An IDC White Paper, sponsored by Dassault Systèmes


# INDUSTRIAL ENTERPRISES ON THE ROAD TO DATA-BASED BUSINESS:

## Getting innovation to the market faster

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## Introduction

The digital revolution is having a dramatic effect on the competitive landscape. By 2023, at least half of global value creation will be digitized. The crucial factors include the ability to implement change at speed, which means being flexible, fast and agile while also rescaling corporate processes.

For industrial enterprises this development creates huge change across the value chain — from the initial idea in product development and engineering to production, operation and after-sales service. Data is key, and using new technologies is the enabler of exponential growth driven by innovation. However, IDC firmly believes that staying ahead in the digital innovation economy in the long term with new digital products, services and business models can only succeed if combined with an integrated transformation of the organization, operative and IT model.

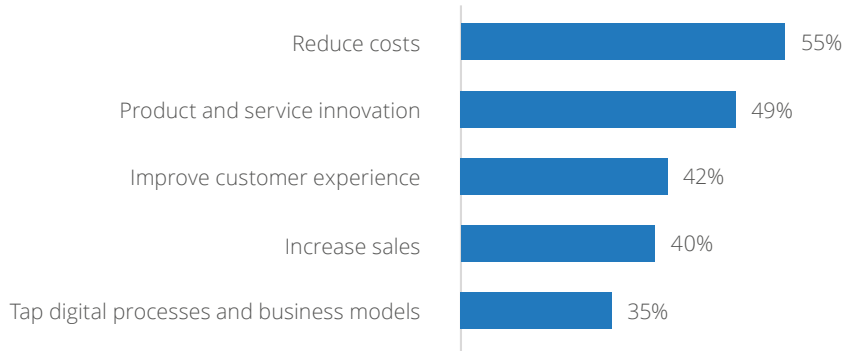
Against this background, in September 2019 IDC interviewed more than 200 industrial enterprises in Germany and Switzerland. This white paper provides a fact-based analysis, best practices, and recommendations on how to speed up the digitization of your product development and leverage your innovative power.

## Digitization and innovation determine the industry's agenda

There has been a significant slowing in the global economic situation. In Germany, economic prospects are clouded in particular by structural change in the automotive industry and declining productivity growth. While the manufacturing sector in Switzerland is better placed than in Germany due to stronger exports in the chemical and pharmaceuticals industry, machine and metal construction are also laboring under global developments and falling investments.

Accordingly, 55% of the business decision makers IDC interviewed are focusing on reducing costs and profitability. At the same time, the innovation of new products and services top the agenda for almost half of interviewees.

**Figure 1: Top 5 business priorities for industry in Germany and Switzerland**

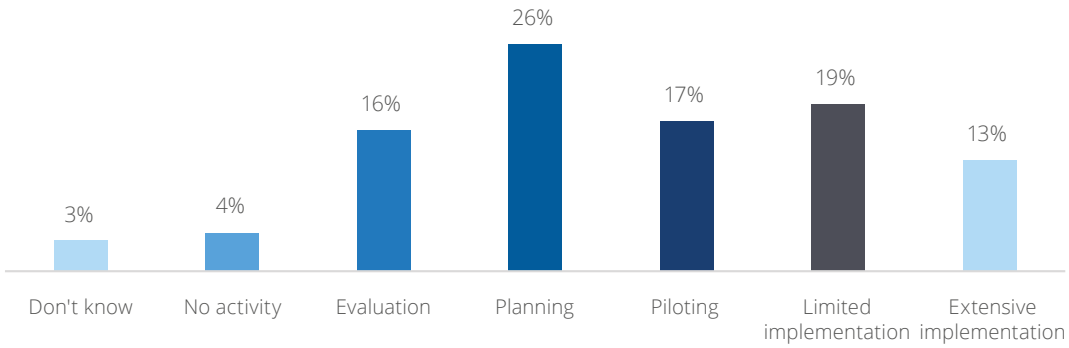



Q.: Name the three most important business priorities in your enterprise in the next two years?
N = 142 (business managers); multiple answers possible; figure abbreviated
Source: IDC, 2019

In IDC's view, these priorities go hand in hand. Everything hinges on the integrated and consistent digitization of product development across value chains. In this way not only can products and services be developed faster, but the costs incurred in the process can also be significantly reduced. Digitization has already unlocked new horizons in industry for product innovation, with data playing a key role. New digital services and products are generated by new technologies and plant, machinery, product, and process connectivity. Last year, IDC's survey entitled "How to seize digitization opportunities with digital business models and new partnerships" highlighted what a challenge this poses. However, advances made by industrial enterprises in their digitization activities are indeed identifiable, as the figure below shows.

Industrial enterprises that have **already begun with their digital transformation to a limited or greater extent** anticipate **revenue growth in the double-digit range** for the coming 12 months.

**Figure 2: Digitization of industry in Germany and Switzerland further advanced**




Q.: Where does your enterprise stand currently in terms of digital transformation?
N = 202
Source: IDC, 2019

After all, just under a third of the industrial decision makers surveyed already assess their own corporate transformation as limited or even fully implemented. By contrast, 42% of enterprises are still on the threshold of their digital journey and are busy evaluating and planning. Almost one in five interviewees is conducting pilot projects.

The question is, do these activities go far enough and is progress fast enough? Even if it is not immediately recognizable, the pace of transformation is rapid and the consequences ultimately exponential. For example, current IDC research shows that enterprises with an integrated digitization approach to transformation can develop and market new digital services up to hundred times faster.

"The goal of our digitization is to significantly shorten cycle times of a complex product development project so we can improve the efficiency of the individual processes and iterations across the product life cycle."

**Ralf Hartmann, VP Digital Design, Manufacturing and Service, Airbus Defence and Space**

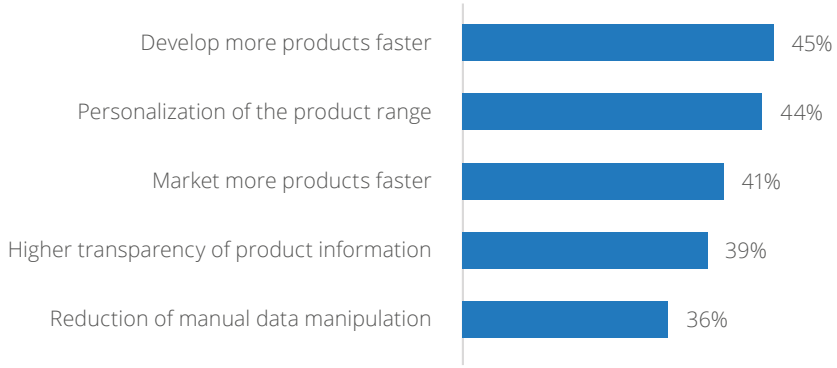
IDC assumes that more than 50% of all IT budgets over the next five years will be invested in digital innovation and transformation aimed at significantly speeding up innovation. This is a crucial milestone for corporate IT in industry to maintain long-term competitiveness in the digital age. Consequently, the operation of existing IT systems is being outsourced to external service providers and increasingly to the cloud. This development is also reflected in the Top 3 IT priorities of industrial enterprises for the upcoming year:

- **Digitization comes first for more than half of IT managers.**
- **42% aim to deploy cloud models for optimization purposes while at the same time improving IT security.**
- **31% are focusing on cross-departmental process automation and IT/OT convergence (operational IT).**

## Time waits for no one: how digitization raises the bar for product innovation

The coming years will witness a revolution in how industrial enterprises develop new products, from the initial concept and engineering to production and after-sales service. From deploying innovative technologies such as the cloud, analytics, artificial intelligence, machine learning, robotics to 5G, speed occupies a key role in all facets of our modern connected world — time to market, time to change, time to value, time to profit, time to volume, and so on. The survey findings clearly confirm this. The topic even enjoys a higher status among Swiss enterprises than among those interviewed from Germany. Customer needs and expectations, and not only in the B2C environment, but long also in the B2B segment, are rising faster than ever before. Accordingly, improving the customer experience is rated as the third most important business priority by 42% of business decision makers (see Figure 1). As part of product innovation, product personalization takes second place for as many as 44% of the interviewees (see Figure 3).

**Figure 3: Top 5 priorities for product innovation in German and Swiss enterprises**




Q.: What are the main priorities in product innovation?
N = 202; multiple answers possible; figure abbreviated
Source: IDC, 2019

"Digitization affects the product development process in diverse ways. For instance, by using models and 3D visualizations of products you can derive new possibilities and minimize the use of product drawings."

**Dr.-Ing. Walter Koch, Head of Advanced R&D Engineering, Schaeffler**

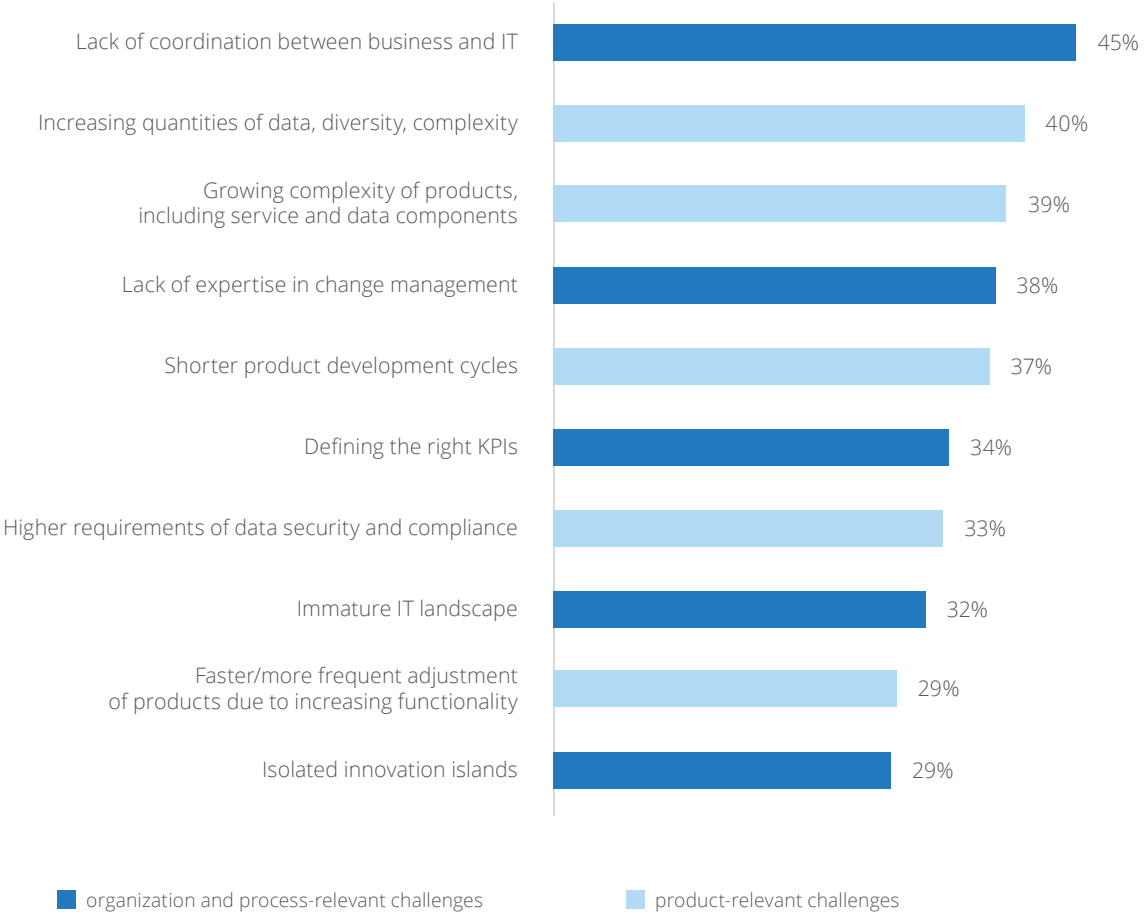
"As things stand now in product innovation we expect many innovative new services based on data and automated processing or in other words, the analysis of mass data. Techniques like predictive maintenance are already taken for granted everywhere."

**Frank Liptow, CIO, JENOPTIK**

Enterprises need a new, digitally integrated, flexible, and proactive approach underpinned by a clearly defined data and technology strategy in order to bring their product and process innovation up to speed for the digital future.

However, the reality in most industrial enterprises is somewhat different: the various departments involved in product innovation and development still frequently work in silos and do not collaborate. So far, the process across the value chain only works in one direction, seldom incorporates all relevant internal and external stakeholders, and is based on multiple and inconsistent data models. To achieve digital transformation in product innovation, enterprises need to tackle a host of tasks, some of them complex, if they want to ensure their long-term market survival. The 10 most important challenges consist of a variety of organizational and product-related obstacles.

### Figure 4: Top 10 challenges in product innovation for industry are varied




Q.: What are the three main challenges for product innovations in the further development of business models and value chains?
N = 202; multiple answers possible; figure abbreviated
Source: IDC, 2019

"Our customers' expectations of products with a higher level of connectivity and integration are rising and increasing the complexity of product development. At the same time, products need to be available on the market faster and comply with new legal requirements. Especially when combined, these pose major challenges for enterprises."

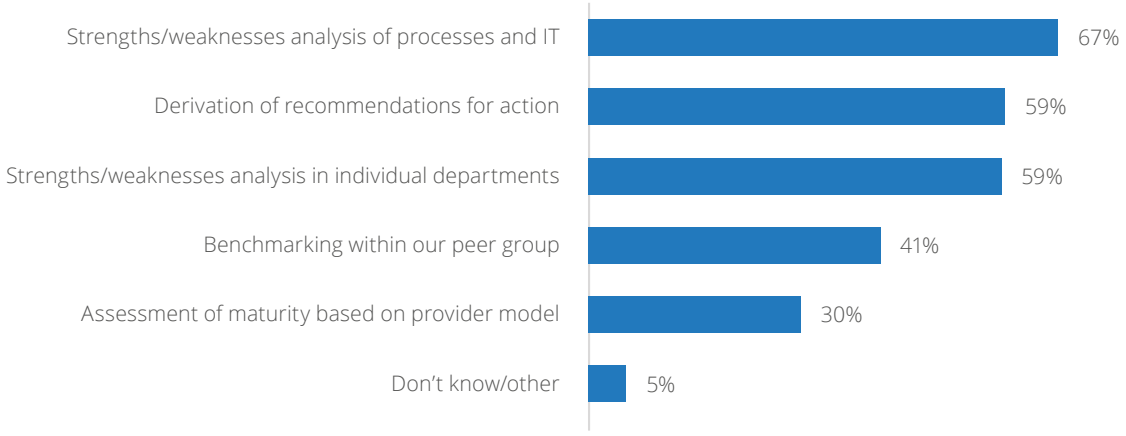
**Dr.-Ing. Walter Koch, Head of Advanced R&D Engineering, Schaeffler**

The lack of coordination between departments and IT is most apparent, as 45% of the industrial enterprises interviewed in both Germany and Switzerland admitted. IT business alignment is set to become a success factor in the digitization of core processes related to product innovation and development. Not to be underestimated, and crucial to the success of transformation at all, is the change management supporting it. 38% of managers identify room for improvement here, and more than one-third of enterprises question the current metrics for measuring success. From a product angle, the main challenges are the growing ocean of data, its diversity and complexity, and shorter product development cycles. In the wake of increasing digitization, the latter two obstacles especially are bound to become more complex. The necessary technologies are already available on the market and can — if deployed comprehensively — promise enterprises exponential growth unlocked by digital product and service innovations. The real difficulty lies in the digital redesign of the processes and data model.

## Using business assessments as a catalyst to transform product innovation and business models

An integrated digital redesign of product development processes, technology, and data strategy is needed to create the basis for digitizing product innovation and development. Business assessments can be used as a catalyst. Enterprises still in the throes of evaluation and planning and unsure of what digitization spells for them often first need to sort out fundamental issues. The most important step in digital transformation consists of recognizing and understanding the difference between traditional document-controlled processes and digital data-controlled processes. Enterprises can use business assessments to structure and gain a full picture of the existing situation in IT and processes. Following a comprehensive analysis, they are able to derive specific areas of action and optimization needs for digitization. 36% of those interviewed have already conducted a business assessment as part of their digitization process, 32% are currently doing so, and another 17% are planning an analysis. The Swiss enterprises have a clear lead over their German neighbors.

**Figure 5: User expectations of business assessments in industry**



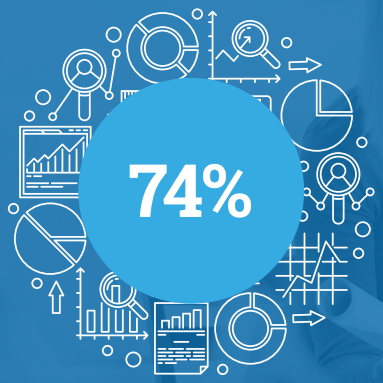

Q.: What do you expect to get out of the assessments or analyses?
N = 186; multiple answers possible
Source: IDC, 2019

**Speed in product development and marketing has the highest priority** for the industrial companies surveyed in Germany and Switzerland.

In particular, managers use assessments to analyze the strengths and weaknesses of their business processes and IT (67%) and derive practical recommendations for action (59%). Seeing where they stand in terms of competitors is also interesting. Three-quarters of industrial enterprises therefore involve both IT and business processes and departments in the analysis from the start, as fast-tracking and improving product development cannot be achieved by simply rolling out new IT systems. A "simple" digitization of existing processes would clearly sidestep the problem. Processes first need to be revisited in digital terms before redesigning them in a second step with appropriate methods and tools. In this context, CIOs often take over and initiate business assessments, according to 49% of interviewees on average. In Switzerland, CIOs, followed by digitization departments and Chief Digital Officers (CDOs), are clearly more active than in Germany, where CEOs tend to initiate the business assessments.

> In a digitization workshop the board and heads of division assessed digital opportunities such as new product and service models, any risks caused by digital disruption from outside, and consequences for the IT backbone.
>
> **Frank Liptow, CIO, JENOPTIK**

> We started by developing a vision of what we understood by digitizing our processes in the first place, and then using examples and classic benchmarking, we identified our goals.
>
> **Ralf Hartmann, VP Digital Design, Manufacturing and Service, Airbus Defence and Space**




**74%** of the interviewees use **business assessments** for an **integrated analysis** of IT and business processes.

**DEFINITION:**

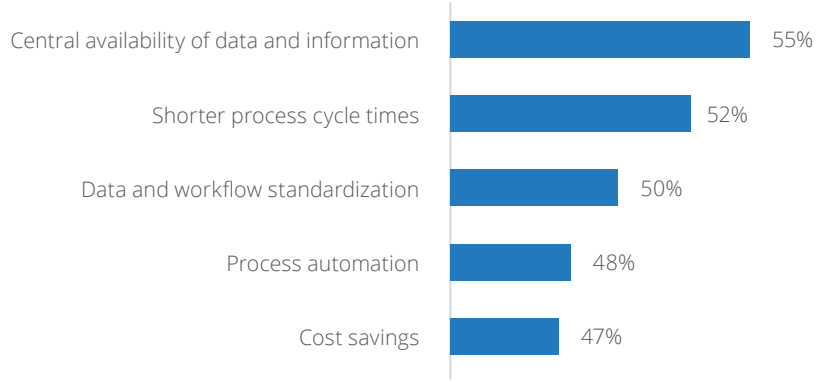
Enterprises and organizations use **business assessments** or analysis to structure and gain a full picture of the existing situation in IT and processes. Following a comprehensive analysis, they are able to derive areas of action and specific optimization needs.

## Data harmonization and digital collaboration: key to successful product development in a connected world

Digital collaboration between the various departments, based on a consistent data model, plays a key role in making the most of the potential unlocked by digitized product development. Almost all industrial enterprises in the survey in Germany and Switzerland recognized the benefits of a unified data pool for all departments. A harmonized data pool, digital collaboration, and model-based development supply important answers to the major challenges facing industry: reducing costs and gaining speed and innovation.

**59%** of interviewees are confident that a **single source of truth** is **essential** for the successful development of their business model.

**Figure 6: Top 5 benefits of a harmonized data pool, digital collaboration, and model-based development**




Q.: Which benefits can be expected of a harmonized data pool, digital collaboration and model-based development?
N = 202; multiple answers possible; figure abbreviated
Source: IDC, 2019

55% of decision makers thus identify the greatest benefit in the central availability of data and information. This has a positive effect on processes through shorter cycles, standardization, and automation, which is bound to reduce costs. More than a third of the stakeholders also hope that harmonization will overcome the greater complexity and provide a consistent picture at and beyond departmental level.

**SMEs** in both Germany and Switzerland still have some **catching up to do** in terms of **harmonizing their data model.**

A glance at implementation plans for designing a consistent data model generally confirms a very high level of acceptance:

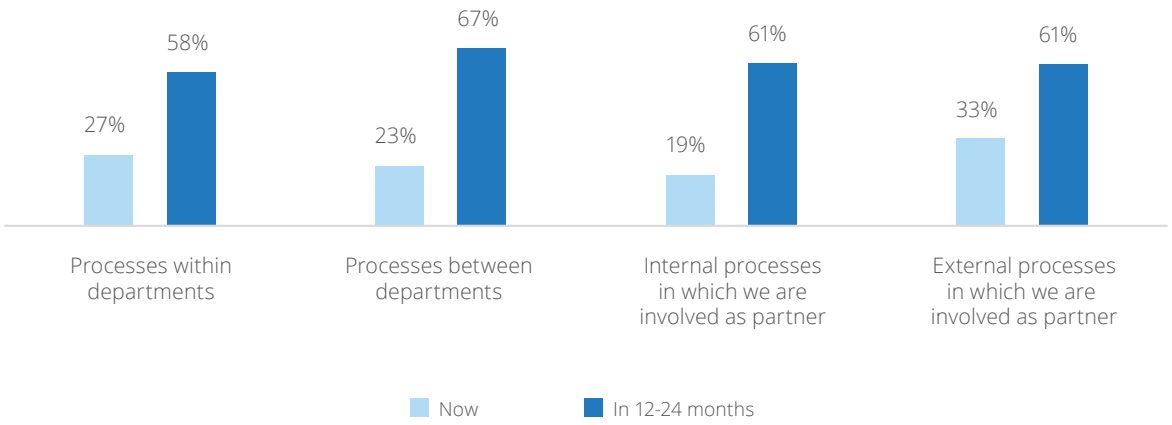
**Around 40% of decision makers have already begun to do so in some areas and 16% in all areas.**

**One in three enterprises plans deployment within the next 12 to 24 months.**

Industrial enterprises that are already well advanced in establishing their integrated data model can also look forward to significantly higher revenues.

Ultimately, a harmonized data pool provides the foundation for digital collaboration between the various internal and external parties involved in product development. The current state of affairs is sobering: collaboration is in fact digitally based across all departments in less than a quarter of the industrial enterprises evaluated. The interviewees usually work both manually and digitally. Even within individual departments the picture is scarcely better. Each department has its own systems and proprietary data formats. Data discontinuity is therefore inevitable, as are slow and inflexible processes. Enterprises are far from achieving the real-time availability that will let them offer new data-based services. However, as soon as the organizations interviewed are integrated into partners' external processes, the share of digital collaboration rises significantly.

## Figure 7: Digital collaboration along the value chain in industry




Q.: How comprehensively have you deployed digital collaboration in your enterprise so far or plan to do so in the next 24 months?
N = 202; illustration abbreviated to answer "Predominantly digital collaboration"
Source: IDC, 2019

"We used a digital process for the first time in our pilot project — from the design phase and production to operation — as one continuous chain. It let us drastically shorten the time from offer preparation to delivery and reduce costs significantly."

**Ralf Hartmann, VP Digital Design, Manufacturing and Service, Airbus Defence and Space**

"The data structure is an important success factor: the better and more homogeneously the data structure is designed, the more successful the new digital products, services, and business models will be."

**Frank Liptow, CIO, JENOPTIK**

In IDC's view, in the long term consistent digital collaboration is a must both internally and externally for product development across the value chain. This is the only way to ensure a smart, closed loop from the initial idea and engineering to production, marketing and sales, operation and after-sales service involving the supply chain, customers, and partners. In particular, connectivity between product development and engineering on the one hand and production, operation, and service on the other, is vital to success in order to satisfy customer expectations of new digital products and services agilely and flexibly. Decision-makers have indeed recognized the benefits and plan to focus significantly on digital collaboration at all levels in the coming months. The journey is arduous, but it has to be undertaken if you want to stay abreast of the pace of innovation in industry worldwide in the long term.

## Best practices for integrated digitization

Overall, IDC's research in the past five years shows that digital pioneers involve all departments towards achieving successful deployment of an integrated digitization strategy. In this way, they create a basis for the consistent digitization of their enterprises as a platform for developing new digital products and services.

As digital strategies mature, organizational structures, in particular, also tend to change. Our analysis of the survey supports this. Industrial enterprises poised to set out on their digital journey usually have not allocated responsibilities for their digital activities.

Nearly half the interviewees cite individual stakeholders or special project teams as those taking the initiative. As soon as activities are firmed up, enterprises set their projects on an official footing and place them under the aegis of a central group that then controls the digitization process and sets strategic priorities. Viewed in the long term, enterprises should embed their digitization strategy and deployment in all business units. This is an important success factor especially for digital product innovation and development, as in the digital age they have to be considered from an angle that takes all value chains into account. This is the only way to make "digital" a natural part of the enterprise. Currently, only 8% of the surveyed organizations have reached this stage. Setting up an integrated digital strategy across the enterprise in order to define the necessary priorities and pool resources has also proved worthwhile. The ball in this case is firmly in the boardroom's court.

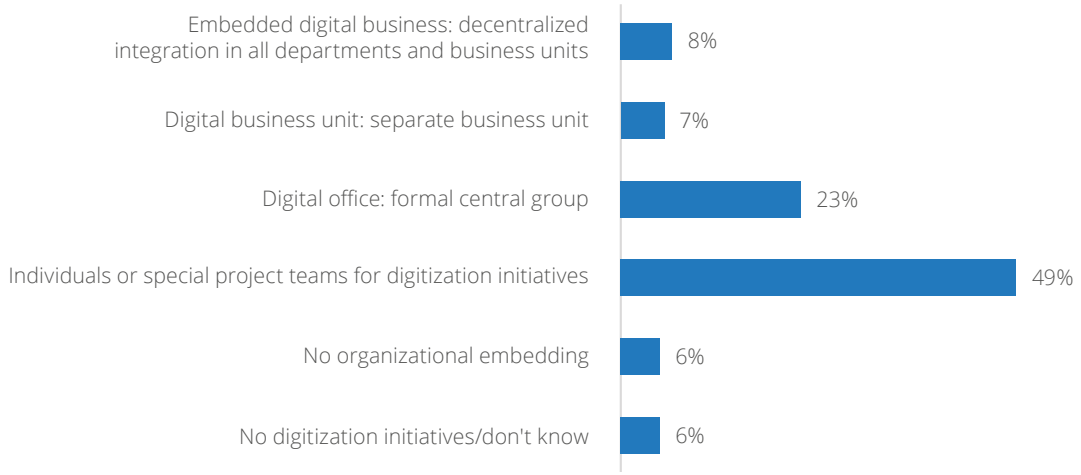
"Product creation, especially in the automotive industry, is an interfunctional process. Development, production, logistics, budgets, quality, etc. are all concerned and need to be brought together in a unified solution. Statutory and state-of-the-art technical requirements also have to be taken into account in processes."

**Dr.-Ing. Walter Koch, Head of Advanced R&D Engineering, Schaeffler**

"Drawing on new IT technologies, a digitization unit needs to be close to the business and work closely with it to improve the latter's efficiency, agility and flexibility, enable new business models and develop IT blueprints and new IT solutions."

**Roberto Henkel, SVP Digitalization & Operations IT, Schaeffler**

## Figure 8: Organization structures for digital transformation in industry




Q.: Please select the organization structure that best describes the digitization approach in your enterprise.
N = 202; figure abbreviated to answer "Predominantly digital collaboration"
Source: IDC, 2019

### IDC: By the end of 2020, 60% of enterprises will adjust their KPIs for digitization activities

Digital transformation, especially in industry, is a long-term project involving many unknowns and huge investments. An ROI is not always obvious. Nevertheless, managers must always be able to demonstrate the value and benefit to the company that transformation will bring. However, almost one in five organizations does not use any metrics at all to assess and monitor the success of their own business model. By contrast, industrial enterprises that have taken digitization further have also realized all too frequently that their existing metrics and KPIs no longer suffice when it comes to measuring the success of their digitization activities and investments and therefore redefine them. The Swiss enterprises interviewed are already a step ahead of their German counterparts on both issues. Overall, 34% of decision makers regard defining suitable KPIs as a crucial challenge for product innovation to take business models and value chains to the next level.

Industrial enterprises also need to create new technological framework conditions to enable cross-divisional digital collaboration so they can tackle the complexity of new digital product innovations while ensuring speed and cost reductions. The centerpiece of new technology strategies is formed by a standard IT platform that enables the necessary scaling of digital innovations in the first place. We are observing the emergence of innovation islands in many enterprises, both at the front and back end. The challenge is to interconnect them and integrate them into the

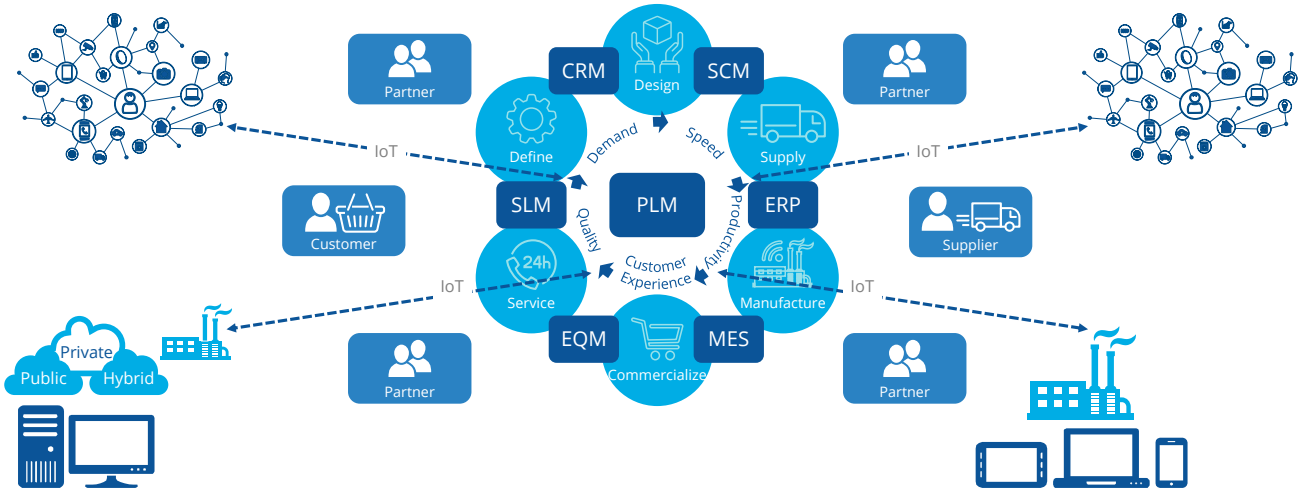
"You need practical examples and appropriate KPIs to evidence the added value generated by projects and to arouse enthusiasm for digitization in the enterprise"

**Ralf Hartmann, VP Digital Design, Manufacturing and Service, Airbus Defence and Space**

**47%** of industrial enterprises deem **existing metrics for measuring success to be no longer adequate** in the context of digitization and have to define new ones.

existing IT environment so they can be scaled. Digital pioneers opt on the one hand for a fully integrated technology architecture, and on the other for modernization and integration of the existing IT landscape. In IDC's view, when addressing the IT platform, attention should focus on optimizing data management. Ultimately in the digital economy it all hinges on how enterprises use their data. A digital IT platform harmonizes the data pool and enables cross-team digital collaboration and demand-focused innovation. At the moment, 85% of the surveyed enterprises are already engaged in setting up such an IT platform. Almost half of the industrial enterprises are already introducing a platform, 35% plan to do so within the coming 24 months.

**Figure 9: A unified IT platform enables product development connectivity in industry**

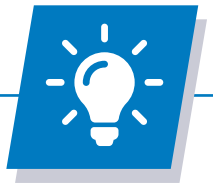



Source: IDC, 2019

Digital platforms also forge a link between internal and external value chains in product development. They provide a group-wide overview of products, production, supply chain, and after-sales service through to customer feedback and include information on performance and the use of connected products, systems, and machinery. Engineering and development teams are also aware that they need to improve their success rate and so have to increasingly involve other departments, partners, suppliers, and customers in product development at a much earlier stage. A unified IT platform is therefore a key enabler to quickly develop and launch high quality products in line with demand. In the medium term, services available over digital marketplaces will increasingly be used to support internal product development.

> We implemented our own data platform, the Schaeffler Data Platform, very early on to solve the problem of data integration. Its purpose was to bring together nearly all the data from existing heterogeneous systems and provide business with new capabilities for generating added value from the data.
>
> **Roberto Henkel, SVP Digitalization & Operations IT, Schaeffler**

> Three things are essential when selecting a platform partner: an efficient backbone, the number of tools in the box and economic and technical resilience for the future.
>
> **Ralf Hartmann, VP Digital Design, Manufacturing and Service, Airbus Defence and Space**



## CONCLUSION AND OUTLOOK

Digitization is marching on relentlessly and future competitiveness in the digital innovation economy hinges on what is achieved in the next five years. Although the potential unlocked by digital product and service innovations is promising, it brings with it major changes for the value chain process of the manufacturers of products, machinery, and systems. The development goes far beyond the optimization and automation of existing business processes. Data and the deployment of new technologies are enablers of exponential growth based on innovation.

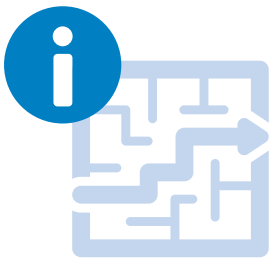
Enterprises need a new, digitally integrated approach underpinned by a clearly defined data and technology strategy in order to bring their product and process innovation up to speed for the digital future. In IDC's view, in the long term consistent collaboration is a must both internally and externally for product development across the value chain. This is the only way to ensure a smart, closed loop from the initial idea and engineering to production, marketing and sales, and after-sales service and operation involving the supply chain, customers, and partners.

The survey showed that most industrial enterprises in Germany and Switzerland still need to clarify many issues related to their digital journey. Doing so now is vital, because the time waits for no one. The new technologies that enable new digital product and service innovations have long been available on the market. The real difficulty for digital product development lies in the redesign of corporate processes and data models. Business assessments can be used as a catalyst, in that enterprises gain a full structured picture of their existing situation in terms of IT and processes and in doing so bring all the departments involved to the table. The analysis can be used to determine specific areas for action and optimization needs.

From a technological point of view, rolling out a unified IT platform is the core element for long-term success. Only a digital platform can enable fast and cost-efficient scaling of digital innovations. If such platforms are not set up, digital projects are often doomed to failure after the pilot phase. The first step is the interdepartmental harmonization of the data model as a “single source of truth” from which to trawl the benefits from the data supplied by connected products, systems, and machinery. Investment in new technologies such as IoT, machine learning, artificial intelligence, and digital twins is necessary to extend possibilities in product development.

Though there are many challenges along this path, the consequences of missing the digital transformation boat outweigh them by far. Organizations that adopt an integrated digitization approach to product development will be able to satisfy the needs of their customers much faster, more efficiently, and better in the long term.

## Recommendations



### 1. Test the mettle of your product development processes

As part of the digitization process in product development, processes first need a digital rethink, then in a second step, a redesign with appropriate methods and tools. A digital redesign of product development covering all value chains is needed along with a technology and data strategy to create the foundation for digital product innovations and developments.

### 2. Use business assessments to digitize product development

The most important step in digital transformation is to recognize and understand the difference between traditional document-controlled and digital-data-controlled processes. Business assessments can be used as a catalyst to determine areas of action and optimization needs for the digitizing of product development.

### 3. Create the foundation for digital innovation with a harmonized data model

A consistent data model forms the basis to tap the potential unlocked by digitized product development. The central availability of data and information shortens process cycle times, enables automation, and reduces costs.

### 4. Implement a unified digital platform to scale your innovations

A unified IT platform creates the technological basis for a "single source of truth" and data management. It forges the bridge between internal and external value chains in product development and provides a company-wide overview of connected products, systems, machinery, production, supply chain, and after-sales service through to the customer. A unified IT platform is the key enabler to quickly develop and, more importantly, scale high quality digital product and service innovations in line with demand.

### 5. Rely on change management to support implementation

For industrial enterprises, the digitization of product development represents a huge change across the value chain — from the initial idea in product development and engineering to production, operation and after-sales service. Support implementation with an integrated change management system to establish a digital corporate culture.

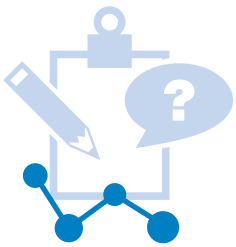
# RECOMMENDATIONS **AND BEST PRACTICES**

> The real obstacle is accepting that the greatest investment goes into various non-IT sectors such as engineering processes, production, and subsequent users. Reengineering is therefore the main item on the agenda and accepting this is crucial to success.
>
> **Ralf Hartmann, VP Digital Design, Manufacturing and Service, Airbus Defence and Space**

> A unified IT platform primarily provides scalability for large volumes of data, flexibility, and speed, and also creates additional IT capabilities by minimizing the administrative work.
>
> **Frank Liptow, CIO, JENOPTIK**

> Data integration is a vital enabler of digital transformation. New technological approaches need to be taken on board. For over time, large quantities of valuable data have mounted up in a variety systems and silos, which if pooled by traditional means, would involve enterprises in exorbitant costs.
>
> **Roberto Henkel, SVP Digitalization & Operations IT, Schaeffler**

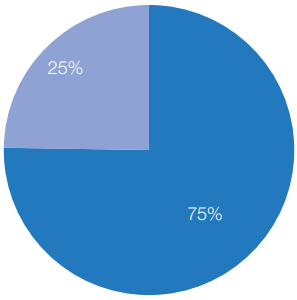
> Due to digitization, development and production teams need to collaborate at a very early stage in the production creation process and settle on a "common language" so that a successful product can be developed.
>
> **Dr.-Ing. Walter Koch, Head of Advanced R&D Engineering, Schaeffler**



# METHODOLOGY

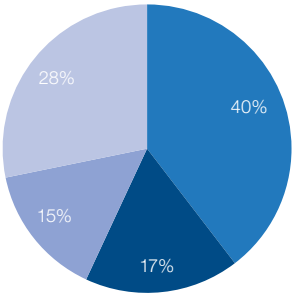
The findings in this white paper are based on a survey of 202 enterprises from various sectors in Germany and Switzerland. The survey was conducted in September 2019. IDC also interviewed several well-known experts. The random sample is spread as follows in terms of countries, enterprise size, industries, and specialized fields.

Countries



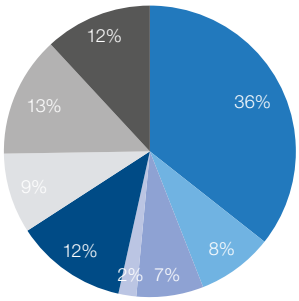

- Germany
- Switzerland

Employees



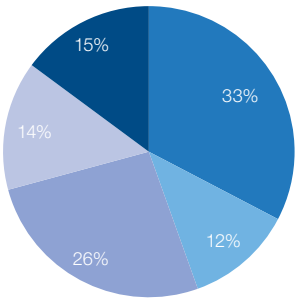

- 100-499 employees
- 500-999 employees
- 1,000-2,499 employees
- 2,500 and more employees

Industries




- Machine and plant construction
- High-tech/electronic equipment
- Automotive
- Aerospace/Defense
- Metal production and working
- Food/beverages
- Chemicals/pharmaceuticals
- Other

Departments




- IT (top/shop floor)
- Product Development/Engineering
- Production Planning/Production/Logistics
- Marketing/Sales/After-Sale Service
- Finance/HR/Legal

## ABOUT IDC

IDC is the world's leading provider of market information, consultancy services and events in the information technology and telecommunications field. IDC analyzes and forecasts technological and industry-related trends and potentials, thus providing clients with a basis for judicious planning of the business strategies and IT purchasing. Drawing on its network of more than 1,100 analysts in 110 or so countries with global, regional and local experience, IDC can offer clients comprehensive research findings on various segments of the IT, TC and consumer markets. Managers and IT professionals have been placing their trust in IDC for decision-making for more than 50 years.

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