

## Innovation in Small and Medium Enterprises

How startup management practices can help in solving digitalization challenges

### **Mission Statement**

New technologies, new business models and customer needs are opening up vast opportunities in industries worldwide. While the future seems to promise almost unlimited disruptive growth potential, existing management and industry practices are being challenged by the same developments.

How can companies harness the potential of these changes and use them for the continual success of their business? It is crucial to understand the new technology developments and learn how to apply them so that firms, economies and societies will reap the benefits of the technological transitions before us.

Within the framework of our **Deloitte Innovation Trends** series, Deloitte features research that provides deep understanding of the technological transitions. This research also provides a thorough understanding of emerging business models and the implications they hold for both industry and the wider economy.

# Executive Summary

Embracing digitalization allows organizations to improve internal processes and drive their growth potential. Small and medium enterprises (SMEs), however, face an entirely different set of innovation challenges compared to large companies due to limited resources. Data-driven, digital shifts in their business models and organizations demand substantially more from them in terms of their innovation efforts.

This paper explores the opportunities and barriers to digitalization and innovation that confront SMEs. In particular, the focus is on capacity constraints, disruptive technologies and digitalization, as well as how the concept of Exponential Organizations (ExO) can provide a solution-oriented approach for SMEs to overcome their specific innovation barriers.

The main points covered are:

- given their special features, SMEs are inherently constrained in their innovative activities due to a lack of financing and a shortage of skilled labor,
- innovation intensity is significantly lower for SMEs than for larger companies,
- from all technological developments, digitalization and internet-related topics have the highest importance for SMEs,
- high connectivity and low cost of information in the digital era are changing the rules of transaction costs,
- IT knowhow, IT infrastructure and big data analytics tools can be sourced from the cloud,
- SMEs should adapt certain characteristics of ExOs such as leveraging external assets.

# 1. SMEs – Focused and Innovative

SMEs are regarded as an engine for technological progress, particularly in high technology areas, as they focus on specific products and employ a highly specialized workforce. Another distinctive feature is their lean organizational structure and the resulting flexibility it provides. (1)

This means SMEs tend to have a fast decision-making process. It also means SMEs can react to technological opportunities in a timelier manner compared to larger corporations. In particular, such innovative strengths are well utilized in dynamic and specialized technological areas such as biotechnology, information technology and nanotechnology.

Based on a recent study on German SMEs, SMEs aim to (2):

- use digitalization to foster their position in the market,
- continue to be successful with specialized and niche strategies,
- remain flexible so as to play an active role in shaping the digitized industry,
- cooperate in innovation activities with scientific institutions and regional partners,
- primarily use equity and subsidies in order to finance their innovation activities.

## Barriers: financing and skilled labor

SMEs face multiple obstacles in the implementation of innovation activities. Multiple studies have examined innovation approaches and digitalization processes in German SMEs revealing that 72% of the SMEs active in innovation have experienced constraints. (2)

Apart from high risks and costs, which are inherent characteristics of innovation irrespective of the organizational structure of a company, SMEs are specifically constrained by a lack of internal and external financing. Up to 39% of all SMEs see internal financing as a major barrier, while 36% consider external financing a problem. (3) These are followed by concerns around legal and regulatory issues, long administrative procedures and organizational problems, all of which can delay a project. More worryingly, innovation barriers means SMEs often prefer to forgo an opportunity and not initiate a project. (4)

In addition, new methods of innovation can emerge from the digitalization process itself and for which some SMEs might not be prepared. Lacking the capabilities to develop these innovations, enterprises can end up lagging behind the R&D agendas of large corporations.

More than one third of entrepreneurs also see a shortage of skilled labor as a major barrier to innovation. SMEs often struggle to offer adequate financial incentives and career opportunities to a young, talented workforce compared to larger corporates. Furthermore, SMEs may face difficulties in establishing cooperation agreements with scientific institutions due to their small size, while their stronger focus on economic feasibility can mean opportunities are not explored in the first place.

## SMEs are as diverse as the challenges

Whereas young SMEs face challenges in obtaining initial funding and a stable customer base, small SMEs face obstacles in attracting skilled labor due to their limited scope to offer attractive financial incentives. SMEs with a strong commitment to R&D confront an increased total risk, as their economic success depends significantly on the success of their R&D activity. Finally, unique innovation barriers may be present in the technological environment and in the industry in which the enterprise is active.

## 2. Innovation Intensity of SMEs – Relatively Low

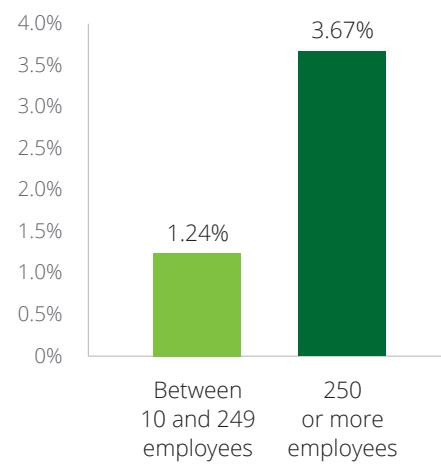
To understand how SMEs could overcome these barriers, a comparative exploration of systematic differences of innovation intensity between SMEs and larger companies has been undertaken. This examines innovation expenditure, cooperation with external partners and the contribution of innovation to the company turnover.

### Innovation expenditure of SMEs at lower level

Comparing SMEs and companies with 250 or more employees provides an approximate distinction between SMEs and larger corporations for analyzing innovation expenditure and its structure.\* As shown in figure 1 the relative innovation expenditure (measured as a percentage of total turnover) is three times higher for bigger companies than for SMEs.

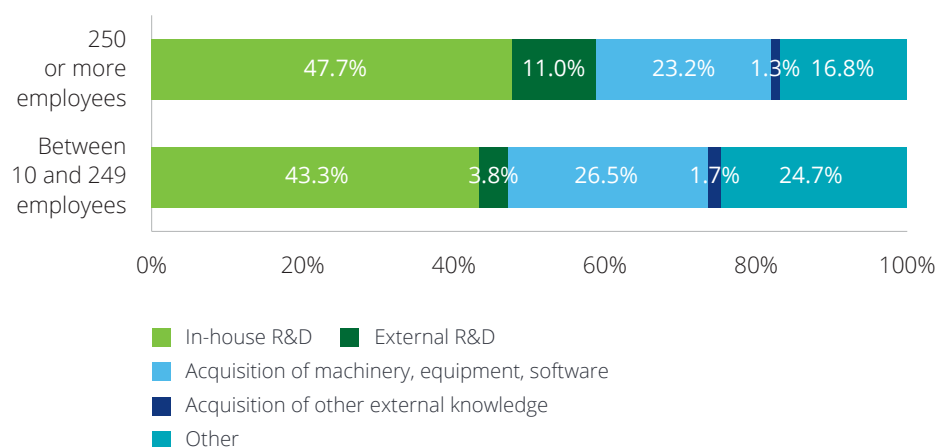
Figure 2 shows the mix of innovation expenditure: SMEs have a tendency to acquire required technologies rather than engaging in own research and development activities.

**Fig. 1 – Total innovation expenditure as % of total turnover**



Source: own illustration based on CIS 2014 data (5)

**Fig. 2 – Composition of innovation expenditure**

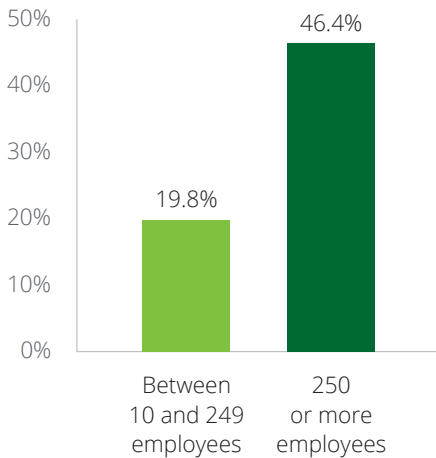


Source: own illustration based on CIS 2014 data (5)

**Importance of cooperation with universities**

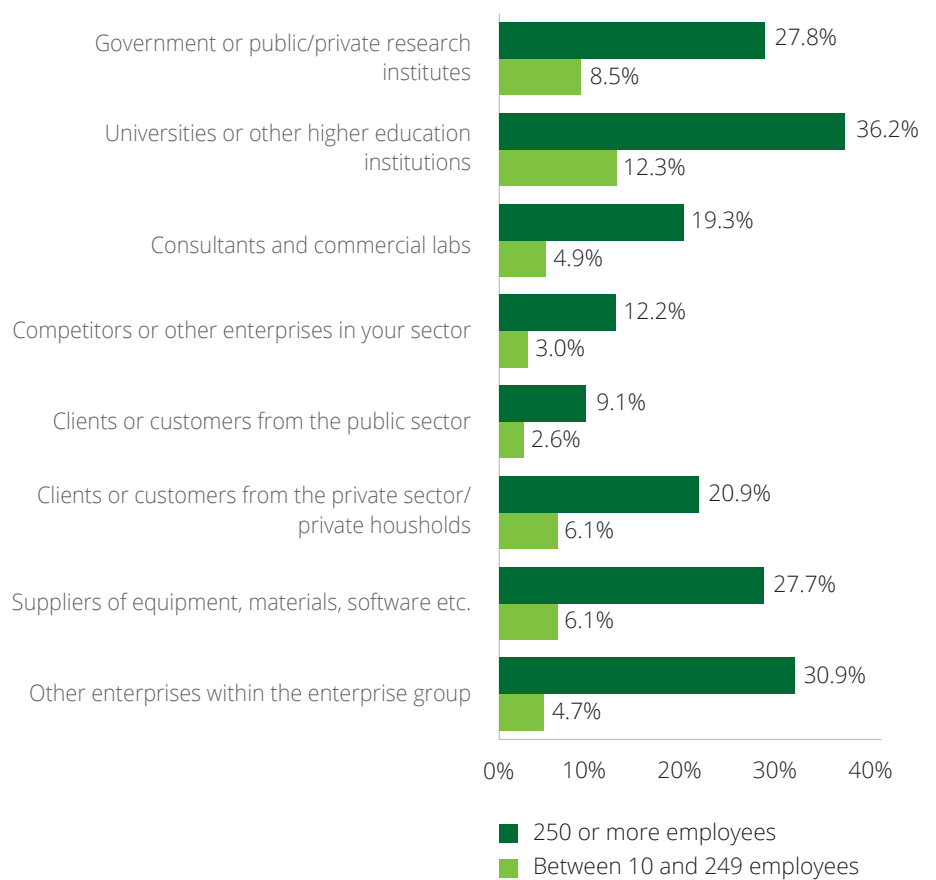
Larger enterprises engage in cooperation agreements more than twice as often as their small and medium sized equivalents (see figure 3). Both SMEs and large corporations see universities as the most important potential collaboration partners. Government and public/private research institutes rank second (figure 4).

**Fig. 3 – Enterprises with cooperation arrangements as % of product/process innovative enterprises**



Source: own illustration based on CIS 2014 data (5)

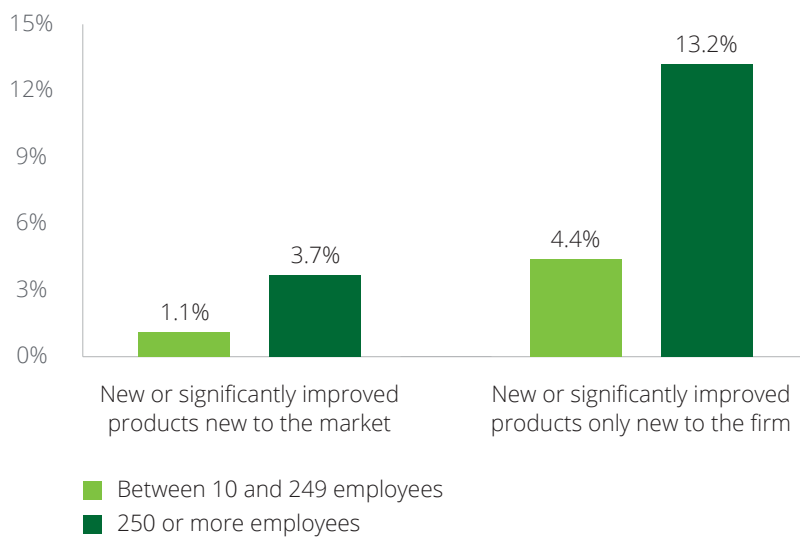
**Fig. 4 – Companies engaging in particular forms of cooperation as % of total number of enterprises with product/process innovation**



Source: own illustration based on CIS 2014 data (5)

These differences also reflect the overall contribution of innovation to turnover: it is far higher for larger companies than for SMEs. Products new to the firm contribute up to 13% to total turnover in large companies and only 4% for SMEs. Products entirely new to the market have a value for large companies more than three times as high as for SMEs (see figure 5).

**Fig. 5 – Turnover of innovative products as % of total turnover**



Source: own illustration based on CIS 2014 data (5)

### 3. Digitalization and Disruptive Technologies Influence Innovation

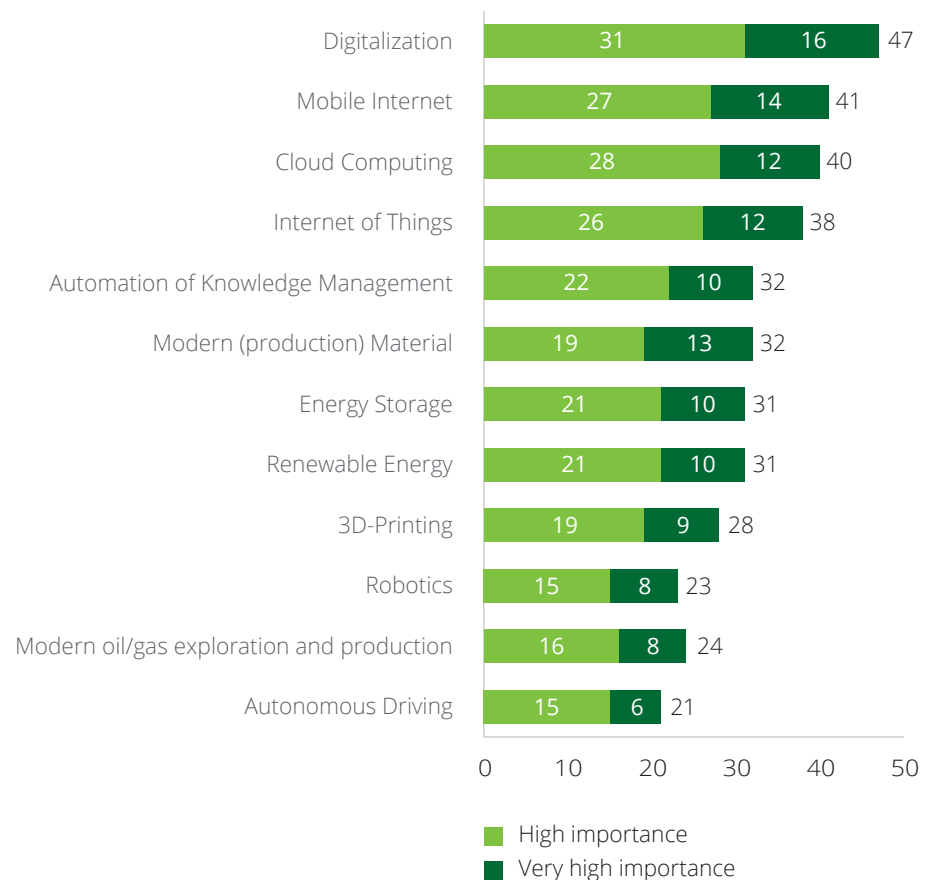
Disruptive innovations often arise unexpectedly and generate new business models and markets. At the same time, they can also destroy existing and sometimes long established technologies, products and services. This was evident in the way digital cameras replaced conventional analog photography and how the rise of instant-messaging services heralded the decline of SMS. These processes threaten SMEs, particularly those in highly specialized fields.

**The challenges of digitalization**

Disruptive innovation currently plays a role in the businesses of more than one third of all SMEs. (2) The disruptive innovations of importance are digitalization (that is, using digital technologies and moving to a digital business) and internet-related innovations. For 47% of SMEs, digitalization has a high or very high importance, followed by the mobile internet with 41%, cloud computing with 40% and the Internet of Things with 38%. Technologies that only address a limited group of companies, such as 3D-printing or autonomous driving, are not considered of significant importance to the majority of SMEs (see figure 6).(6)

For 91% of SMEs, digitalization is seen as facilitating the implementation of flexible and customized business models. At the same time, however, 50% of manufacturing SMEs do not appear to take disruptive innovations seriously enough, so run the risk of falling behind in a changing market environment and fall behind. Only 24% agree that SMEs will benefit from digitalization and strengthen their position against large corporations. (2) These sentiments show an awareness of the potential opportunities of disruptive innovation, but also of the threats posed to SMEs.

**Fig. 6 – Importance of disruptive innovations among German SMEs**



Source: Innovationsreport 2016 (6)



### New digital technologies are not widely used by SMEs

Even though the basic infrastructural requirements for digitalization processes exist (91% of SMEs use computers and 89% have access to the internet), only 11% of companies use cloud computing technologies. Utilization of specific digital technologies is extremely sparse. (2) This holds especially for technologies in the areas of information processing (for example, 2% for big data analysis) and marketing and external communications (5% for e-commerce and 4% for social media). (7)

The digitalization process poses specific challenges for SMEs as 26% of SMEs are struggling with data security. Some 23% have trouble with data protection. SMEs also confront missing technical infrastructure (19%) or general skill requirements for qualified staff (13% lack suitable IT skills among employees and 12% suffer a shortage of specialized IT staff). (7)

Most SMEs use only basic digital infrastructure due to issues related to infrastructure, knowhow and staff. The general aversion of SMEs to new technology could cause them to drop behind their competitors on the international stage.

### Learning from start-ups

In times of fast innovation processes, many companies are struggling to keep pace with competitive forces in the market. As industry moves from a material-enabled enterprise to an information-enabled one, the relationship to the physical world is changing rapidly. Digitalization and an information-enabled environment can help lower the transaction cost of processes and services. Furthermore, business can, especially with the use of platforms, scale organizational factors, such as knowledge, expertise and physical assets.

To remain competitive and successful during this process of digital transformation, enterprises are increasingly seeking analogies in the brief but successful history of the digital start-up industry. SMEs should not see start-ups as a threat, but as examples of businesses that have successfully adapted in the digital age.

Despite their young age, start-ups are characterized by a high degree of innovation and a strong (often exponential) growth potential. This is due to their relatively small organizational structure compared to their reach and scope. Even large enterprises are hoping for new business stimuli from start-ups, regarding organization, technology and innovative ideas, with a particular focus on the implementation of operational strategies and practical instruments. The main attributes that help start-ups gain exponential growth are new organizational techniques that leverage accelerating, exponential technologies. (9)

### Transaction cost theory and digitalization

British economist Ronald Coase argued that the main reason why companies exist, as opposed to sole individual agents exchanging commodities and services directly in the market, is the existence of transaction costs. Through the acquisition of assets, a company can reduce transaction costs and, as a result, increase its competitiveness and efficiency. (8)

The emergence of a new technological era, namely that of digitalization, has thrown up a new set of companies that are regarded to be among the most successful and promising in their markets. Surprisingly, these businesses are focused on the (at first) counter-intuitive idea of leveraging their assets externally. That is, they are seeking to reduce their transaction costs by actually disposing of assets. All of these innovative businesses share a common foundation built on digital technologies. This shows the potential of technology to rewrite classic transaction cost theory, but also the threat it poses to conventional industries and economic structures.

### Advantages through exponential organizations

The key attribute of exponential organizations (ExOs), is the ability to leverage externalities, such as labor force, assets and computing power. ExOs are driven by access to low-cost technology capacity and assets. An ExO approach is designed to grow by setting up structures that can access, rent or share assets to stay nimble.

The second attribute of ExOs is the way workflows are set up in a lean and transparent manner. The use of improved, technology-enabled interactions between employees and an external crowd means human capital capacity is leveraged remotely via digital platforms.

In times where the cost of access to and transfer of information is becoming marginally low, digital and on-demand information allow for growth disproportional to the internal assets of an enterprise. Utilizing such externalities could be vital for SMEs to increase their innovation activity and to harness the potential of digitalization.

Exponential organization techniques can be matched with the obstacles and threats of SMEs, especially concerning digitalization (see table 1).

Selected ExO techniques could potentially enable SMEs to overcome obstacles in the digitalization process and unleash a greater volume and better quality of digitalization-driven innovations. Yet, these techniques should be assessed carefully to determine which functions of the enterprise can be outsourced and which should be – based on security, company culture and relevance – retained within the enterprise.

**Table 1: Addressing SME specific obstacles in the process of digitalization with ExO**

What are the obstacles and threats for the SMEs?	How can ExOs offer solutions?
<ul style="list-style-type: none"> <li>Missing or insufficient technical infrastructure and data capacities constrain the companies in the ability to keep pace in the process of digitalization.</li> </ul>	<p>Services and other leveraged assets, such as server capacity and cloud computing, can be rented externally to acquire the needed capacities.</p>
<ul style="list-style-type: none"> <li>A lack of IT skills exists among existing employees.</li> </ul>	<p>Staff-on-demand and crowdsourcing services can support existing staff; social technologies can share knowledge within the company.</p>
<ul style="list-style-type: none"> <li>A shortage of specialized IT staff restricts the implementation of further advanced technology in the enterprise.</li> </ul>	<p>Crowdsourcing of IT specialists can help set up new technologies without the cost of establishing a permanent IT department.</p>
<ul style="list-style-type: none"> <li>The struggle to find skilled labor (due to competition with large corporations) limits the ability to react quickly, flexibly and elaborately to new orders.</li> </ul>	<p>Staff on demand and crowdsourcing allow for a project-specific, flexible workforce.</p>
<ul style="list-style-type: none"> <li>Limited possibilities and tools for the analysis of big data.</li> </ul>	<p>Cloud services and cloud computing offer storage and computing capacity; algorithms can help to analyze large amounts of data.</p>
<ul style="list-style-type: none"> <li>Costly investments in innovation and R&amp;D put additional financial pressure on the enterprise.</li> </ul>	<p>Leveraged assets, such as cooperation with or the acquisition of external R&amp;D, can establish a shared economy for knowledge.</p>

## 4. SMEs Moving Forward

Due to the specific organizational features of SMEs, their needs and problems are unique when it comes to digitalization driven and disruptive innovation. A comprehensive assessment helps to understand the obstacles and challenges in the innovation process of SMEs.

SMEs can increase their innovation capabilities through the adoption of ExO techniques, which offer lower transaction cost in the digitalized environment. This can strengthen the position of SMEs within the ever-changing economic and technological environment.

While efficient managerial structures already exist in SMEs, they need to embrace the concept of digitalization-specific production factors and turn themselves into true ExOs.

Specific assets such as computing capacity, staff-on-demand, IT expert knowledge, as well as R&D activity can be sourced externally through crowd and cloud solutions, which strengthen the innovation capabilities of SMEs.

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