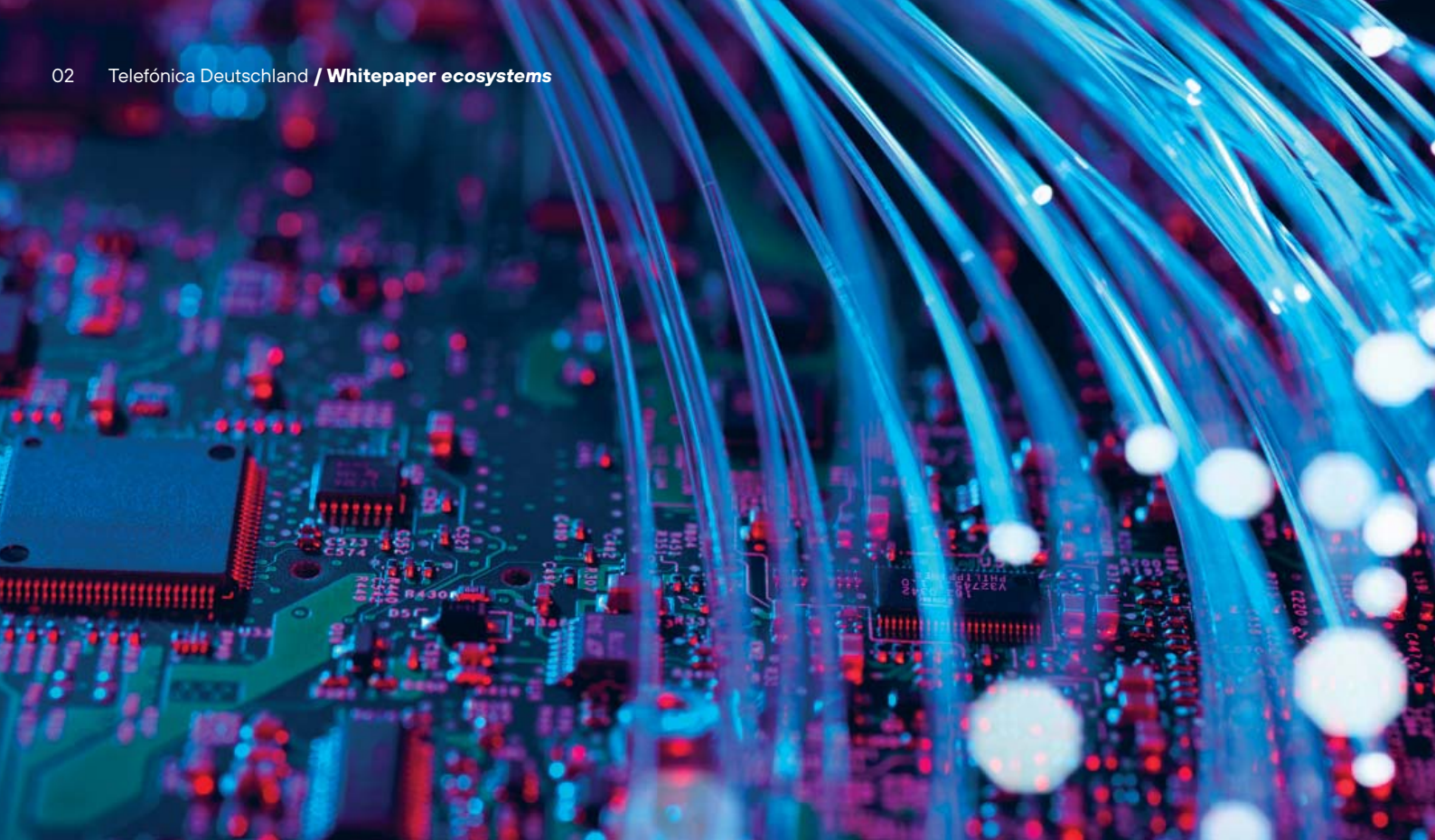# Digital *ecosystems*

Win-win situations
for complex digitisation projects

Opportunities and challenges through digitisation

Whether it is IoT, artificial intelligence (AI), cloud solutions or VR technologies, it is hardly possible for companies today to avoid digitisation – whether the business is a start-up, OEM or stock exchange quoted. Electronic services and smart products have been considered for some time by both private individuals and business clients to be the norm. Overall, the way people use and consume things has already changed dramatically and digitisation has taken a firm foothold in all walks of life. At the same time, internationalisation and globalisation are proceeding unchecked. These developments require new, intelligent, networked processes. Digital transformation, and, often, disruption of our economy and society can no longer be held back. As a result, it is of existentialist importance for businesses to invest in digital reorganisation. In doing so, they will not only reduce their overheads, but they will also expand their flexibility, resilience, and competitiveness.

It is hardly surprising, then, that, according to a recent survey by PWC[1], industrial companies alone invest as much as one trillion euros worldwide in digitising their production.

In Germany, digitisation has taken on heightened importance in particular due to the COVID pandemic and has moved up the list of priorities in many companies. The associated networking within industry and other sections of the economy opens numerous benefits and opportunities for businesses. It starts with the automation and simplification of business processes and continues through to more efficient cooperation between business partners. This also enables supply chains to be completely redesigned.

Digitisation plans simultaneously generate numerous new questions that, in some companies, amount to considerable challenges. Whether this is because the market is highly fragmented or because experience in implementing the aims end-to-end is simply not there: what processes are to be digitised? What is the actual benefit of each digitisation project? What software, hardware, or other infrastructure, such as telecommunication technologies, will be required to implement each of the use

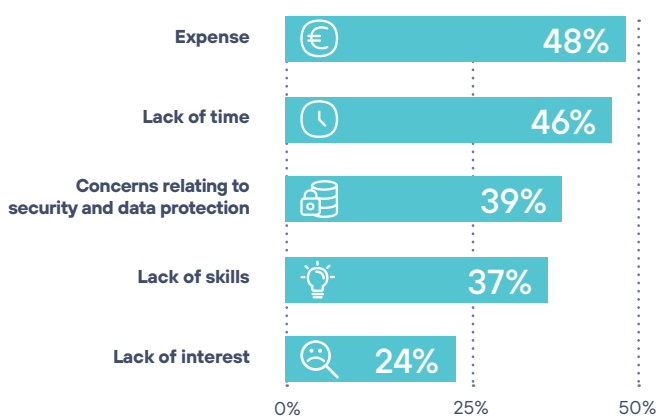## What are the factors that define digitisation?

- **Digitisation of internal processes and production**
- **Digital interfaces to customers**
- **Digital products, services, and business models**

[1] PwC: Digital Factory Transformation Survey 2022;
https://www.pwc.de/de/strategie-organisation-prozesse-systeme/operations/smart-manufacturing/digital-factory-transformation-survey-2022.html/

cases? How can the whole complex be implemented and integrated most efficiently in one's own company? What points must be considered in terms of security and data protection?

One additional question, which applies to both customers and suppliers, is this: how would the supply chains be set up on a green-field site – taking into consideration all the benefits that digitisation offers? The implementation as put into practice will generate completely new products and services or new fields of application for existing products and services.

What factors prevent companies from digitising their processes?

Expense	€	48%
Lack of time	🕐	46%
Concerns relating to security and data protection	🗄	39%
Lack of skills	💡	37%
Lack of interest	☹	24%

0%   25%   50%

Source: online survey by YouGov Deutschland GmbH among approx. 1000 individuals in businesses with up to 250 employees (January 2022)

The necessary knowledge can often only be acquired through high investments regarding time and money – which frequently causes conflict with a company's core business because of the resources it ties up. In addition, digitisation plans also require solutions that are often complex and demanding, in particular in comparison with previous analogue processes. This complexity is caused, for example, by the fact that various differing technologies, systems, and interfaces and, often, several suppliers, are involved. Furthermore, reorganisation using only one's own resources presupposes a greater willingness to take risks, because there is relatively little experience to draw on for projects of this nature, or no experience at all.

A remedy for this can often be found in the shape of support from outside – from project partners with many years' experience and greater expertise in the field of digitisation. Many companies yearn for easy access to a range of solutions where several participants combine their core competencies. Ideally, there will be one central contact, who is a business partner, who will take on the coordination between the various participants. Digital *ecosystems* provide exactly this opportunity and, for this reason, are a crucial development in digitisation.

Digital *ecosystems* at a glance

- Digital *ecosystems* describe the coordinated interaction between a number of actors involved in delivering digital solutions. The guiding principle behind this is cooperation between several businesses in a spirit of give and take. This means that the performance of the entire *ecosystem* exceeds the sum total of the individual contributions from all the actors involved in the system. As a result, all the participants in the *ecosystem* receive more than they contribute to the system.

- Digital *ecosystems* are characterised by always being designed to be customer-centric, are data-driven and are automated, dynamic, and scalable to a high degree. They are not orientated around existing processes but more around the opportunities offered by innovative technologies.

- Digital *ecosystems* rely on a central orchestrator to bring together all the strands of the *ecosystem* as a partnership of equals. That person will often take on the role of the interface for customers.

- Digital *ecosystems* provide customers with turnkey solutions from a single source and with much reduced complexity in terms of procurement, supplier management and implementation.

- For suppliers of solutions, digital *ecosystems* enable them to venture into new areas of business without having to set up all the competencies themselves.

- Telefónica Deutschland has successfully applied the principle of partner *ecosystems* for around 20 years.

- Depending on the specific challenge, Telefónica takes on the role of the orchestrator or makes a contribution as a valuable component in the *ecosystem*. Contact us and let us discuss ways in which we can jointly support our customers in implementing their digitisation plans.

What is a digital *ecosystem* anyway?

The term *ecosystem* as used in connection with economics was first applied by economic theorist James F. Moore (*1948). In his article "Predators and Prey – A New Ecology of Competition"[2] he wrote in 1993: *"In a business ecosystem, companies coevolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations."*

The guiding principle behind a digital *ecosystem* is cooperation between several businesses in a spirit of give and take. This means that the performance of the entire *ecosystem* exceeds the sum total of the individual contributions from all the actors involved in the system. As a result, all the participants in the *ecosystem* receive more than they contribute to the system.

In attempting to define the term, it makes sense to delimit it from neighbouring concepts. Of particular relevance here is a distinction between **digital solutions, digital platforms** and **digital *ecosystems.***

- **Digital solutions** are, from the standard viewpoint of the telecommunications and IT fields, bundles of products made up of various hardware and software components and the associated services which, taken as a whole, solve specific individual needs and use cases. In this connection, it is of no importance whether several partners are cooperating and what role each of them plays. One example for this might be a track and trace solution in logistics comprising hardware (the tracker) and software (visualisation of the localisation action).

- **Digital platforms** are defined by Ansgar Baums, a digital expert and director of Government Relations with Zoom, as *"Products, services or technologies that serve as the basis for a wide range of companies that enables them to offer complementary products, services and technologies."*[3] In this respect, every digital platform is initially an IT architecture that enables the creation, structuring and exchange of data. A key feature of digital platforms is their network structure. That structure enables networking between users and

Digital *ecosystems* – a watershed in digitisation
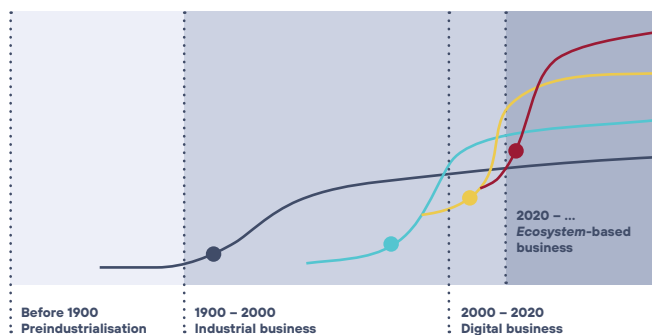
Focal points:			
■ **Product**	■ **Service**	■ **Platform**	■ ***Ecosystem***

Source: https://platforminnovationkit.com/ecosystem-strategy/

an exchange of data between them. As a result, the more participants congregate on a digital platform, the more it will gain in attractiveness and importance – the network effect, as it is called, is at the centre. That effect describes the way in which the benefit of a product to its consumers changes as the number of users of that product or complementary products changes. The App Store run by Apple or Google's Play Store become more attractive to their users if the number of participants using the platforms increases. A greater number of suppliers on the platform makes the platform more attractive to its users. The more users there are on the platform, the greater the attraction of that platform for suppliers. The business model of online dealer Amazon is also based on digital platforms.

- **Digital *ecosystems*** go much further than platforms and solutions. In that context, it is the cooperation that is in focus, since several participants are working together actively to generate the supply chain. The added value thus produced is not aimed solely at the end customers. In fact, all those participating in the *ecosystem* are intended to benefit. Digital *ecosystems* transform the added value supply chain of one business into a supply chain network consisting of several partners. This cooperation demands central coordination by the orchestrator, as he or she is termed.

2 https://pubmed.ncbi.nlm.nih.gov/10126156
3 http://plattform-maerkte.de/wp-content/uploads/2015/10/Kompendium-I40-Analyserahmen.pdf

Key characteristics of digital *ecosystems*

Digital *ecosystems* are generally characterised by these five key characteristics:

1 Customer-centric approach: all processes are conceived starting from the customer's viewpoint. This applies not only to the resulting products but also to all the processes, services on the road to the goal and the business and monetising models on which they are based.

2 Management through data: as a rule, data are the centre piece of the entire business process. By linking data, such as those gained from processes and transactions, added value can be generated together with information that goes beyond the original content of the data gleaned. One example is big data analytics which draws together numerous individual data points to create usable patterns and information.

3 Automation: the necessary analyses of the data are automated, as are the deductions and insights derived from them. In this way, the patterns detected in the above example are derived by automated means. Due to the enormous volumes of data involved, manual processes would hardly be feasible.

4 Scalability: digital *ecosystems* are ideally suited to being scaled up – not infrequently right up to global level. The further the cooperation extends beyond the borders of the regions, countries or continents, the greater the joint benefit.

5 Dynamism: digital *ecosystems* can be quickly adapted to dynamic market developments. They respond to changing boundary conditions by adapting the technologies used and, where appropriate, even the underlying business models.
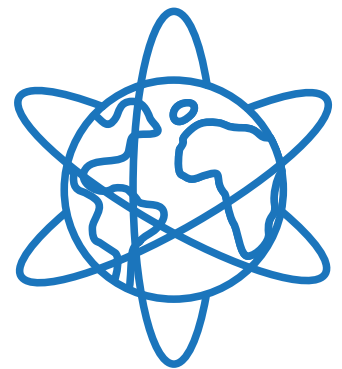
Roles in digital *ecosystems*

In a digital *ecosystem* there are a number of different roles and the boundaries between them are often very fluid. It is necessary for businesses to decide for themselves what role they wish to take on and what position they are suited based on their competencies and offerings.

- **The orchestrator** is the central coordinator within an *ecosystem*. He or she is responsible for ensuring that all the necessary, suitable participants are selected for the *ecosystem* and become involved in implementing the project-specific application. In so doing, the orchestrator also enables consumers and customers themselves to become part of the *ecosystem* as implemented.

The basis of a digital *ecosystem*

The foundation of a digital *ecosystem* is a joint value proposition. All the projects and forms of cooperation are based on this foundation. The fulfilment of this value proposition depends on modules that are contributed by numerous partners. The orchestrator promotes the integration of the partners, which enables the desired value proposition to be achieved.
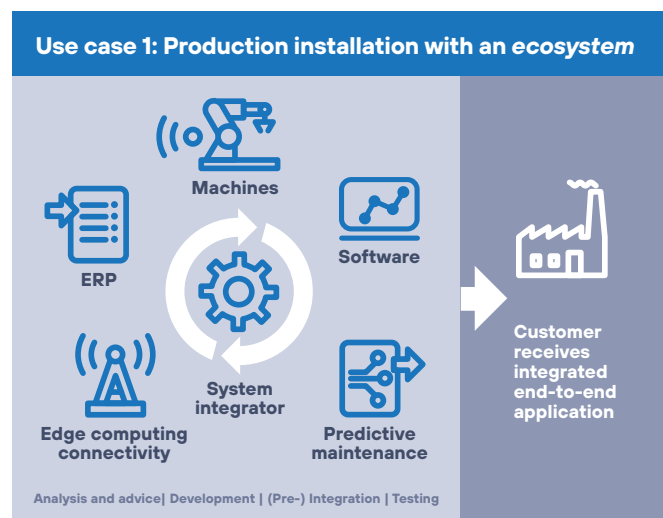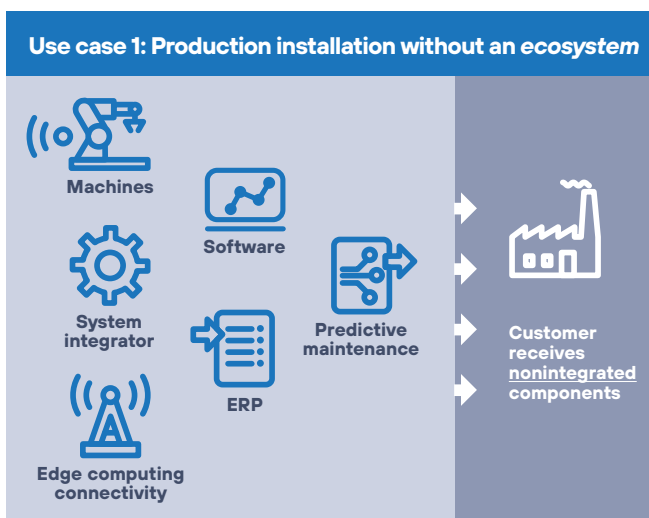
- **The face to the customer** bears responsibility as the central contact for all issues raised by customers or business customers relating to the application in hand or individual solutions. Ideally, there will already be a relationship so that the relevant requirements and needs are already known.

- **The connectivity provider** is considered to be the expert who will select the best networking infrastructures for each specific application and make it available.

- **The hardware manufacturers** supply the hardware necessary for the *ecosystem*. Most use cases require the provision of sensors, networked production installations or automated guided vehicles (AGV). Depending on the use case, the hardware may have to be modified to incorporate modems to enable connectivity or new ones may have to be manufactured because the connectivity-capable hardware available today is not as commonly accessible as needed.

- **The software manufacturers** develop the software that is required to meet the individual requirements and needs.

- **Cloud providers** are the suppliers of decentralised computer resources – frequently, an existing cloud provider used by the customer may be incorporated in the design of the solution.

- **Use case suppliers** as higher-level solution providers, combine hardware and software components as needed for each specific use case or a specific section of that use case.

- **The system integrator** is the expert responsible for combining the individual modules making up the solution. He or she will also integrate them with existing systems and infrastructures at the customer's site. The objective is for the use case to be integrated seamlessly in the customer's processes.

In everyday practice, individual roles may be merged, so the *orchestrator* may frequently also take on the role of the *face to the customer*. However, the *use case provider* may also take on the role of *face to the customer* and leave the role of the *orchestrator* to other participants in the *ecosystem*. On the other hand, blended roles are not a requirement and are therefore dependent on the specific configuration and objective of the *ecosystem*. The distribution of roles and the solution modules incorporated in the digital *ecosystem* become clearer in the context of specific examples, as presented in the following chapter.

Examples of digital *ecosystems*

The following four examples demonstrate the content and technological bandwidth of digital *ecosystems*. At the same time, they also illustrate the complexity of the overall solution and the challenges encountered with its implementation.

Use case 1: Production installation without an *ecosystem*

Machines
Software
System integrator
Predictive maintenance
ERP
Edge computing connectivity
Customer receives nonintegrated components

Use case 1: Production installation with an *ecosystem*

ERP
Machines
Software
Edge computing connectivity
System integrator
Predictive maintenance
Customer receives integrated end-to-end application

Analysis and advice| Development | (Pre-) Integration | Testing

1 Networking a production installation to boost efficiency

Starting position: a company in the manufacturing sector would like to network its production installations that have hitherto been a conventional configuration. The objective is to be able to implement a range of digital solutions to optimise production.

The challenge: the solution as described is not available as a holistic product from a single source. Instead, a number of different suppliers participate in the project in order to produce a holistic application: hardware and software manufacturers, a connectivity provider and a system integrator. Each of the components used must be procured and integrated individually. Interoperability of the individual modules is an essential feature. In addition, the existing enterprise resource planning (ERP) system must be integrated. This intention also presupposes dedicated technical expertise.
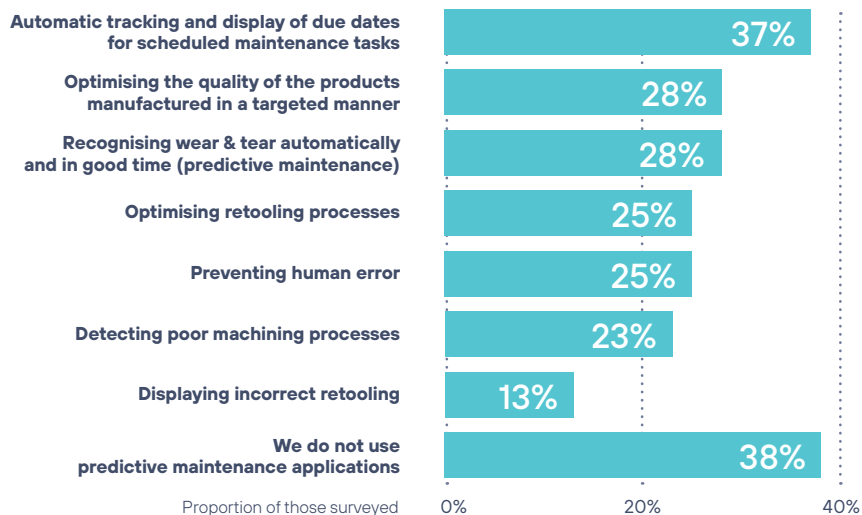
Implementation: in order to connect the required sensors, dependable connectivity with the lowest possible latency and interference and with fast, secure data processing is required. A recommended implementation would therefore be a private 5G network with an edge computing infrastructure **(see info box).** The reduction in latency made possible

through 5G networks mainly influences data transmission between individual devices and the transmitter. Edge computing addresses the other half of the equation by placing computing and storage resources within the telecommunications network infrastructure, eliminating the latency associated with connecting to central cloud data centres. Added to this there is the integration of the necessary hardware, in particular the sensors, and the software for managing and analysing purposes. In order to be able to monitor production processes continuously and support such applications as predictive maintenance **(see info box)** efficiently, it is also recommended to configure the entire installation as a digital twin **(see info box).**

Advantages: uncompromising implementation has a number of advantages. It allows utilisation and maintenance to be managed and predicted more effectively. Networking allows the products to be designed more individually – small production runs down to a batch size of one can be implemented using continuous digital control. At the same time, the sensors help to enhance product quality, for example by continuous in-process monitoring of sub-steps. The outcome is noticeably less scrap and a reduced need for rework. As a general rule, production is now linked more closely to the ERP system – and the business can respond more flexibly to changes in demand and new market trends.

**Which of the following
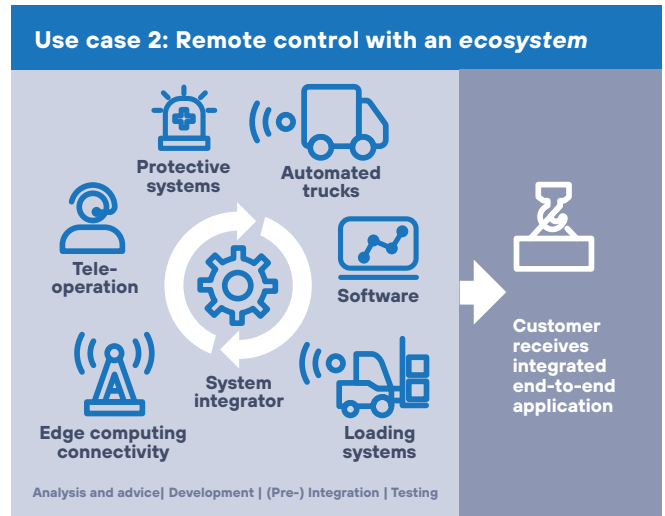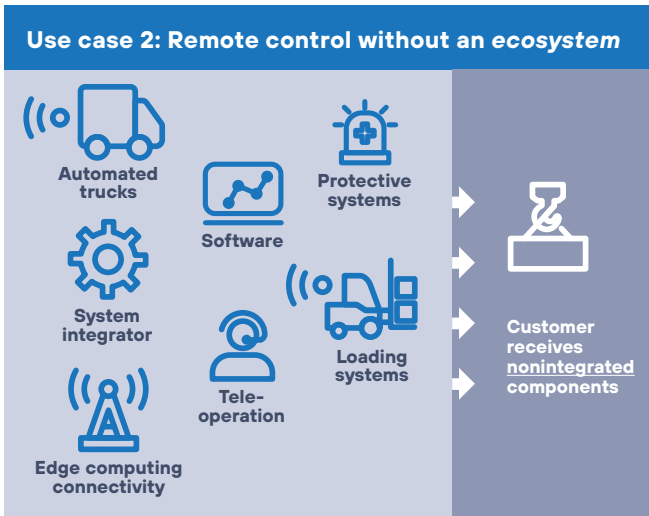predictive maintenance applications do you use at the moment?**

Application	%
Automatic tracking and display of due dates for scheduled maintenance tasks	37%
Optimising the quality of the products manufactured in a targeted manner	28%
Recognising wear & tear automatically and in good time (predictive maintenance)	28%
Optimising retooling processes	25%
Preventing human error	25%
Detecting poor machining processes	23%
Displaying incorrect retooling	13%
We do not use predictive maintenance applications	38%

Proportion of those surveyed

Source: https://de.statista.com/statistik/daten/studie/1078451/umfrage/nutzung-von-predictive-maintenance-anwendungen-in-deutschland/

Technical terms
and their meanings

- **Edge computing** aims to provide decentralised data processing. To this end, a compact computing centre located physically close to the company's private network reduces transmission delays – frequently referred to as "latency" –, which would unavoidably occur if access had to be made through a more remote computer centre. From the viewpoint of the company, in terms of the computer infra-structure, this mini-cloud arrangement is on the outer edge. So instead of having to transmit data over a longer distance to a remote server with corresponding delays, data is processed as close as possible to the company site. This results in reduced overheads resulting from latency, data storage and the costs of broadband communications.

- **A digital twin** is a virtual representation of a real-world phy-sical system, process or service. The individual components or elements are logged and analysed using digital tools and sensors and mapped as a digital model – including all the geometries, kinematic characteristics and logic data. This digital twin then allows simulations, for example, or the con-trol of processes without having to run corresponding tests on the real, physical equipment. Amongst other benefits, this simplifies early detection of problems and allows a number of potential solutions to be assessed. Furthermore, analyses of the digital data may also generate process optimisations that can be transferred across to the physical world.

- **Predictive maintenance.** Instead of running maintenance tasks and wear & tear repairs in predefined intervals based on empirically collected data, sensors detect the typical signs of wear and recognise early signs of impending failures. Based on these sensor readings, maintenance or a replacement of a wear part can be implemented before a failure actually occurs. At the same time, maintenance tasks are conducted just as they are needed in fact.

Use case 2: Remote control without an *ecosystem*

Automated trucks · Software · Protective systems · System integrator · Tele-operation · Loading systems · Edge computing connectivity · Customer receives nonintegrated components

Use case 2: Remote control with an *ecosystem*

Protective systems · Automated trucks · Tele-operation · Software · Edge computing connectivity · System integrator · Loading systems · Customer receives integrated end-to-end application

Analysis and advice| Development | (Pre-) Integration | Testing

2 Remote control of trucks on a logistics site

Starting position: due to regulatory provisions defining maximum driving and minimum break times, there are often bottlenecks for truck drivers when loading and unloading on a freight forwarder's site – the already limited number of drivers compete for slots in a tight timeframe. Automation or, at least, remote control of the truck manoeuvring actions on the site is intended to relieve some of the pressure.
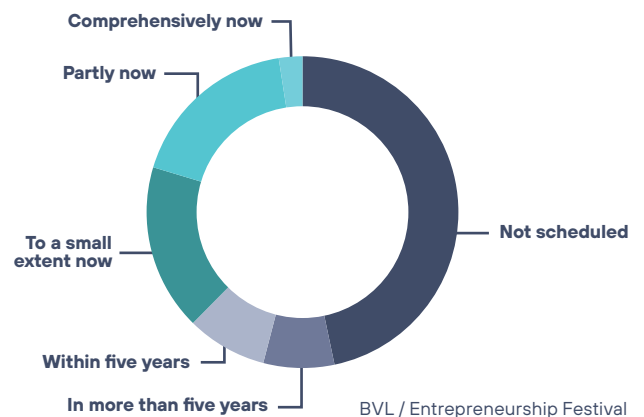
The challenge: in configuring an overall solution, it is the interoperability of the individual components that is the focal point. This includes, inter alia, the automated vehicles, centralised control and loading systems as well as the protective systems for humans working in the same zones.

The orchestrator of the digital *ecosystem* must, therefore, have appropriate experience with remote-controlled processes. In particular in the case of mobile use cases, close matching of the requirements for the underlying connectivity is essential – regarding latency, providing cell phone signals throughout the logistics site, resistance of communications signals to interference etc.

Implementation: to implement this, trucks and tractors must be fitted with the corresponding equipment – such as sensors, control systems etc. – to enable highly automated travel and manoeuvring. Teleoperation is guaranteed through appropriate software on board the vehicles and by means of the configured teleoperation centre. Connectivity also provides a private 5G network on the freight forwarder's site. Edge computing to guarantee fast, dependable and secure data processing is also essential here. In this way, latency of data transmissions can be kept to an absolute minimum so that sensors and control information can be interchanged fast enough to enable vehicles to respond

almost in real time. The individual components making up the overall solution are generally supplied by different hardware and software manufacturers and connectivity providers. As a result, orchestration is also required here to achieve the overall aim.

Advantages: once the solution has been implemented, the company significantly enhance the efficiency of its loading and unloading activities on the site. The number of vehicles managed and, as a result, the amount of goods processed, can be considerably increased.

Digitisation plans in the logistics field

Comprehensively now · Partly now · To a small extent now · Within five years · In more than five years · Not scheduled · BVL / Entrepreneurship Festival

Source: https://www.businessinsider.de/gruenderszene/automotive-mobility/logistik-autonom/

Example of added value from digital _ecosystems_

Carl Zeiss

Carl Zeiss, expert in optical instruments and precision mechanics, uses spectrometers in its quality assurance processes in order to analyse the quality of raw materials with a view to ensuring the best possible settings of the process parameters for its manufacturing process. The data recorded by the spectrometers, manufactured in-house, is then transferred in real time to cloud storage managed by Microsoft. The data is then analysed using artificial intelligence (AI) algorithms provided by other partners in the digital _ecosystem,_ and the data is then returned to the production installations in the form of the necessary parameters. This enables the company to achieve greater efficiency, higher production quality while, at the same time, optimising its use of energy and resources.

Danske Bank A/S

Danske Bank A/S is the largest Danish bank. In 2013, the bank decided to implement a four-year programme to implement a peer-to-peer payment solution called MobilePay by creating a digital _ecosystem._ Today, the bank processes over 200 million transactions per year using that system, which has meant it turns over payments exceeding 1 bn US dollars every month. In 2021, the system was merged with the Vipps service, popular in Norway, and the Pivo service used in Finland to form a joint payment platform.
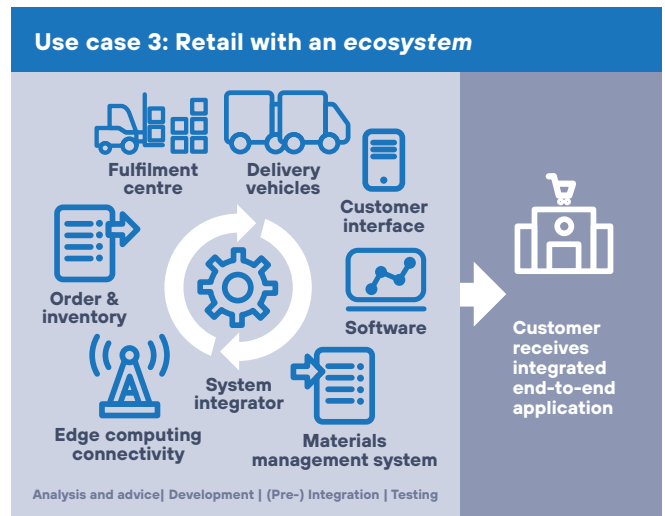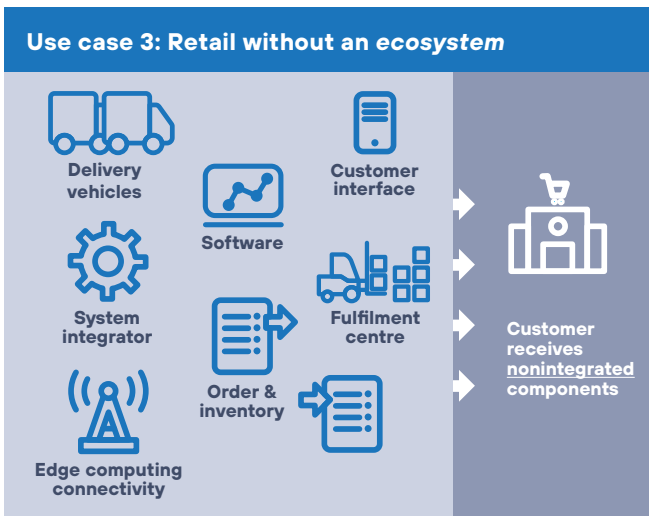
thyssenkrupp Elevator

thyssenkrupp Elevator, a specialist provider of lifts and building systems, employs digital twins in order to offer predictive maintenance for its lifts. To this end, the company integrates IoT sensors developed by specialist suppliers to monitor all aspects of a building in real time – from lifts and lights to air-conditioning, ventilation and heating systems. AI-based analytical systems, contributed to the digital _ecosystem_ by additional solution specialists, combine the data with additional information on the way the building is used. This base data is used to identify potential problems, detect usage patterns for optimising processes and functions and scheduling maintenance tasks in an optimised way.

Use case 3: Retail without an *ecosystem*

Use case 3: Retail with an *ecosystem*

Analysis and advice| Development | (Pre-) Integration | Testing

3 Implementation of a digital *ecosystem* in a retail business

Starting position: retailers often have to adapt to unexpected shifts in consumer habits. This includes, for example, increasing demand in urban zones for particularly fast deliveries of orders straight to the consumer's home.
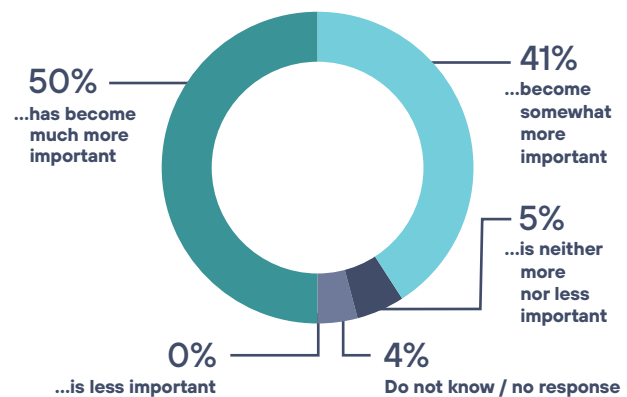
The challenge: implementation of this customer expectation in the most efficient and cost-effective way requires a complex digitisation project. The required solution is not available as a turnkey product but is made up of a series of individual modules.

Implementation: the implementation of this project consists mainly of the following individual modules. First, a digital customer interface must be established which customers use to order their goods direct. An order and inventory management system will also be needed as will a digital, fully automated micro-fulfilment centre. Finally, it is necessary to integrate this in the materials management system. Only in this way can orders be processed as quickly as possible – starting with order picking and packaging through to outgoing goods and dispatch. To ensure that the delivery itself runs in the least complicated manner, individual networking between the delivery vehicles that transport the goods direct to customers from the micro-fulfilment centre is necessary. The overall solution package also includes the necessary telecommunications infrastructure. That system makes it possible for individual systems and solution modules to communicate with each other.
Within the context of an *ecosystem,* the core competencies and contributions of the individual module providers come together to make up a holistic product. Even the future use of autonomous delivery vehicles is already included in the *ecosystem* solution.
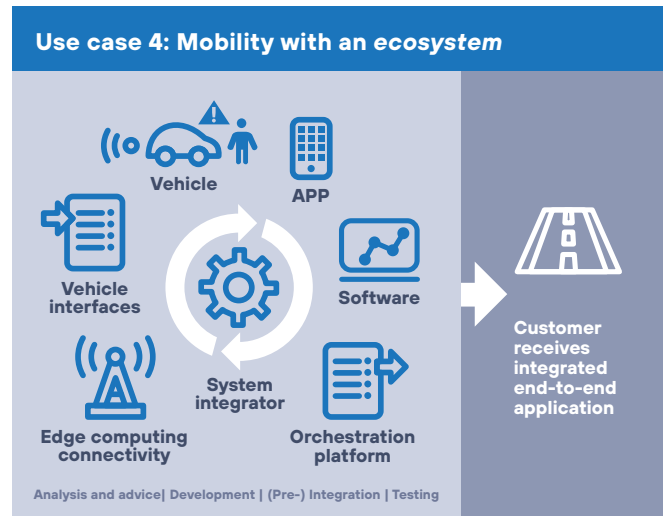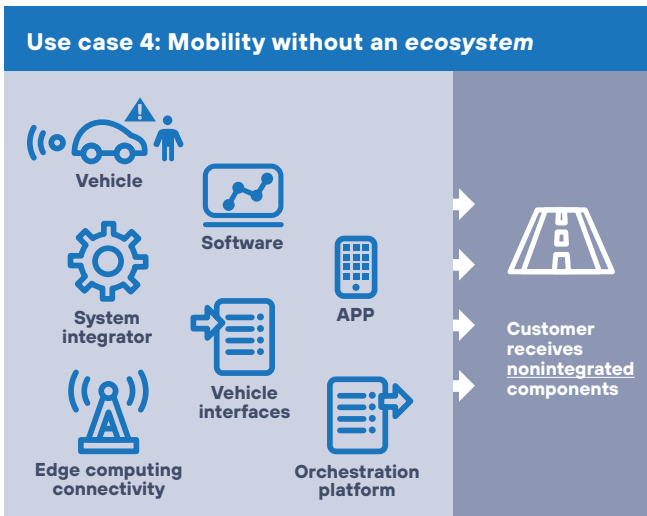
Advantages: thanks to *ecosystem* integration, each retail business is able to concentrate on its own specific core competencies instead of investing time, money and resources in the complex management and implementation of a digitisation project. At the same time, this solution also enables low-cost, fast delivery of the individually selected goods to the consumer. In this way, the retailer can increase sales while, at the same time, considerably improving the customer experience and consumer satisfaction. In addition, expensive rented space in urban zones can be exploited far more efficiently.

Digitisation is gaining dramatically in importance in the retail business

As a result of the Corona pandemic, digitisation for our company...

41% ...become somewhat more important

5% ...is neither more nor less important

50% ...has become much more important

0% ...is less important

4% Do not know / no response

Basis: All surveyed retail business in Germany (n=505)
Source: Bitcom Research 2021

Use case 4: Mobility without an *ecosystem*

Vehicle

Software

System integrator

APP

Vehicle interfaces

Edge computing connectivity

Orchestration platform

Customer receives nonintegrated components

Use case 4: Mobility with an *ecosystem*

Vehicle

APP

Vehicle interfaces

Software

System integrator

Edge computing connectivity

Orchestration platform

Customer receives integrated end-to-end application

Analysis and advice| Development | (Pre-) Integration | Testing

4 Implementation of a digital *ecosystem* in the field of mobility

Starting position: in mobility, too, digitisation is playing an ever more significant role. One example of this is implementing a system for collision warnings between participants in road traffic. However, due to the considerably fragmented, often manufacturer-specific solutions in use in the mobility market, implementation of such a system is hardly conceivable.

The challenge: there is also no off-the-shelf solution for this use case and not even one from a single source. Instead, the car manufacturer has to procure each separate part of the solution individually and ensure they can be integrated. Furthermore, in this case, particularly close cooperation between the individual module providers is essential. With time-critical applications, in particular, the solutions used must be perfectly matched to each other. Even the smallest discrepancy may have far-reaching ramifications. As an example, the computing capacity available from the server provider in the network used by the telecommunications company must be configured in such a way that the required real time capabilities are always accessible. Managing cooperation of this scale outside an *ecosystem* is hardly feasible. A central orchestrator is absolutely essential.

Implementation: full-scale implementation of this application requires at least five parties. First, there is the provider of an app solution that can be used by pedestrians and cyclists and continuously monitors their position in the flow of traffic. Secondly, there is an automotive OEM supplier that provides vehicle manufacturers with the necessary sensors. The sensors must communicate with the provider's app and the interfaces on board the vehicle to enable it to respond quickly enough in the event of an impending collision. Thirdly, there is the telecommunications provider that makes the network available so that the app and sensors in the vehicle can communicate with each other at all times and, in addition, ensures handovers to other telecoms networks as required. Fourthly, there is the provider of the necessary edge computing resources at every required position in the telecoms provider's network. In this case, data processing must take place almost in real time to enable a response to happen preferably without any delay. And fifthly, there is the orchestration platform that makes it possible to provide and operate the calculation model for vehicle position detection and motion vectors on the many distributed servers.

Advantages: thanks to a digital *ecosystem,* the core competencies and performance contributions of the individual participants are merged to form a single holistic product. Such a solution frees up the vehicle manufacturer to concentrate on its own core competencies. Due to the performance of the digital *ecosystem* and its central orchestrator, the manufacturer need not invest either time or resources in what would otherwise be a highly complex digitisation project. Despite that, the originally intended objective can be achieved without restriction: accidents involving people and vehicles on the roads could be reduced while, at the same time, noticeably improving the flow of daily traffic.

Opportunities and benefits for consumers, customers and solution providers

The speed of change in technological fields is continuously increasing, which requires companies to increase their speed of innovation to the same extent. However, individual companies and providers are finding it increasingly difficult to keep up with the enormous speed and the considerable pressure to change.
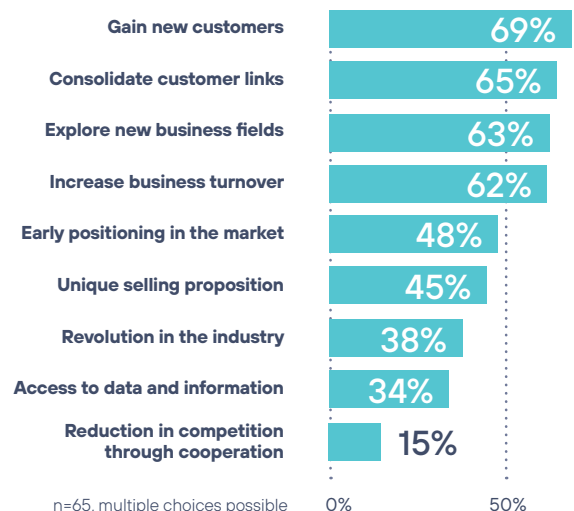
In a digital *ecosystem,* the necessary innovations can be achieved much faster, as all the participants are able to focus on their individual strengths and their own core business. This automatically results in the overall product or solution making faster progress. However, this requires close coordination with regard to the interfaces and this task has to be solved by the parties involved in the *ecosystem.*

The support provided by the common *ecosystem* enables providers to present holistic and fully integrated solutions, and this, in turn, enables them to meet the more complex requirements of their customers. The rapid further development of relevant technologies is even proving to be beneficial: the increasing migration of IT solutions to the cloud as well as the spread of open standards, interfaces and platforms is facilitating the joint cooperation of the various parties in a digital *ecosystem.*

The turnkey product is made available to customers by the solution provider. In this case, the solution provider takes on the role of the "one face to the customer."

Potential of digital *ecosystem* plans

What does your company expect of its digital *ecosystem* project?

Gain new customers	69%
Consolidate customer links	65%
Explore new business fields	63%
Increase business turnover	62%
Early positioning in the market	48%
Unique selling proposition	45%
Revolution in the industry	38%
Access to data and information	34%
Reduction in competition through cooperation	15%

n=65, multiple choices possible   0%   50%

Source: https://www.iese.fraunhofer.de/content/dam/iese/dokumente/leistungen/
umfrage_digitale_oekosysteme-dt-fraunhofer_iese.pdf p.23

Ecosystems as competitive advantages for solution providers

Particularly in view of the complexity of digitisation projects, the provision of a complete solution offers customers and consumers increased added value and a clear competitive advantage for the provider: while the establishment of a complete value chain for an individual provider is associated with high capital expenditure and time invested – and not forgetting the risks – cooperation with partners within the framework of an *ecosystem* offers an attractive, more cost- and resource-efficient alternative for market access.

Ecosystem-based business models contribute to increasing both the speed of innovation and efficiency at the same time.

If a company wants to offer a new digital product, it usually has three options:

1 Build – Acquire one's own competencies, which, however, may take considerable time and slows down the speed of innovation.

2 Buy – Purchase skills, for example by acquiring another company, which, however, is accompanied by high levels of capital investment and risk.

3 Partner – Cooperate with other companies with differing core competencies. This allows a company to offer a new value proposition without extended research & development phases and without large-scale capital investments.

Where this build, buy or partner decision is on the table, the "partner" option turns out to be the preferred choice to an increasing extent. By combining different competencies in the *ecosystem*, new products can be developed faster, more efficiently and with lower costs. In addition, the competencies brought together in the *ecosystem* help the individual providers to understand the needs of their customers better and jointly develop the best possible solution for the given problem. This is also favoured by the fact that individual partners are closer to the end customers in the value chain than others. However, they all need to understand the upstream and downstream steps fully in order to implement the necessary interfaces properly.

## Digital *ecosystems* as an opportunity for business clients and solution providers

Benefits of digital *ecosystems* for business clients

- Turnkey holistic solutions from a single source
- Easy access to core competencies in a complex solution environment
- Reduction of complexity in procurement, supplier management and implementation
- Lower-risk implementation
- Added value of an integrated end-to-end solution while reducing procurement costs at the same time
- Enables the company to focus on its core business
- No need to build one's own new competencies for complex digitisation projects

Benefits of digital *ecosystems* for solution providers

- Offer of holistic, fully integrated solutions
- Competitive advantages by providing an end-to-end solution
- No backward and forward integrations necessary in the value chain
- Increased speed of innovation and efficiency
- Innovation with reduced capital investment and time outlay
- Focus on further development of one's own core competencies
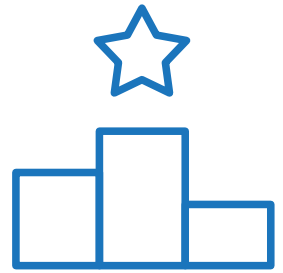
Success factors in digital *ecosystems*

Several factors are essential preconditions for the success of a digital *ecosystem*. As a result, they must be met when implementing the system:

- **"1+1=3":** the combination of the individual modules or core competencies must create added value or a USP (unique selling proposition) for the end customer.

- **Cooperation on a level playing field:** every role in the *ecosystem* has its importance and must be taken seriously. Sharing knowledge from the respective fields of competence is an essential activity. This is the only way to ensure that the jointly created product or service creates added value. Furthermore, *ecosystems* benefit when all the participants understand the entire *ecosystem*. This includes an understanding of the activities, products and sector-specific characteristics of the individual participants as well as comprehensive knowledge of the overall solution. This common, mutual understanding is essential for the active design of the *ecosystem* as well as its interfaces, for example to ensure the interoperability of the various individual components of the overall solution.

- **Clearly defined accountabilities:** the roles and account-abilities must be clearly defined and agreed from the outset. Among other things, this includes defining exactly which of the partners is to be the "one face to the customer." This is crucial for the customer's one-stop-shop experience. Ideally, this will be the partner with existing customer relationships – that is, the participant in the *ecosystem* who is already close to the customers and their needs.

- **There is no one-size-fits-all business model:** one of the central issues when setting up a digital *ecosystem* is deciding on a common business model. This means that all the participants in the *ecosystem* are motivated according to the same logic and participate equally in the success of the overall solution. In this way, all the participants in the *ecosystem* understand the need to pull together. A strong will to cooperate between the partners is essential, and there must also be a certain flexibility – one-size-fits-all definitely does not apply in these cases. The joint business model is the basis for the long-term existence and success of the *ecosystem*.

The value chains in an *ecosystem* have to be configured from scratch right at the beginning. This usually means that all the participants are entering new territory and there can be uncertainty as to whether the cooperation and the *ecosystem* will be successful. This means that *ecosystems* sometimes presuppose a greater willingness to take risks than established business models. However, the more experience the participants in the *ecosystem* have gained, the lower that risk will be.

- ***Ecosystems* require an orchestrator:** a successful digital *ecosystem* requires a strong orchestrator who holds the reins within the partner *ecosystem*. The orchestrator can combine this role with other roles and competencies or, where appropriate, restrict himself or herself to this one coordinating role.

In order to implement the *ecosystem* in a future-proof manner and to ensure its availability over a long period of time, it is important continuously to develop the entire *ecosystem* or the products and services provided. This must also be ensured by the orchestrator. New insights with regard to consumer trends, market needs, and technological developments must continuously be fed into the *ecosystem*. But in order to be able to respond to in good time to changes, a certain flexibility is a prerequisite.

Checklist: success factors in an *ecosystem*

- **"1+1=3"** – Does the cooperation create added value for the customer?
- **Cooperation on a level playing field** – Is knowledge gleaned from the individual and for the individual?
- **Clearly defined accountabilities** – Who is the "one face to the customer"?
- **Joint business model** – Do all the participants benefit to the same extent from the success of the overall solution?
- **Orchestrator** – Who in the e*cosystem* holds the reins?
- **Flexibility** – Can the combined partners respond quickly to changes?
- **Iterative learning** – Is new information about the needs of the market and industry or technological developments consistently shared and implemented in the *ecosystem*?

Digital *ecosystems*
at Telefónica Deutschland

Telefónica Deutschland has successfully applied the principle of partner *ecosystems* for around 20 years. In the business-to-partner (B2P) sector, this telecommunications provider has already established and maintained successful partnerships in many different business and cooperation models. This has resulted in a clear customer and partner-centric corporate culture.

The combination of Telefónica's core competencies, for example the provision of dependable, high-quality connectivity, together with the assets of the partners, results in a relevant USP for customers. In this context, the telecommunications technologies provided by Telefónica Deutschland are seen as enablers for digitisation. This applies, for example, to 4G/5G cell phone technology, narrowband IoT and LTE-M, private campus networks, multi-access edge computing, SD-WAN and fixed broadband connections. Telefónica Deutschland also offers the largest footprint in Germany in the landline network sector (VDSL, broadband cable FTTH/fibre) through strong partnerships.

Telefónica Deutschland's role in digital *ecosystems*

From within Telefónica Deutschland's own core business, extensive experience has been gained with digital *ecosystems* – in particular in the role of orchestrator. Telefónica Deutschland takes on the role of orchestrator, for example, in connection with private 5G campus networks or in implementing the Telefónica SD-WAN offer. In these tasks and projects, the aim is to coordinate several partners and solution providers with a view to creating a solution that is designed to benefit both consumers and customers. This corresponds to the classic definition of an orchestrator in a digital *ecosystem*.

As a rule, Telefónica Deutschland always takes on the role in digital *ecosystems* that makes most sense and adds most value in each specific case.
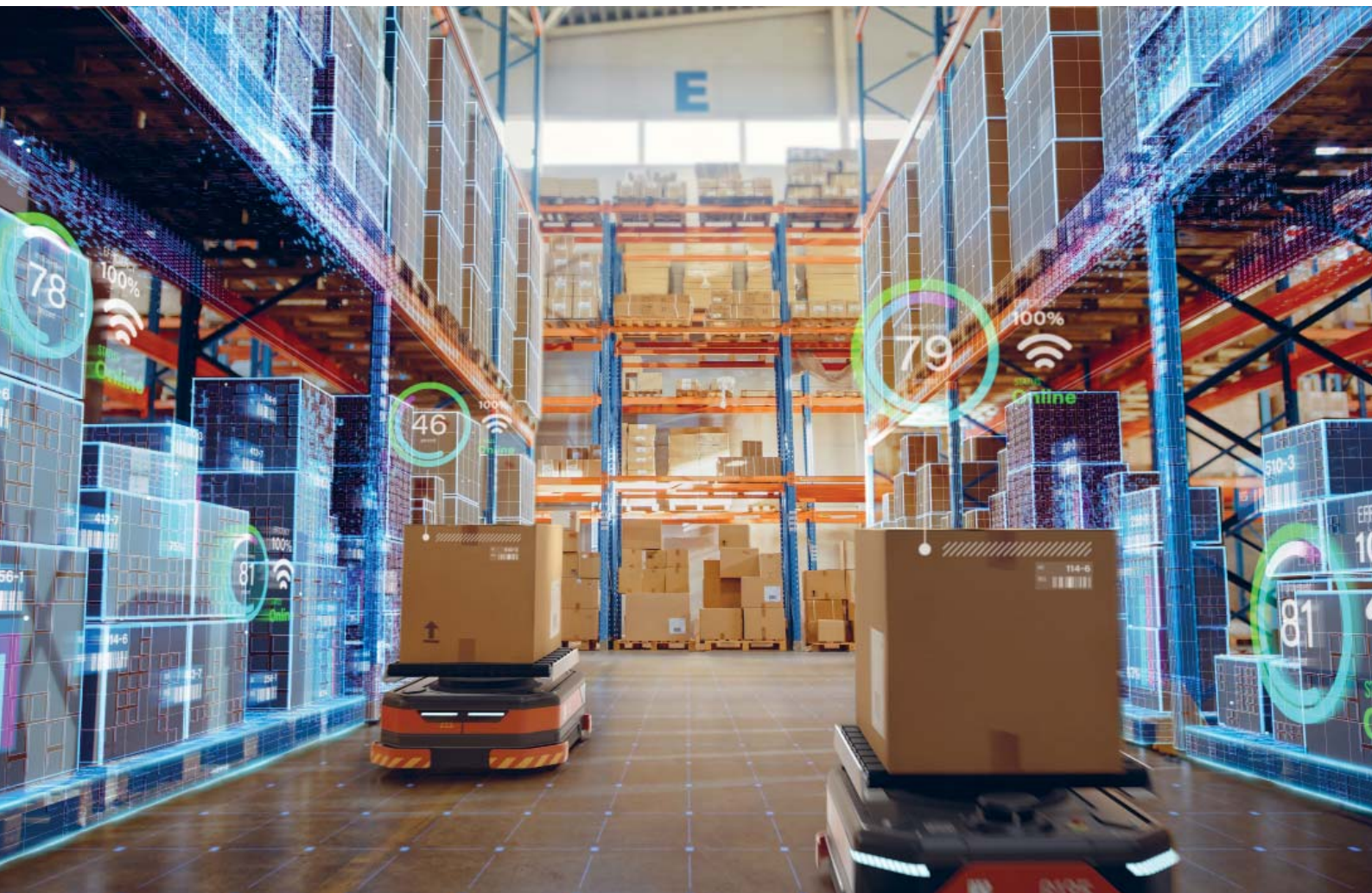
In addition to its experience as an orchestrator, Telefónica Deutschland contributes other assets to an *ecosystem,* regardless of its role in that *ecosystem.* For example, Telefónica Deutschland has gained valuable experience and best practices that were required in connection with the migration of its own systems and applications to the Cloud – while at the same time meeting high security and compliance standards. Other participants in a digital *ecosystem* can benefit from this experience.

Telefónica Deutschland has built up reliable, high-performance invoicing capacities based on its approximately 46 million customer and invoicing relationships. These resources and infrastructures can help the participants in a digital *ecosystem* to manage their own invoicing relationships.

Telefónica Deutschland's decades of experience in the telecommunications market make it an expert in the complex regulatory and legal environment in this market. Companies from outside the industry would have to acquire this knowledge painstakingly if they wanted to offer mobile-based connectivity – or they can simply benefit from the expertise of Telefónica Deutschland in the *ecosystem.*

The international structure of the Telefónica Group also makes it possible to achieve economies of scale in the provision of a broad technology portfolio. In addition, Telefónica can call on the resources of no less than 12 country subsidiaries and more than 113,000 employees.

The start-up incubator Wayra, founded by Telefónica Deutschland in 2011, connects the telecommunications provider worldwide with the start-up community and in particular with technological and economic disruptors. As a result, Telefónica Deutschland has direct access to a steady stream of new disruptive solutions and can quickly integrate them into digital *ecosystems* as required. In some cases, disruptive solutions are even deliberately brought about by these *ecosystems.* Currently, more than 530 active international start-ups are included in Telefónica's portfolio.

Telefónica also runs several test labs for partners and customers, in which complex overall solutions are jointly assessed and optimised.

These capabilities make Telefónica Deutschland an ideal partner in digital *ecosystems* – even in the case of high complexity and a high degree of individualisation of the implemented solutions. Telefónica Deutschland provides its partners and business customers with customised support in configuring digital *ecosystems.*

"An experienced orchestrator will often be instrumental in making faster, efficient digitisation possible."

Three questions to Alfons Lösing,
Chief Partner & Wholesale Officer
on the Management Board
of Telefónica Deutschland

- **What effect has digitisation had on Telefónica Deutschland's partner business?**

Lösing: Digitisation changes underlying processes and structures in industry and the economy. It is the decisive lever affecting the future capability of all businesses – from small SMEs up to international corporate Groups. However, in view of the rapid rate of technological change and increasing demand for innovative, digital business models, many businesses are having difficulty keeping pace. Overall, digital transformation is presenting many businesses with a number of challenges and uncertainties. The solution environment is complex and the market fragmented. Often, businesses lack the experience with end-to-end implementation of digitisation projects. It makes sense to approach this complexity with digital *ecosystems,* because in that environment the core competencies of a number of different actors can be combined to participate together on the solution. Partnerships of this kind are, in my opinion, essential to cope with the challenges of digitisation projects for our customers.

- **Isn't the communication of best practices or the role of an orchestrator in this field somewhat far removed from the core business of a tele-communications provider?**

Lösing: Of course, as a telecommunications provider, we are the ones that create the foundation for the digital transformation of businesses with our networking solutions. But our range of products and services goes far beyond that.

In many networking projects we have seen that businesses should not attempt to manage digitisation alone. The best solution is easy access to a central, dependable, and experienced contact, who draws together the corresponding skills for planning, selection, implementation, and operation of complex digitisation solutions. For businesses, which can be the initial step in faster, efficient internal digitisation.

We at Telefónica Deutschland can provide this. We can draw on our successful partner business and wide-ranging SD-WAN and 5G campus network projects to apply comprehensive know-how and in-depth experience in orchestrating such digital *ecosystems.* In addition, we have the necessary experience in networking industry.

- **What part does Telefónica play in connection with digital *ecosystems*?**

Lösing: Depending on the requirements and configuration of the *ecosystem,* Telefónica Deutschland can take on a number of different roles in the *ecosystem.* We not only provide our partners with high-performance networking solutions that can be flexibly tailored to their specific requirements via mobile communications, broadband, 5G private networks, 5G network slices, SD-WAN and IoT. We also provide our partners with our infrastructure and resources and our expertise in areas such as security and compliance, regulatory requirements in the connectivity environment and end-customer invoicing, if required. Where appropriate, we can also orchestrate the *ecosystem* so that the core competencies and service components of the individual participants are combined into a holistic product. Our experience in building successful partnerships, as well as our understanding of our partners and their business models, products, and services, are essential to understanding and shaping the *ecosystem.* If desired, we offer this to corporate customers as a turnkey solution – and can thus drastically reduce the complexity and expense of digitisation projects.

The next steps

Benefit from our experience as orchestrator of digital *ecosystems*

Telefónica Deutschland supports you in complex digitisation projects. Our partner managers and digitisation experts will take into account the specific requirements and individual boundary conditions of your business.

Below, you will find additional information resources and all our contact options.

Additional sources of information

5G campus networks by Telefónica: https://iot.telefonica.de/iot-m2m-produkte/5g-campus-netze-campus-networks/
Wayra – the start-up accelerator from Telefónica: https://www.wayra.com
Alfons Lösing, Chief Partner & Wholesale Officer on the Management Board of Telefónica Deutschland, talks in this video-based interview about digital *ecosystems* for trade companies: https://www.youtube.com/watch?v=PacoxYuSWcg
"How SMEs can stay future-safe" (German title "Wie der Mittelstand zukunftsfähig bleibt") – interview (in German) with digitisation and transformation expert Sven Göth in the O_2 business magazine: https://www.o2business.de/magazin/interview-mit-sven-goeth

Contacts

Contact for partner businesses:
Please contact us through the following email address wholesale-partner-de@telefonica.com for information about the Telefónica *ecosystem* and please put "Telefónica *ecosystem*" in the subject line

Contact us through the channel that is most convenient for you. You will find an email contact form, the form for a call-back request and links to advisory staff through WhatsApp or advice through our chat system on https://www.o2business.de/service/hilfe-kontakt/hotlines