

IBM Service Transformation

From product suppliers to service providers



Service Transformation

Fighting global competition and building resilience

Manufacturing companies are facing increased global competition, commoditization of their products, and decreasing product profit margins.

The current COVID-19 pandemic has negatively impacted the ability of many companies to invest in new equipment. Many have halted investment plans and want to respond with more flexibility to the volatile course of the pandemic. The opportunity to turn capital expenditures (CapEX) into operating expenses (OpEX), e.g., through outcome-based service models directly addresses these requirements.

The role of services in delivering a superior customer experience is increasingly important as clients expect not just a product but a solution to their problems. They want their providers to have a deep understanding of their industry, business model, processes, and the challenges linked to them. There is a demand to transfer the risk of asset failure or breakdown back to the manufacturer and in return, clients are willing to pay a premium for guaranteed service levels or outcomes.

Given the challenges above and the need to review their business models, companies see services as:

- a strategic differentiator and a source for competitive advantage. IBM research shows that 66% of leading industrial service providers are actively developing new services and business models to differentiate themselves.¹
- a chance to acquire new customers, demonstrated by a 14% higher promoter score for delivered service experience for leading industrial service providers.¹
- an opportunity for higher growth rates, as service operations tend to grow 5 to 10% annually in comparison to 2% for original equipment.²
- a means to expand the revenue base. As IDC research shows that the service revenue share of transformed companies is 30% larger than the share of their peer.³
- a segment that can generate higher margins (IBM research shows that industrial machinery executives expect on average a

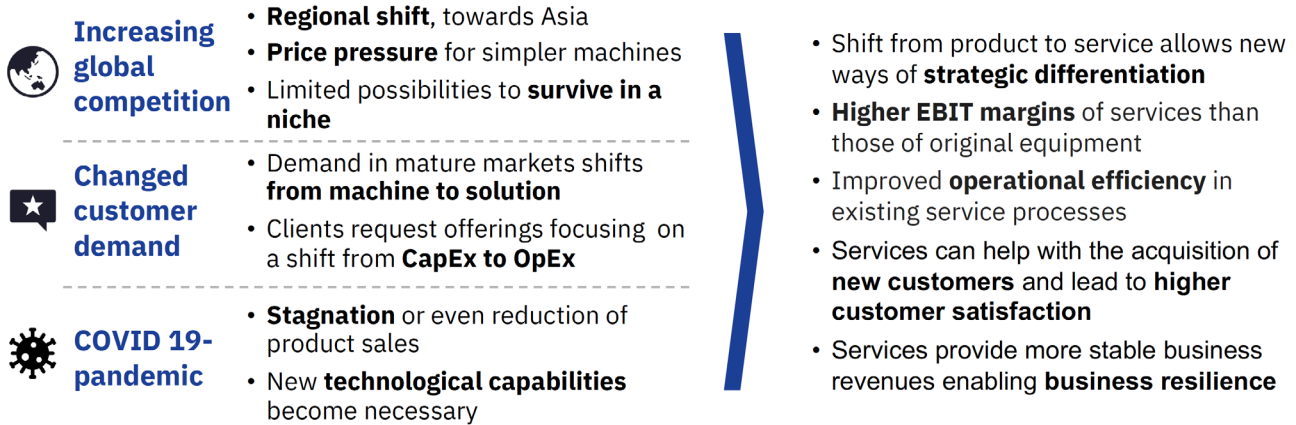


Figure 1: Driver of the service transformation

service margin growth of 35% in the upcoming) and a more stable revenue stream than product sales leading to an increased business resilience.

- and lastly, as a possibility to increase customer loyalty and lock-in, and a possibility to acquire information about product usage.

This paper depicts our view on the challenges and opportunities of a service transformation based on our experience with our clients.

While the shift from a product-centric to a service-centric organization seems compelling, the transition is anything but straightforward. Some key challenges must be addressed:

- manufacturing companies are missing a well-defined service strategy with consistent service models.
- customer-centric services require a deep understanding of the customers' needs and processes.

- innovative services are unthinkable without state-of-the-art technology. Investment into and the right combination of technology has become a success criterion to develop and deliver services that address the needs of increasingly tech-savvy customers.⁵

There is no one-size-fits-all roadmap towards a stronger service orientation, but there are recurring themes that characterise a successful transformation. IBM has defined three major dimensions for a successful service transformation:

1. Strengthening strategic differentiation by developing a consistent service strategy and an appropriate, customer-centric service portfolio.
2. Enabling customer centricity by optimizing the customer interface to address the changing expectations of customers.
3. Achieving operational excellence in field service as central building block of service delivery.

Service transformation dimensions

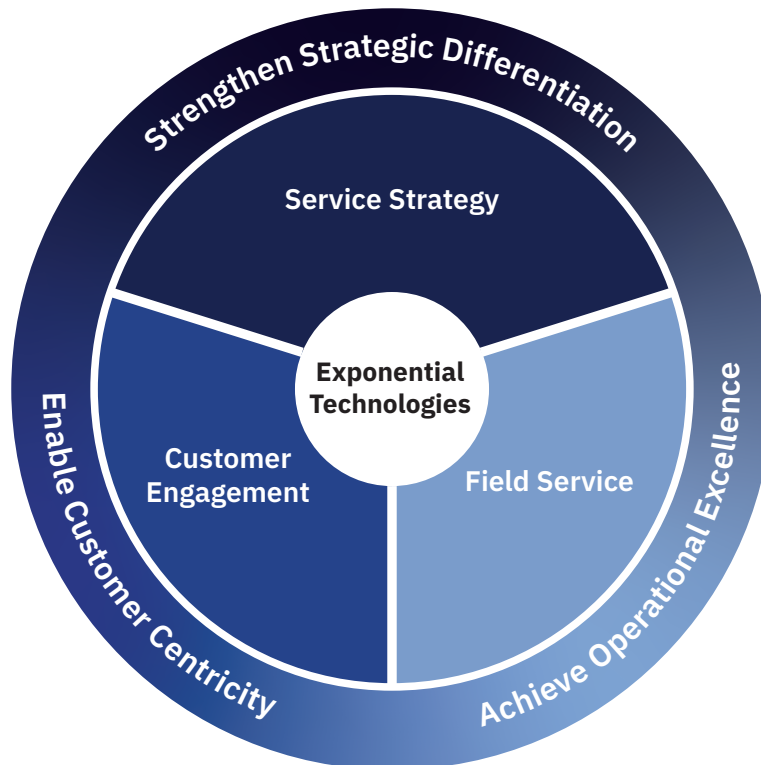


Figure 2: Service transformation dimensions

Manufacturing companies require an integrated and holistic approach to defining and implementing the right product/service mix. Conceptualizing, designing and implementing services is a multi-disciplinary task that requires the cooperation of stakeholders from various corporate functions, like product development, marketing, sales, services, finance, and human resources.

While the manufacturing industry is only slowly increasing the

variety of its service offerings, we know that **operational excellence** and **customer centricity** are essential cornerstones of service transformation. For a holistic service transformation, companies need to consider three complementary dimensions—**service strategy**, **customer engagement**, and **field service** (see Figure 2). These dimensions are enabled by a number of technologies that continue to advance exponentially.

Service strategy: Strengthen strategic differentiation

The service strategy ensures that the manufacturer defines a suitable service portfolio as part of its business strategy. It includes development of a suitable organizational design which enables them to deliver the portfolio in such a way that a convincing offer can be created and continuously delivered for the customer.

Manufacturers have different ambitions for services, and their service models develop at different speeds, some have announced moves to advanced services early and already have them available at scale. For example, Yara, one of the world's largest producers of fertilizer, is using AI, machine learning and in-field data to unlock new insights for farmers. These insights are then used to offer digital services to increase yields, crop quality and incomes in a sustainable way. Another example is Caterpillar (CAT), which produces connected machines (and retrofits older models) with sensors that record usage.⁷ This data helps customers optimize the use of their fleets and reduce the overall cost of ownership. As a result, CAT has new recurring revenue streams, closer relationships with their customers, and the world's largest connected fleet consisting of more

than 500,000 connected assets in the field.

Types of service models in the market vary in three main characteristics. The first characteristic is the value for end customers. It spans from the extension of asset life to the mitigation of business risk and shifts from CapEx to OpEx. The second characteristic is the manufacturer's value, ranging from a reduction of customer complaints to tapping into new revenue sources and acquiring new clients. Thirdly, the organizational prerequisites which manufacturers need to develop. These characteristics range from cost-efficient and measurable delivery of basic services to advanced operational capabilities in the end customers' core business.

We differentiate between **five different service models for manufacturers** (see Figure 3). Even though these models differ in the ambition of service offers, it is by no means the goal for every manufacturer to adopt the highest level. Instead, there should be an alignment between their service strategy with their business strategy.

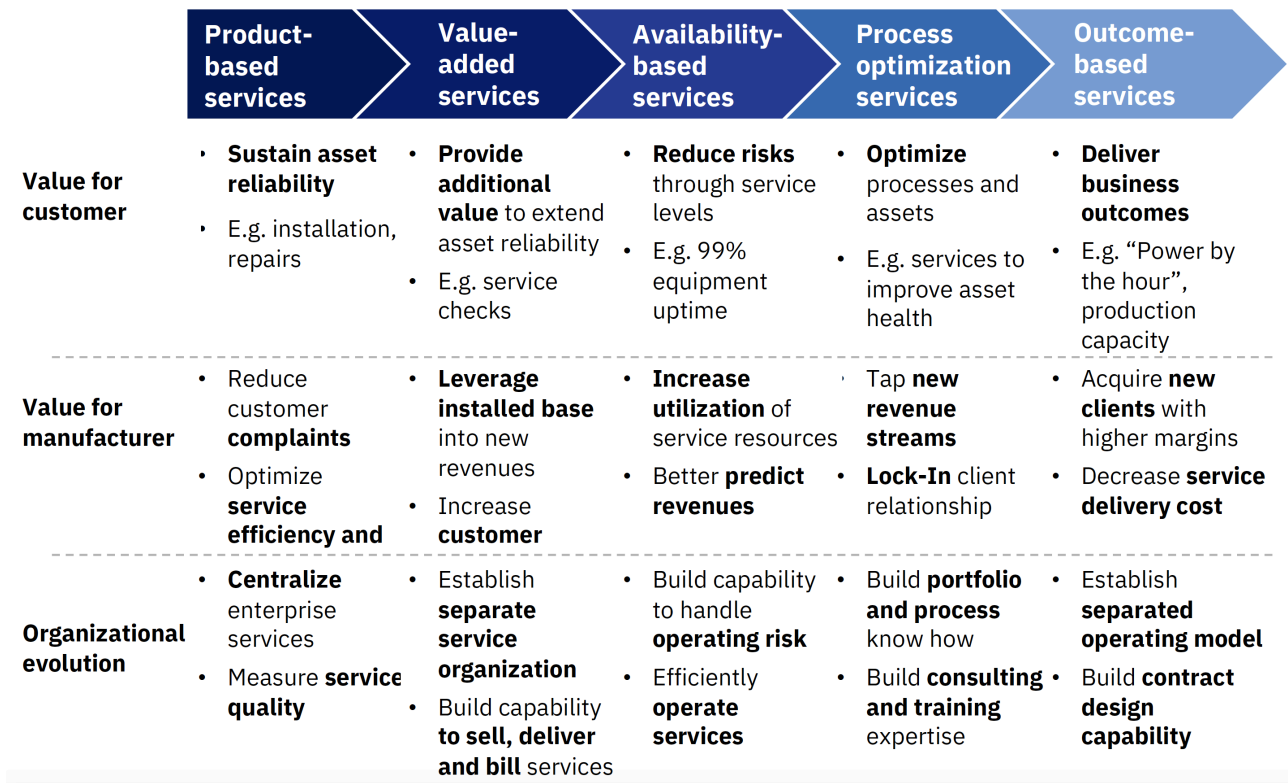


Figure 3: Five types of service models

First, **product-based service** models are mostly centered around sustaining asset reliability. For example, manufacturers can offer maintenance and repair services to customers.

Service pricing is traditionally

cost-based with markups and charges per transaction. For manufacturers, this service model most notably adds value by reducing customer complaints rather than generating major sources of revenue.

Product-based services

Robert Bosch GmbH

The Robert Bosch GmbH is a German multinational engineering and technology company and is the world market leader for portable electric power tools and power tool accessories. Bosch Professional is a product offering for professional craftsmen and extends the usual catalogue through higher quality and profession specific innovations. They highlight the professional products with a blue color in contrast to the green non-professional products and offer product-based services such as spare part orderings, warranties and repair services as part of the portfolio.



Second, **value-added services** enable manufacturers to gain additional revenue by offering add-on services around their products. For instance, they can offer regular packages for service checks, cleaning, refilling of consumables, or advanced product insights to enable more efficient self-service.

A value-based pricing approach can be successful, as these services often increase customer satisfaction. For value-added services, the service portfolio usually gets more complex, so many manufacturers bundle services into a separate business unit and set the course for scalability.

Value-added services

Vaillant

The Vaillant Group is a global market and technology leader in the fields of heating, ventilation and air-conditioning technology. They have included value-added services to their portfolio, an example is its API Developer Program: Business partners such as property and service companies, energy suppliers and smart-home developers use Vaillant's device data that can be integrated into the partners' products and services to make their portfolio more appealing to their customers. This data is shared via the Vaillant API platform. As a result, the company can provide an ongoing data-based service beyond offering their heating appliances and connectivity products on a one-off basis. The API Developer Program is now a standard service available in 13 countries and with 40 partners.⁸



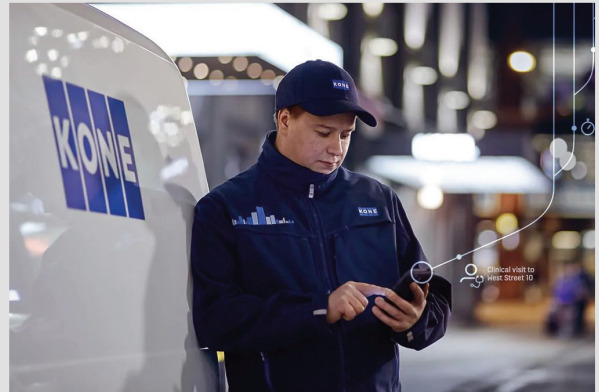
Third, manufacturers can sell **availability-based services** to their customers for instance, service level agreements upon availability. This is beneficial for customers who want to reduce costs; therefore, manufacturers mostly price their services based on the value of their customers' risk reduction. In this model, services revenues get more predictable for manufacturers,

though this is accompanied by higher importance of staff utilization and an efficient delivery. When it comes to service level agreements, the use of service resources and risk management are key to the profitability of services. Also, new skills to seamlessly embed services into client processes have to be gained.

Availability-based services

KONE

KONE builds and services moving walkways, automatic doors and gates, escalators and elevators. Asset performance management methods are used to ensure that Kone achieves the most consistent availability of its lifts and escalators. After understanding the customer's needs, KONE embraced AI and IoT technology to obtain real-time insights to proactively predict maintenance needs and help its customers improve "people flow" in buildings, resulting in more seamless service experiences. Their goal is to help people to move in and between buildings in the smoothest and safest way possible. Kone is using IBM Watson IoT and Predictive Maintenance to connect, remotely monitor and optimise the service management.⁹



Fourth, services in the area of **process- and customer asset optimization** can help manufacturers gain new revenue sources by building solutions which improve the clients' processes on an overarching level. Especially clients who operate various assets and expect stable output may have a plethora of connected asset types but lack an overarching solution to efficiently manage these assets and the workflows around them. Therefore, it may be beneficial for manufacturers to sell services to improve asset health, manage a portfolio of various assets, and

optimise processes around the assets. This requires in-depth knowledge of the client's processes and therefore generates value by fostering deep client relationships and a possibility for a lock-in effect. For these services, entirely new competencies have to be built, which also require customer-specific knowledge and more digital skills. Research shows that 46% of leading industrial service providers, in contrast to 29% of other companies, offer process optimisation services, emphasising the potential of this service model.¹

Process- and asset optimisation services

Sandvik

Sandvik is a global supplier of mining and construction equipment. Sandvik Mining and Rock Technology offers OptiMine to help clients optimise the full mining process. The solution combines artificial intelligence (AI), the Internet of Things (IoT), and predictive analytics to analyse and optimise underground hard rock mining and processes. Its platform, based on open system architecture, allows efficient data integration between mining systems and equipment from different providers, providing real-time and predictive insights to improve operations. It focuses on overall equipment efficiency, identifies possible lost time, and predicts failures.¹⁰



Finally, **outcome-based** services sell business outcomes to customers. Pricing-wise, it's about directly linking the price to the client outcomes. The customers can eliminate the risk of high fixed costs during production lows. Manufacturers benefit from this high client value by being able to demand higher margins. Also, they can acquire new clients who wouldn't have the initial investment capital to buy the equipment up front. Outcome-based services go one step further: Here, manufacturers need to follow

in the footsteps of their clients, understand the market they are operating in and gain skills in understanding/managing their operations and taking investments for service innovations to increase profitability. Also referred to as subscription-based model, consumption-based model or membership model, the outcome-based business model is oftentimes regarded as the future of business. However, the greatest challenge is the cultural shift from a product focus to a customer focus.¹¹

Outcome-based services

TRUMPF / Munich Re

TRUMPF, a German industrial machine manufacturing company, partnered with Munich Re, one of the world's leading reinsurers. They have developed a new equipment-as-a-service business model for the sheet metal processing industry.

Customers can use TRUMPF's machines without having to buy or lease them. The service is tailored specifically to the customers' requirements. It includes access to a laser cutting machine, a storage system, TRUMPF's know-how, necessary service components, equipment maintenance, as well as required raw materials. By paying on a "per part" basis, customers are more flexible and can better react in dynamic markets. This case study emphasises the importance of having a robust ecosystem. Munich Re acts as a business enabler not only by financing the machines and bearing the investment risk but also by orchestrating the solution so that end-customers benefit from only contracting with one party for the entire equipment-as-a-service model. They guarantee service availability and insures the customer against potential downtimes. TRUMPF, on the other hand, provides access to machines and their manufacturing expertise.¹²



No company can cover all capabilities needed for the service transformation on their own. To acquire these capabilities, **partnerships** and **ecosystems** with the right companies become more and more critical. For example, the financial structure of a company selling outcome-based services, i.e., having a continuous payment stream, differs strongly from traditional one-time revenues from selling machines. Manufacturers therefore need new expertise in financing and billing these services and can consider accomplishing

this with specialised associates. Partnerships are also needed to develop and access modern technologies as for many services the company needs access to the usage data of machines. they can consider partnering with sensor-, connectivity-, or IoT platform providers. Other services need knowledge in AI or AR. It is unlikely for many solutions that a single player is capable of simultaneously building the best technologies on their own. Therefore, a well-orchestrated ecosystem of technology partners is needed. The

data which fuels advanced services is often distributed over company borders. Emerging data ecosystems help manufacturing companies to provide the whole data lineage

leading to trustful data. By integrating these different players into an ecosystem, immense value for everyone can be created.

Customer engagement: Enable customer centricity

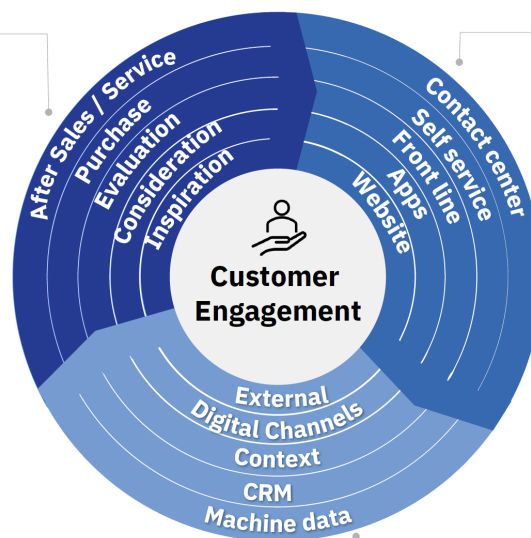
Customer engagement aims at delivering a superior experience across all interfaces by placing the customer at the center of their attention.

Customer engagement requires utilising available **customer insights**. To interact with them in anticipation of their needs, analytics helps to create micro-segmentation profiles to use in coordination with real-time performance and

experience metrics. If a customer's previous payments are usually late, the billing cycle can be adjusted or a grace period can be offered based on their payment history. Advanced analytics make it possible to understand the customers' behavior, buying choices, and usage patterns at various touchpoints that matter most to them. For this, different data types need to be analyzed, such as weather, sensor data, and current events.

Provide meaningful & contextually relevant personalization

- 360° view of customer based on customer data insights Real-time and context-based targeting
- Personalized loyalty and customer appreciation
- Relevant recommendations that match customer needs



Create seamless omnichannel experience across touchpoints

- Combination of online and offline presence
- Seamless customer experience
- Consistency across multiple touchpoints
- Utilize centralized database
- Direct and proactive customer engagement

Maintain up-to-date and easily accessible customer insights

- Data collection from various sources
- Connect external and contextual data with internal customer data
- Get insight from analytics / analyze large amounts of data
- Create a trusted single view of the customer
- Structuring, integrating and linking data

Figure 4: Superior customer engagement is driven by an interplay of personalization, seamless omnichannel experience and customer insights

Manufacturing companies should provide **personalized customer care**, both during the interaction and when designing service offerings. Based on the extracted insights and intelligent recommendations the customer agent can provide personalised offerings.

Customers want a **seamless omni-channel experience**. They want to engage at any time, from any device and in any channel. They are annoyed by having to explain their problem multiple times because different channels do not interact with each other. Therefore, companies need an

integrated approach and technology which aggregates and stores each interaction and combines channels in a meaningful way. To implement personalized and connected customer engagement, companies can build on top of off-the-shelf commercial solutions, extended by customization. For unique business challenges, they should develop individual solutions that need to be integrated into a holistic technological ecosystem. Figure 5 provides an exemplary overview of the central capabilities of customer relationship management solutions, such as Salesforce, Oracle CRM or Microsoft Dynamics CRM.

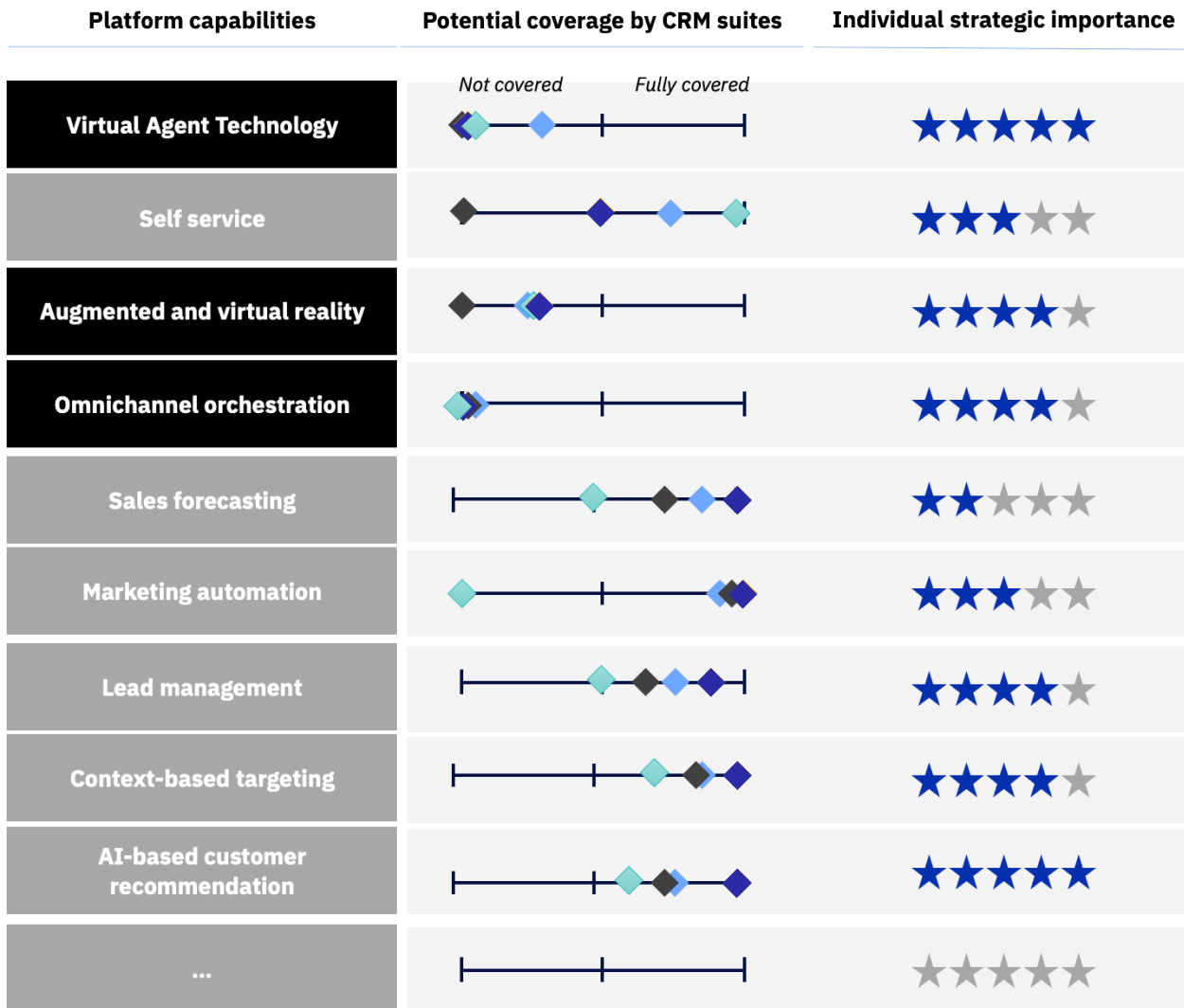
Virtual Agent Technology

Endesa

Endesa, the largest Spanish energy power company, had to transform its legacy phone-based and inefficient call center to deliver a much more personalized customer service.

The first step of the transformation was the improvement of the voice channel so that now, through their phones, customers can now ask the voice-based virtual assistant to handle transactional requests like providing bill duplicates, changing bank account information or paying a bill. The contact center transformation further automated more of their 10M yearly calls by adding additional transactions like changing the contracted power level, modifying the contract holder and even the supplier as well as enabling additional conversational channels. Virtual assistants now handle over 100K voice calls per month, which leads to a 5% improvement in customer satisfaction. Endesa taps IBM Watson and IBM Cloud to deliver superior Customer Service through its AI Contact Center.¹³





= Core elements not/insufficiently covered by CRM suites

◆ = Provider1
 ◆ = Provider2
◆ = Provider3
◆ = Provider4

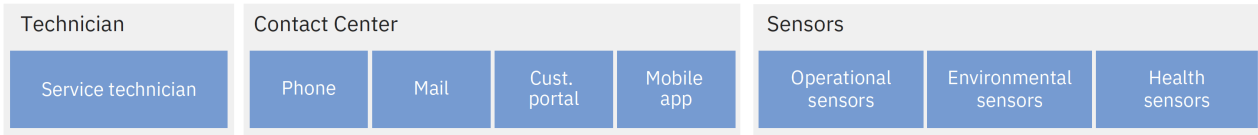
Figure 5: Illustrative evaluation guide for the selection of customer relationship management solutions (coverage and strategic importance are exemplarily)

Field service: Achieve operational excellence

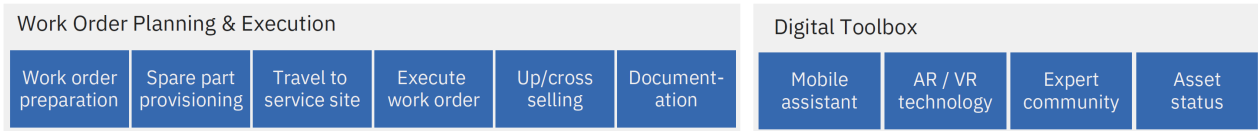
With regard to field service, operational excellence is key. IBM research shows that leading industrial service providers do not excel due to their ability to generate more service-related

revenues, but because they are able to provide their services more efficiently.¹ Reacting fast and being well prepared, leads to minimized repeated jobs, reduces costs for the service provider and the customer.

Field Service Interface: Omnichannel experience



Field Service Technicians: Provide efficient field service



Field Service Management Back-office: Improve transparency and increase productivity

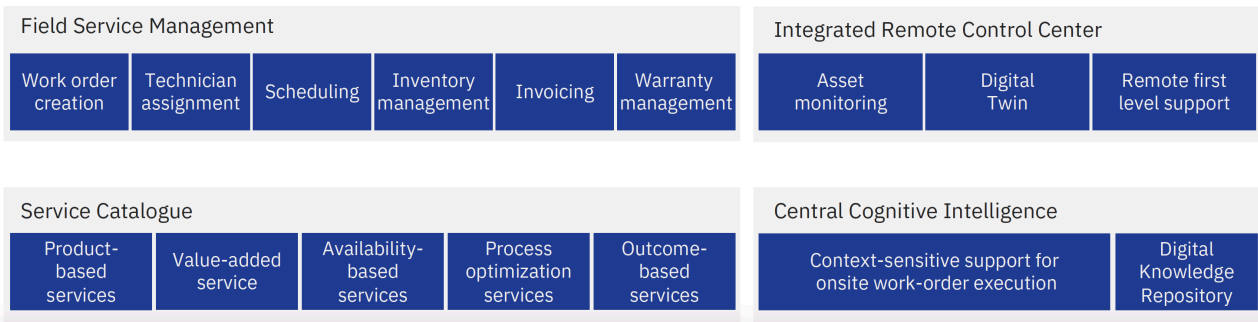


Figure 6: Most important means to provide efficient field service.

The first layer is the service interface: The service interface is the holistic, customer-centered and brand embodying touchpoint with the customer. Through the interface, service calls are triggered and information is communicated. Beyond traditional interfaces, a service call can be triggered by sensors and more advanced services, such as predictive maintenance, can be purely triggered by IoT enabled machines. The transmitted sensor data gives information about the condition of the machine and allows a fast diagnosis/prediction.

The second central layer are the services delivered by employees in the field:

The service technician role is

transforming with an increasing number of tasks. Service workers once needed to be engineering experts, now their job is transforming into consulting and advisory roles. Additionally, manufacturing companies will be confronted with new challenges in the coming years due to demographic change: The knowledge accumulated over decades by experienced employees will be lost upon their retirement. To address this transformation and the aging workforce, remaining expert knowledge needs to be scaled and new knowledge needs to be built. An option is for field service workers to remotely get in contact with technical experts if they encounter an unknown problem. These recommendations

might be initially human based but can also be infused with AI. IBM research shows that leading industrial service providers generate a significant part of new service contracts directly through the field service therefore, training field service workers in advisory and consulting skills can be a way to grow the top line.¹

Operational efficiency starts with the effective preparation of service workers by combining customer and asset information. To do so, integrated and intelligent **asset management** is essential as missing spare parts is the number one reason for return

visits. Research has shown that the implementation of advanced technologies reduces repeated visits by up to 20%.¹⁵ Next, the field worker needs **routing support** to reach the customer in an optimized way and this can lead to travel time reductions of up to 30%.¹⁵ On site, they will be supported by **mobile assistants** to resolve issues efficiently and effectively. This high-quality field service leads to an increased trust opening up opportunities for consulting services and **up- and cross-selling**. The available services need to be presented to end users in an organized, easy-to-access interface with proper documentation.

Operational excellence in field service

BSH Hausgeräte GmbH

BSH Hausgeräte GmbH is the largest manufacturer of home appliances in Europe and one of the leading companies in the sector worldwide. Five thousand field service technicians in 46 countries work for BSH. A cooperation of IBM

and Apple facilitated a significant service transformation and an iOS app family was developed to support the BSH service technician during their daily activities. One app is focused on job scheduling and payment processes while an additional app supports parts management. These applications improved the sales revenue through service technicians by 20%, increased productivity by 7%, and increased the Net Promoter Score by 22%. BSH Hausgeräte Enhances the customer support experience with innovative iPad apps from IBM.¹⁴



Maintenance

JFE Steel

JFE Steel, one of the world's leading integrated steel producers, deployed an AI maintenance solution that can search vast numbers of documents such as daily work reports, failure reports, and work manuals created over the past several decades.

If an equipment malfunction occurs during the steelmaking process and the production line is stopped for a prolonged period, huge losses can be incurred. Therefore, equipment should be operated 24X7 and, in case of emergency, recovery should be quick. As many experienced staff members with advanced maintenance experience and know-how enter the retirement age, a support system that preserves this knowledge is needed. The AI maintenance solution can identify past events and solutions, allowing maintenance personnel rapid access to collective knowledge that supports timely results. In September 2018, the company's controllers and instrumentation failure recovery support system was implemented in all lines of steel mills/manufacturing plants in six regions. The system has helped reduce manufacturing downtime from equipment failures by 20% or more.¹⁶



The third layer is the field service management back-office: **Dynamic scheduling and dispatching** enables automatic scheduling of the best service worker for a task with the right equipment while taking external factors such as customer processes and partnerships into account. Appreciated field service especially minimizes the impact on customers' processes, for instance, by scheduling repairs to less busy times. **Spare part optimization**

allows for efficient management of the inventory, and **warranty management** ensures maximum uptime of contracts and customer satisfaction.

To pave the way for operational excellence in field service, companies need to analyze the service interface, the field service and the service management holistically and integrate them into a field service platform. IBM

research shows that only 2 out of 5 companies have implemented such platforms.¹ Figure 7 provides an exemplary overview of central capabilities of field service management solutions, such

as ServiceMax’s Field Service Management platform, IFS’ Field Service Management software, or the SAP Field Service Management software.

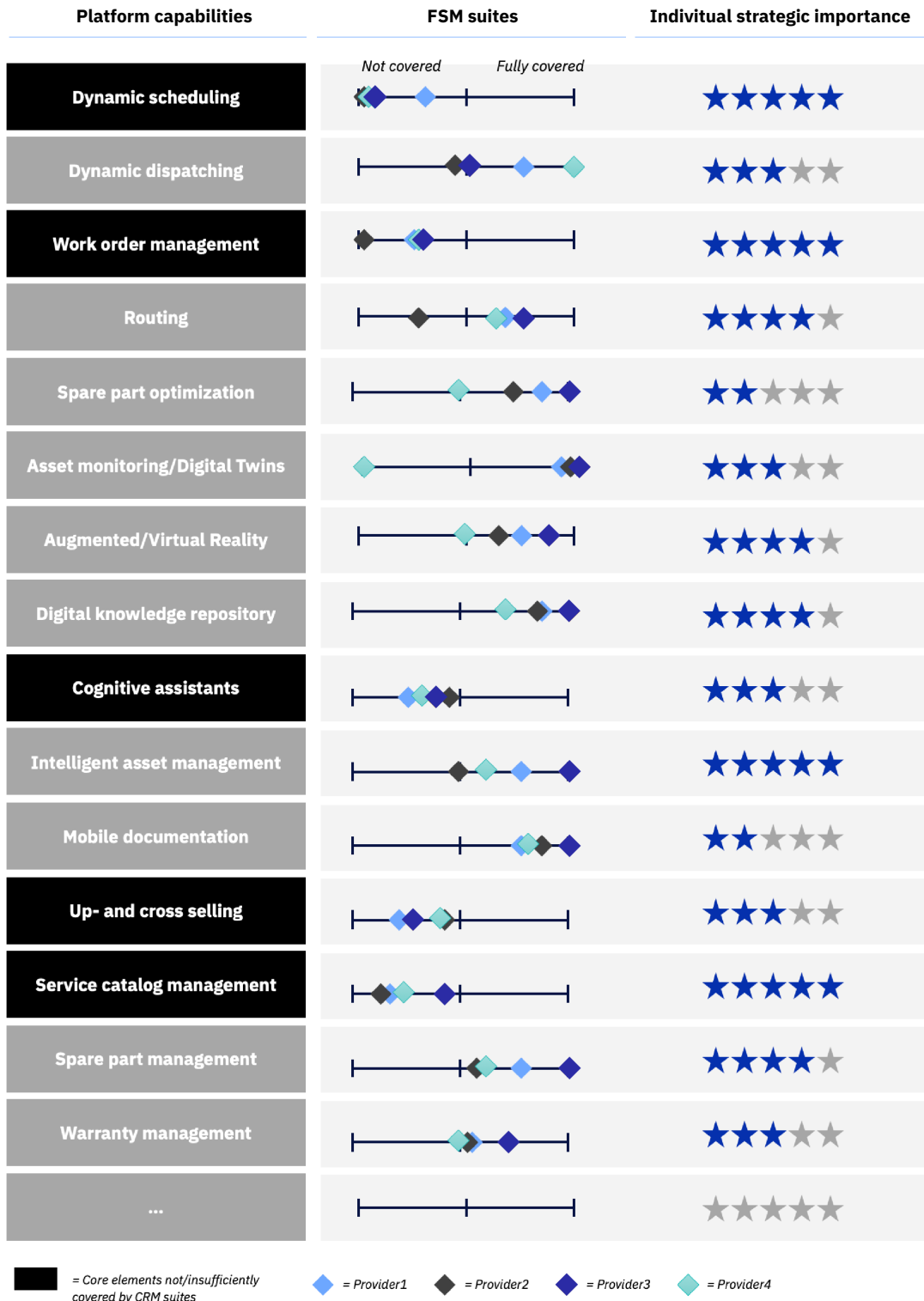


Figure 7: Illustrative evaluation guide for the selection of field service management solutions (coverage and strategic importance are exemplarily)

Exponential technologies: The backbone of the service transformation

Exponential technologies are technologies that benefit from exponential growth. Combining multiple exponential technologies can even amplify the exponential effect. These technologies are key drivers of service transformation as they enable fundamentally new business models.

It is important to note that while exponential technologies are the building block for a successful service transformation, no company can build and provide all necessary technologies on their own. Therefore, companies have to develop strong partner ecosystems.



Connectivity: Connectivity is a key driver of digitalization and an enabler of future business models. Especially, the Internet of Things has the potential to enable a magnitude of new service offerings. To enable advances through IoT a strong backbone needs to be created and products should be designed with connectivity in mind. Research from IFS, a leader in field service software, shows that missing connectivity is a key challenge for outcome-based services.¹⁷



Data: Manufacturing companies have access to significant amounts of raw data. For example, one production line at a modern plant might have 2,000 different pieces of equipment. Each piece could have 100 to 200 sensors that collect data continuously, generating 2,200 terabytes of data each month.¹⁶ Insights based on the aggregation, classification, and analysis of this data through AI and predictive analytics could increase productivity and reveal data monetization opportunities.



Cloud: The three service transformation dimensions are supported by different technical platforms and generate a significant amount of data. To ensure that this data is accessible for each node in the service system mesh, the data should be stored in the cloud.



Artificial Intelligence, Advanced Analytics and Augmented Reality:

AI enables computers and machines to mimic the perception, learning, problem-solving, and decision-making capabilities of the human mind. Frontrunners on digitally transformed products embrace AI as part of their digital transformation—up to three times more often than their peers. By applying AI and Advanced Analytics in service processes, companies can improve their efficiency and customer satisfaction.¹⁶ AR can create completely new and unique customer experiences which can boost the perception of services.



Automation:

AI and automation—together they become intelligent automation—alter the way humans and machines interact in terms of how data is analyzed, decisions are made, and tasks and activities within a workflow or system are performed. 80% of organizations scaling intelligent automation expect to outperform the competition in profitability within three years.¹⁸



Service Platforms:

Exponential technologies and specialized platforms for field service, customer care and advanced services need to be integrated into a holistic service platform. For example, ServiceNow’s platform or the Maximo platform integrate automation, AI and predictive analytics and have specific optional capabilities for field service and customer engagement. Figure 8 shows a high-level perspective of essential capabilities of such service platforms.

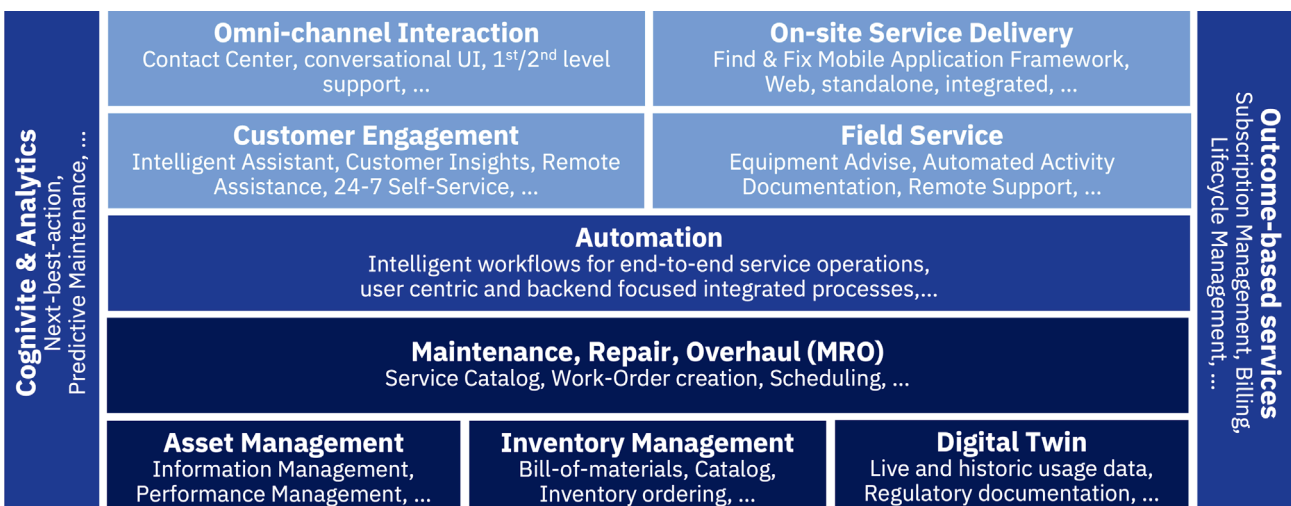


Figure 8: Essential capabilities of service platforms

Action guide

Manufacturing companies operate from very different points of departure. Their circumstances vary greatly in their service transformation producing a large array of roadmaps. However, we have established, five key imperatives that manufacturing companies should address during their service transformation journey.



1. Make your service journey a holistic transformation

It takes more to thrive in the service industry than to create new features and functions for clients. The transition approach to services should be a comprehensive transformation initiative instead of creating services in isolated pockets. We see two key success factors to ensure an adequate and executable product and service portfolio.

First, the development of an enterprise-wide service strategy:

- frame a service target picture by analyzing external (customer needs, market developments, competitors) and internal (strengths, weaknesses, assets) factors.
- formulate your services target picture.

- assess your current state, identify white spots, derive the required capabilities to develop specific services and identify initial quick wins.
- decide which capabilities need to be built or sourced from a defined partner ecosystem.
- identify specific initiatives and work towards a prioritized roadmap for implementation. Described as an ongoing process in which the service strategy needs to be frequently adapted to on-the-track learning.

Second, a successful transformation of services requires profound organizational changes. There should be a new definition of how the new service business and the old product-based business

work together. A possible way is to implement an ambidextrous operating model – one part of which exploits the old product-based business, and the other part explores new service models in a more greenfield approach. While

both will have their approach to organizational set-up, processes and ways of working, they should build on a common ground to enable technology to ensure the successful scaling-up of new services.

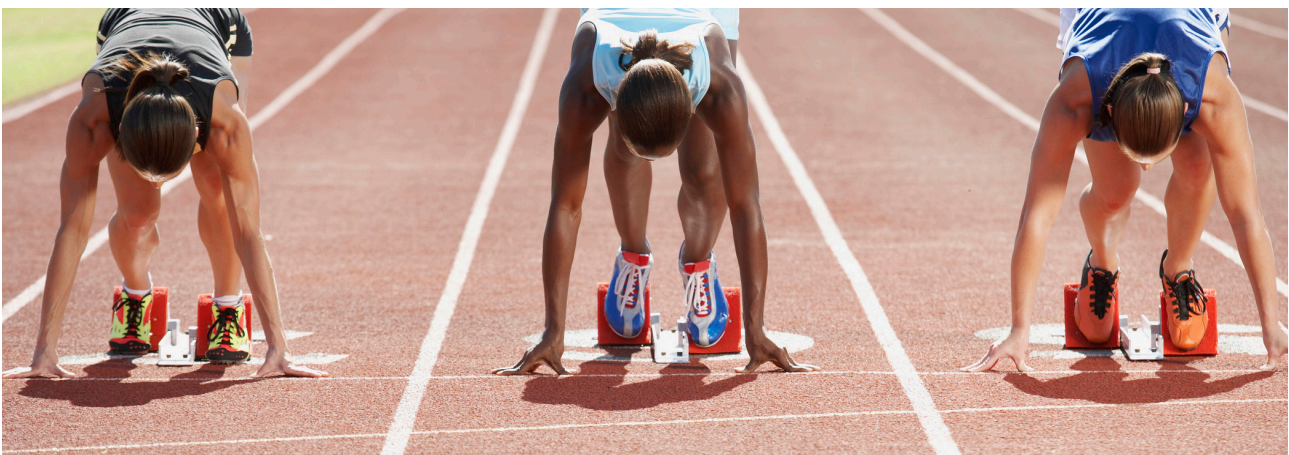
2. Take a customer-centric perspective

Organizations must learn to place the consumer at the core of their innovations when it comes to the development of new services. Manufacturing companies can rely on proven methods and validated approaches from technology companies.

Open innovation approaches with customers, partners, and client-facing employees help reveal the most relevant customer problems and design innovative solutions to them. User-centric methods such as Design Thinking can be used to facilitate the customer-centric innovation process. However, it is important to highlight that not all customer problems allow the development of a profitable service.

Therefore, always incorporate the business case into your decision which ideas to select for development.

For service development itself, manufacturing companies should strongly embrace cross-functional teams to ensure feasible outcomes. Moreover, teams should follow agile principles to develop the right services quickly. A test-and-learn mindset is crucial to success, as it allows fast validation of hypotheses. To measure real customer value, customer-centric KPIs and corresponding measurement processes should be established. In doing so, feedback from selected customers can be gathered and incorporated as early as possible.



3. Think about commercial scaling from the beginning

The opportunity to find new ways to grow services always seems exciting at first. But when the time comes to turn those prototyped concepts into reality, scaling attempts often fall short.

Coming up with unique, innovative ideas and models is one thing, but what matters is how those concepts generate substantial customer demand. A key question is how sales, marketing, and the partner ecosystem can contribute to make the service a success. Therefore, a holistic market activation strategy should be created early in the process, ensuring sufficient commercial scalability and strategic impact (e.g. targeting sufficiently

large customer groups) of the services.

Finally, it is important to remember that it's not the magnitude of marketing budget, sales force, and brand reputation that will drive commercial success. What businesses need to do is think like a startup when bringing innovations to market and smartly leverage the means of digital marketing and sales. Here, it is crucial to test the market activation strategy as early as possible in the innovation process. By experimenting with different strategies, marketing and sales can determine the optimal brand image, pricing, distribution channels, and advertising.

4. Treat data as an asset

Data is the core of new services. In particular, those in the field of process and asset optimization depend on smart data access and usage. The value of predictive maintenance services, for example, depends heavily on access to the right data set from IoT sensors. To create advantages for others, manufacturing companies should adopt a “data-as-an-asset” mindset, leveraging insights to generate value and unlock new revenue streams.

The first step to kick-start this journey is to create a data catalog. An inventory of available data, mapping it with the desired use cases, and identifying shortages in the process. Then, strategies for extracting the data have to be developed. Also, manufacturing companies should assess the value of enriching their data landscape with data from external vendors/partners to drive higher-value services.

Moreover, data handling and extracting its value needs the right skills. Data engineers help to build the infrastructure and architecture for data generation. Data scientists generate new insights from the

data. Data translators serve as a liaison between business- and technical team members and ensure that requirements are met.

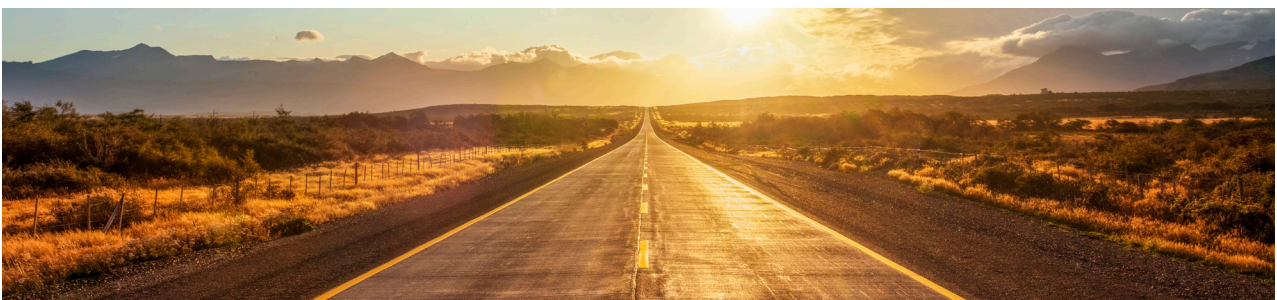
5. Strengthen your technical backbone

The entire potential of new service use cases can only be achieved with a solid and integrated technical backbone. However, as they seek to build complex self-developed platforms that meet too many requirements, many manufacturing companies seem to get stuck in scaling this backbone. They are losing speed, the most critical capability in digitalization and service transformation. In addition, some exponential technologies, be it because of huge initial investments or a lack of data, are not even possible to develop and implement in house.

Instead of trying to develop everything on their own, they should consider prioritizing best-of-breed platforms from independent software vendors and find the right balance between configurable

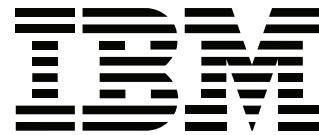
out-of-the-box functions and customizations. They should rigorously assess their current technological landscape and rate the importance of specific capabilities. Evaluation guides (as shown in the previous chapter) help decision makers to prioritize existing solutions from independent software vendors and define necessary customizations.

For other major technical investments, manufacturing companies can also consider cooperating with peers or partners to build custom platforms, split investment costs and increase time-to-market. Partnerships with selected and important clients can be utilized to customize technical platforms to their specific needs and enable the right use cases.



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