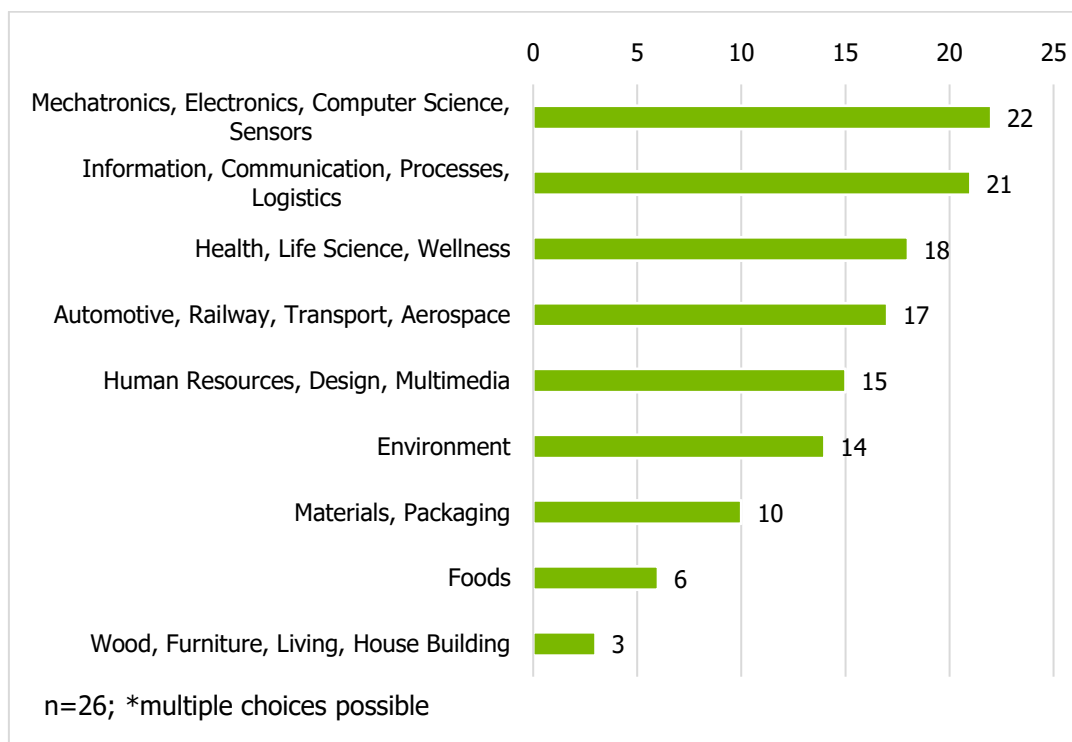
**Figure 3: Potentials of new business models of startups for cluster companies**

Regarding the specific product and service portfolios of start-ups that have digital business models, the cluster community expects big data and smart solutions to have the most significant benefits for established cluster corporations. Moreover, about half of the cluster managers see high potential for established companies in the following service offerings: Smart products and associated services as well as cybersecurity solutions. About 40% are of the opinion that mobile applications supporting employees and predictive maintenance, and remote maintenance solutions are of particular interest to cluster companies, whereas marketing and sales solutions play a subordinate role.

**Figure 4: Product offerings of startups with potential for cluster companies**

The startup community sees the highest potential for new business models of digital startups mainly in the two cluster fields of mechatronics, electronics, computer science and sensor technology, and information, communication, processes and logistics.

**Figure 5: Potential of cluster fields for new business models of startups**



### 3. Policies and Activities to Improve Digital Transformation

#### 3.1. Challenges of the digital transformation and the collaboration between startups and clusters

As already pointed out in chapter 3.1 established companies are facing various challenges (internal and external) in the era of digitisation. Internal challenges relate to the following areas:

- Strategy and product: Maintaining the core business and innovate simultaneously in new areas.
- People and culture: Changing the mindset of employees by giving them the opportunity to experiment with new and disruptive ideas.
- Processes and structures: Developing new methods of working and structures that are agile.

New digital technologies may induce those increasing internal challenges by the speed of change and adjustment of customer needs. Especially disruptive technologies, as well as the globalisation, create shorter product life cycles affecting the speed of change and innovation.

The collaboration between startups and established corporations to address the challenges can be of value for digital innovation ecosystems. However, there are also several obstacles to consider regarding particular challenges with the cooperation between the two parties. These barriers of Austrian startups and established companies are summarised below.

Firstly, a barrier to the cooperation between startups and established companies may lie in the anxiousness of startups that cooperation partners could copy their businesses and then transform into competitors. Also, connecting with relevant contact persons within the complex organisational structures of some large companies may represent a challenge (Kailer & Hora, 2017).

Within the online survey of the study “Digital Startups and Clusters” representatives of the cluster and the startup community have been questioned as well on challenges and barriers that occur in the context of cooperation between startups and established corporations. According to the Austrian cluster community, main obstacles to collaboration between those two parties are a lack of access to suitable startups, immature business models of startups and different corporate cultures between the two groups.

The Austrian startup community too sees significant challenges of collaborations in the different corporate cultures between startups and established companies. Other inhibiting factors for cooperation include a lack of interest in partnerships by established firms, little experience of founders or startup teams and the difficulties to get in contact with suitable companies.

The two groups rate the inexperience of startup teams and immature business models differently. The cluster managers think that sometimes immature business models of startups are a significant obstacle (second-most prioritised issue among cluster managers, second-least among the startup community). The startup community, however, sees more significant challenges with the inexperience of founders (third-most named among the startups, second-least among the cluster community).

### **3.2. Policies and activities on a regional and national level**

The digitisation, digital technologies and the role of startups have strongly influenced the Austrian innovation, research and economic policies during previous years. The first specific focus on digitisation was set in 2015 with the conduct of the study “Agenda Industry/Production 4.0” – a report of the BMDW to strengthen the competitiveness of small and medium-sized enterprises (SMEs) and leading companies. From this point on, Austria increasingly developed policies and activities that enhance the digital transformation.

In the following, an extract of Austrian policies and activities on national and regional levels is presented.

### 3.2.1. Policies and activities on a national level

In 2015, the Federal Ministry for Digital and Economic Affairs (BMDW) presented **Austria's startup strategy**<sup>6</sup>, which includes five fields of action and 40 measures. The five main policy fields of action are innovation, financing, awareness building, networks as well as infrastructure and regulation. The strategy was developed in cooperation with more than 250 actors and institutions, including startups, seed investors, funding agencies, research institutes and business angels. Together with the community, 40 measures were defined. The package of measures contains, for instance, new instruments to increase innovation activities, new tools to improve financing, closer networking of startups and established companies. Some of the defined measures have already been implemented, like the development of a digital roadmap and an online guide on IT security, and the implementation of an accelerator programme ("aws JumpStart").

Currently, the issue of digitisation is being addressed in several policies and programmes on a national level, mainly by BMDW, which has an integrative view on the technological and economic development of Austria. The Federal Ministry of Transport, Innovation and Technology (BMVIT) is responsible for the digital infrastructures in Austria and offers among others a variety of dedicated research funding programmes for information and communication technologies and production technologies.

The current central policies, initiatives and programmes that deal with digitisation are presented below.

- **Digital Roadmap 2017:** In 2017 the Digital Roadmap Austria<sup>7</sup> was presented by the BMDW. This roadmap provides an overview of current and future challenges as well as of existing and planned measures and activities. Twelve guiding principles shape the digitisation process in Austria.

The roadmap presents approximately 150 specific measures in 12 fields of action to ensure that Austria can optimally exploit the potential of digitisation. The fields of action within the roadmap are listed below:

- Education
- Health, care and social affairs
- Business
- Research and innovation
- Integration and inclusion
- Environment, energy, agriculture and climate protection
- Work and jobs
- Politics and administration
- Mobility and transport
- Media, civil courage and culture

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<sup>6</sup> <https://www.bmdw.gv.at/Wirtschaftspolitik/Standortpolitik/Seiten/Oesterreich-soll-Gruenderland-Nr.-1-in-Europa-werden-.aspx>

<sup>7</sup> <https://www.digitalroadmap.gv.at/en/>

- Infrastructure
- Security, protection and trust

The Digital Roadmap Austria is a dynamic strategy paper continuously adapted to the latest developments in digitisation and is currently being updated.

- **Digitisation strategy for Austrian tourism:** In 2017 BMDW<sup>8</sup> presented the digitisation strategy for the Austrian tourism<sup>9</sup> in cooperation with the Austrian Economic Chambers and “Österreich Werbung”. The strategy presents 22 specific measures in the following three strategic objectives:
  - Shaping digital transformation (data as a resource, digital infrastructure, cooperation and service bundles, promotion of digital transformation).
  - Strengthening the power of innovation of companies (dialogue and open innovation).
  - Creation of competencies and processes for digital transformation (education and labour market, sales, communication and marketing)
- **Blockchain Austria:** The platform “Blockchain Austria”<sup>10</sup>, presented by the BMDW in 2017, pursues several objectives that are formulated within nine concrete recommendations for Austria. These include the implementation of pilot projects and the creation of protected regulatory frameworks (“sandboxes”), the promotion of existing civil society activities, the training of skilled workers, the creation of a blockchain information platform and the formation of an Austrian blockchain cluster (ABC).
- **Industry 4.0 Austria – The Platform for Smart Production<sup>11</sup>:** The association Industry 4.0 Austria was founded in 2015 by the BMVIT, the Chamber of Labour, the Association for the Electrical and Electronics Industries, the Association of Metaltechnology Industries, the Federation of Austrian Industries and the main trade union in the production sector (PRO-GE). The initiative fosters collaboration among all stakeholders and facilitates new technological developments and innovations in the context of digitisation. The platform is organised into different working groups with the participation of companies, research institutions and societal stakeholders.
- **National cluster platform<sup>12</sup>:** Within the framework of the national cluster platform of the BMDW, six working groups address technological and innovation issues. One of these groups deals with the topics of digitisation, Industry 4.0 and innovative services. Clusters can support the interaction between knowledge-intensive service

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<sup>8</sup>Since 2018 the strategy can be found at the Federal Ministry of Sustainability and Tourism.

<sup>9</sup><https://www.bmnt.gv.at/tourismus/tourismuspolitische-themen/digitalisierung-und-innovataion/digitalisierung.html>

<sup>10</sup><https://www.blockchain-austria.gv.at/>

<sup>11</sup> <http://plattformindustrie40.at/uber-den-verein/?lang=en>

<sup>12</sup> <https://www.bmdw.gv.at/Innovation/ClusterplattformOesterreich/Seiten/default.aspx>



providers and the industrial sector or set impulses for the further development of the service sector through targeted actions and measures.

- **“Smart and Digital Services” initiative<sup>13</sup>:** This funding programme is an initiative of the BMDW and funds service innovations in all sectors that are characterised by research. Service innovations should strengthen the competitiveness of Austrian companies by funding the development of hybrid products, processes and services. The processing of application is not dependent on the research topic, the branch of industry, or the size of the company or project. The funding level is max. 50 % of total eligible projects costs (start-ups up to max. 70 %). Submission is possible at any time and funding is carried out by non-repayable subsidies.
- **AT:net – Austrian electronic network<sup>14</sup>:** AT:net is a thematic research funding programme of the BMDW. It promotes the market launch and establishment of digital applications and digital products. Based on an existing prototype, the programme supports the market launch phase as well as marketing activities up to the commercial operation.
- **R&D competences for Industry<sup>15</sup>:** This initiative of the BMDW supports measures in companies for the systematic development and qualification of their research and innovation staff. Additionally, the programme aims to promote cooperation between companies and tertiary education and research institutions. The programme has the following three programme lines: Qualification seminars to increase expertise, qualification networks to develop expertise and tertiary level courses to enhance expertise in applied research.
- **Virtual community “Kettenbruck”<sup>16</sup>:** To make the different activities around the topic of blockchain in Austria visible, the Austrian Federal Chancellery and the Austrian Federal Computing Centre (BRZ) created the digital blockchain village with the name “Kettenbruck”. In the context of this blockchain village, applications of the blockchain technology are being looked at and actors and experts on blockchain are interconnected.
- **KMU DIGITAL<sup>17</sup>:** The digitisation campaign for SME is financed by funds from the BMDW and implemented by the Austrian Economic Chamber. KMU DIGITAL focusses support on small and medium-sized firms in their digital transformation by promoting the analysing phase, consultancies and qualification activities.
- **ICT of the Future<sup>18</sup>:** ICT of the Future is a thematic research funding programme of the BMVIT for the promotion of challenging technology development and

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<sup>13</sup> <https://www.ffg.at/en/service-innovations-initiative>

<sup>14</sup> <https://www.ffg.at/atnet-markteinfuehrungsprojekt-fuer-digitale-anwendungen-und-produkte-ikt>

<sup>15</sup> <https://www.ffg.at/en/rd-competences-industry>

<sup>16</sup> <https://www.brz.gv.at/was-wir-tun/Innovationen/kettenbruck.html>

<sup>17</sup> <https://www.wko.at/Content.Node/kampagnen/KMU-digital/index.html>

<sup>18</sup> <https://www.ffg.at/en/ictofthefuture>

innovation in information and communication technology, interlinked with application fields and societal challenges.

- **Startup funding programmes of the Austria Wirtschaftsservice (aws)<sup>19</sup>:** The aws awards and executes business-related funding by the state and provides financing and innovation consulting services that are in the public interest and support the economy. The aws offers a variety of funding instruments for startups. A particular focus lies on innovative and academic spinoffs supported with funding programmes like aws PreSeed, aws Seedfinancing, aws JumpStart, aws i2 Business Angels and the aws Industry-Startup.Net.
- **GIN – Global Incubator Network<sup>20</sup>:** The Global Incubator Network (GIN) of the Austrian Research Promotion Agency (FFG) connects entrepreneurs and investors and incubators and provides an international network of key players in innovation and finance.

Besides the policies and activities carried out on a national level, the **Austrian Economic Chambers** supports the collaboration between established companies and startups. The Austrian Economic Chambers assists these companies with the following actions<sup>21</sup>:

- Startup scouting and cooperation: Supporting innovation search by identifying topic-specific international startups.
- Incubator/acceleration contacts: Identification and initiation of appropriate innovation infrastructures for in-house spin-offs or startups.
- Event support: Supporting the presentation of a company's innovations or infrastructures services abroad, including the local startup and innovation community.

### 3.2.2. Policies and activities on a regional level

There are also various policies and activities on a regional level that focus on the digital transformation of companies and the cooperation between startups and established corporations.

Digital strategies on a regional level are presented below:

- **Digital agenda Vienna 2020<sup>22</sup>:** In 2015 the digital agenda was published and is based on nine guiding themes, which address the issue of digitisation. Since its publication, various ideas and measures have already been implemented, including public WIFI and open data. Currently, the agenda is being updated.
- **Digitalisation strategy (Lower Austria)<sup>23</sup>:** In 2018 government of Lower Austria presented its strategy on digitisation. Three central objectives form the basis of this strategy, namely securing jobs, strengthening urban regions and improving the

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<sup>19</sup> <https://www.aws.at/en/>

<sup>20</sup> <https://www.ffg.at/en/global-incubator-network>

<sup>21</sup> [https://www.wko.at/service/aussenwirtschaft/start-ups.html#heading\\_new\\_corporates](https://www.wko.at/service/aussenwirtschaft/start-ups.html#heading_new_corporates)

<sup>22</sup> <https://www.digitaleagenda.wien/index.html>

<sup>23</sup> <http://www.noe-digital.at/noe/>

quality of life and highlights eight fields of action regarding digital fitness, digital infrastructure and digital solutions.

- **Digitalisation campaign (Upper Austria)<sup>24</sup>:** The digitalisation campaign is a 20-point programme of Upper Austria to encourage the digital future of the province. The campaign is coordinated by the Upper Austrian government's business agency (Business Upper Austria). Current projects of the digitalisation campaign are the expansion of broadband, the digital skills qualification alliance, Upper Austrian DESI (Digital Economy and Society Index), additive manufacturing and predictive analytics.
- **Digitisation campaign (Styria)<sup>25</sup>:** In 2017 the digitisation campaign of Styria was presented by its government. The campaign aims to strengthen the digital competences of Styrian companies by implementing an extensive portfolio of specific funding programmes.
- **ICT innovation and research master plan (Salzburg)<sup>26</sup>:** In 2015 the ICT innovation and research master plan for Salzburg was presented. Based on this report, which contains an analysis of the potential of Salzburg in the fields of research, economy and education, different fields of action (including the establishment of living labs, the creation of an infrastructure for ICT and research, technology and innovation) are going to be implemented.
- **Digitisation campaign (Tyrol)<sup>27</sup>:** In 2017 the digitisation initiative of Tyrol "digital.tirol" was established by the Tyrolean government and a variety of defined measures are to be implemented to encourage digitisation. The measures address the improvement of the digital infrastructures, new funding instruments for research and innovation projects of companies and the initiative "education 4.0".
- **Digital agenda (Vorarlberg)<sup>28</sup>:** The digital agenda of Vorarlberg is based on a model in which the factors of humans and qualification, cooperation and companies and infrastructure and administration are equally responsible for the digital development of Vorarlberg. The agenda contains eight fields of action, e.g. the creation of a digital world of work, creation and linkage of digital players, supporting the digital transformation of companies and the development of the digital startup scene.

The main activities and measures of the federal provinces in Austria with the focus on the promotion of cooperation between startups and established companies are summarised below:

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<sup>24</sup> <https://www.digitalregion.at/en/digital-region-upper-austria/digitalisation-campaign/>

<sup>25</sup> <http://www.wirtschaft.steiermark.at/cms/beitrag/12562592/11526613/>

<sup>26</sup> <https://www.itg-salzburg.at/de/standortentwicklung/ikt>

<sup>27</sup> <https://www.digital.tirol/page.cfm?vpath=digitalisierung-in-tirol>

<sup>28</sup> [http://www.vorarlberg.at/vorarlberg/wirtschaft\\_verkehr/wirtschaft/wirtschaft/neuigkeiten\\_mitbild/digitaleagenda.htm](http://www.vorarlberg.at/vorarlberg/wirtschaft_verkehr/wirtschaft/wirtschaft/neuigkeiten_mitbild/digitaleagenda.htm)

- **Innovation to Company (Vienna)<sup>29</sup>:** The initiative of the Vienna Economic Chamber brings startups and established corporations together. The Vienna Economic Chamber acts as an enabler by providing its members with the opportunity to structurally search for innovation and thus creating new business models in cooperation with startups in Vienna.
- **“StartUp(per) Austria” – startup strategy of Upper Austria<sup>30</sup>:** In 2016 Upper Austria started with its strategy “StartUp(per) Austria” to increase the number of new businesses up to 5,000 startups per year until 2020. The startup strategy of Upper Austria contains, inter alia, the collaboration of industrial corporations with startups, the promotion of corporate spin-offs and internationalisation of startups.
- **Pier 4 (Upper Austria)<sup>31</sup>:** “Pier 4” is a protected zone for industry companies, developers and founders, supervised by tech2b, an incubator in Upper Austria. The platform focuses on linking together global startups with industrial corporations of Upper Austria. Startups that are focusing on the fields of e-mobility, data collection and analysis, sensor technology and internal processes will be connected to companies like those within the automotive, steel and aluminium industries.
- **Industry meets Startups (Salzburg)<sup>32</sup>:** The Innovations- and Technologietransfer Salzburg GmbH (ITG) is Salzburg’s innovation centre and responsible for the technology- and innovation-related policies of the regional government. The ITG organises events such as “Industry meets Startups” to encourage and support the innovation collaboration between startups and established companies.
- **Creators expedition – a startup initiative of AVL (Styria)<sup>33</sup>:** The startup initiative of AVL places a high priority on co-innovation with startups, particularly representing a gateway to the automotive industry. In addition to technological topics such as autonomous driving, AVL also opens up to software startups in order to jointly develop new data-driven services and thus to identify new business models.
- **Innovation Challenge (Carinthia)<sup>34</sup>:** The Innovation Challenge, an initiative of the Austrian Economic Chamber in Carinthia, brings together startups and established companies to work on common-interest projects. Startups can participate in the challenge for free; those selected the best are matched with established companies taking part in the challenge. With the first Innovation Challenge in 2016, ten cooperation projects emerged and formed the basis for further collaboration.
- **Hardware Tribe Camp (Tyrol)<sup>35</sup>:** The Hardware Tribe, an initiative of WhatAVenture, Werkstätte Wattens and the Standortagentur Tirol (especially the

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<sup>29</sup> <http://www.innovation2company.wien/>

<sup>30</sup> <https://www.biz-up.at/news-presse/detail/news/ooe-gruenderstrategie-start-upper-austria-greif/>

<sup>31</sup> <http://www.pier4.tech/>

<sup>32</sup> <https://www.itg-salzburg.at/veranstaltung/industry-meets-startups-273>

<sup>33</sup> <https://www.creators-expedition.com/>

<sup>34</sup> <https://www.netzwerkzumerfolg.at/innovationchallenge/>

<sup>35</sup> <https://www.whataventure.com/hardwaretribe#>

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mechatronics cluster) is an open community for hardware, including startups and established companies. The initiative aims to connect established industrial companies with hardware startups.

As this chapter showed, the Austrian innovation and economic policies at national and regional levels regard digitisation and startups as fields with high potential for the successful development of the business location Austria. Political priorities and funding instruments significantly address the digital transformation of the country and the supportive role of startups for the traditional economy.

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