

COST TRAPS IN BUSINESS MODELS 4.0

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CASE STUDY: SIEMENS SOARIAN



Fig. 1: Advertisement for Siemens Soarian

In 2001 Siemens AG launched a revolutionary product on the healthcare market named Soarian: Using an IT-based solution platform it was to improve processes in hospitals by orchestrating patients and treatments as well as departments and products. Soarian not only enabled hospitals to track the progress of individual workflows but also proactively drew their attention to any anomalies. As the system collected and constantly evaluated all data, it could automatically identify any weaknesses.

During the launch Siemens initially concentrated on the North American market and was soon able to gain a number of customers there, including the renowned Massachusetts General Hospital in Boston. Nevertheless, the profitability of the new division fell short of the set targets for years. For this reason Siemens' management made the decision to divest the business in 2014 and sold it in the same year for US\$1.3bn to Cerner, an IT and consulting firm that is well known in this sector.

BUT WHAT CAUSED THIS UNSATISFACTORY PROFIT SITUATION DESPITE THE SUCCESSFUL ACQUISITION OF CUSTOMERS?

In order to find answers to this question we will first provide a few more details on the case: When Siemens AG launched Soarian on the market in 2001 the company had been a player in the healthcare industry for over 100 years. In the past few decades its focus had been on the development, production and marketing of medical imaging equipment based on a variety of technologies such as x-ray, ultrasound, CT scanning and magnetic resonance imaging.

However, the medical equipment market was increasingly targeted by new competitors, especially from emerging markets and developing countries such as Mindray, founded in Shenzhen (China) in 1991. Some of the new competitors were soon able to improve the quality standards of their devices to a high level – not always in compliance with all the regulations for the protection of intellectual property (IP) – and put pressure on the profit margins of the established suppliers with their low prices. Because of this and because cutting costs was becoming an increasingly important issue in the healthcare sector across many different countries, Siemens wanted to offer hospitals innovative service solutions to help customers make their processes more effective and efficient.

In its complexity, this new system far exceeded Siemens' traditional business with medical equipment and the associated repair and maintenance services. To launch the system, it bought a software company that was already working in the sector. Simultaneously, a division focused on the new business was created within Siemens Healthcare. There 1,400 software experts started developing a comprehensive IT-based solution platform. In their purchase decision customers could choose whether to buy the software license, software customisation, system implementation, maintenance and consulting services at fixed price rates or to pay according to their achieved efficiency gains. To adapt the solutions to the customer's specific needs after the purchase decision, the specialists of Siemens first had to analyse all workflows of a hospital and identify improvement potentials, before configuring and implementing the IT system with all the necessary process adjustments in an employee-friendly manner.

In 2016 we asked Tom Miller, then president of Soarian and board member of Siemens Healthcare from 2005 to 2013, what he considered the most important lessons learnt from the development of the Soarian division. He singled out five:

1. We lost too much time and money developing software that fulfilled our vision of the customer's functional requirements and lost sight of the true prioritised needs and costs of the actual customer.
2. We overestimated our knowledge and capabilities of the entire healthcare enterprise as well as the necessity to integrate the installed base of competitors' products in our complex service.
3. We overestimated our knowledge and ability to change processes and culture when going from business for high-tech machines to the business of complex service solutions. Our extremely successful processes for medical device capital equipment development and sales were actually a liability in the solutions business.
4. We underestimated how different a portfolio of skills in our people was required. The people from the traditional business did not even have the right skills to interview the necessary candidates.
5. We miscalculated the different financial logic of these businesses in time, cash requirements and flows, risk projections and mitigation.

This disproves the view that top managers never admit to their mistakes. At least, this cannot be said of Tom Miller.

In addition, these statements pinpoint the causes of cost traps that are also relevant for other industrial enterprises in our experience when they enter markets for "complex service solutions" with new business models. For this reason we will return to these statements time and again in the course of the following observations.

THE END OF THE OLD SOURCES OF REVENUE

The situation in many industrial enterprises today is very similar to that of Siemens Healthcare in 2001, in particular for those that have a strong presence in western industrial countries. For decades these companies have been developing, producing and selling high-quality products. Despite being highly priced their sale does not generate a high profit. In contrast, so-called "after-sales services" – i.e. repair and maintenance services as well as the necessary spare parts – generate a much higher profitability. But this business model is increasingly endangered. On global markets its future viability is under threat due to several developments:

1. Customer groups from developing countries and emerging markets account for the largest growth world-wide, while lacking the spending power for expensive high-quality products and interest in after-sales services. If at all necessary, they want to be able to repair the products themselves. This wish makes sense: If a truck suffers a breakdown in Inner Mongolia, its driver will not be able to rely on the manufacturer having a well-established repair service network on this route. The driver must be able to help himself, hence the high-tech electronics of modern trucks rather make life more difficult for him.
2. Many companies world-wide try to copy the expensive spare parts of established technology firms. This applies just as much to simple power plugs by Apple as to complex drives by Siemens, GE or Mitsubishi. As a result, these companies lose highly profitable after-sales business. But it gets even worse than that: Some of the imitators – like the above-mentioned Mindray from China – are re-investing their profits in improving their know-how and will soon be able to manufacture not only spare parts but also more complex product systems.
3. "China" is a topic that takes us to the third reason why business models that owe their profitability mainly to the large margins of their after-sales services are particularly at risk. This is due to state interventions such as those imposed on German premium car manufacturers in China in 2014. If one had purchased all the individual parts of their cars individually, the total would in some cases have been more than ten times higher than the price of a new car. Driven by demands of the National Development and Reform Commission – effectively accompanied by reports on the state television channel CCTV – manufacturers were forced to bow to the pressure and lower their parts prices; at least to a level where a full set of spare parts of the Chinese long version of the Audi A6 cost less than three times the price of a new car.¹ Government authorities in China can put pressure on manufacturers very effectively because their country has now become the largest sales market for cars world-wide. Nevertheless, other countries also play a major role for the sales development of established technology firms and could take example of China.

In addition to these three threats to traditional business models technical developments in the IT sector create new possibilities for tapping great sales potentials with innovative business models. In this context two factors are important:

Firstly, the surging number of options for generating and analysing data. With the help of auto ID technology products can now autonomously deliver data for automatic identification, and sensors keep you permanently informed about the status of production systems. For example, a modern aircraft engine features over 3,000 sensors, by means of which a manufacturer can monitor the state of health of their customers' engines from the control centre and take action before things go wrong.

The second factor is increasing global networking, which not only concerns communication between humans but also, and above all, machine-to-machine as well as machine-to-product communication. According to a study by Cisco from 2011 the number of connected devices has exceeded that of the world's human population since 2005, and by 2020 devices will outnumber people by a factor of six.²

While the new technologies have already revolutionised consumer goods segments such as the book trade and travel market, there are only gradual signs of such changes in the markets of industrial enterprises. Nevertheless, numerous industrial enterprises are working on how to benefit from the new technologies, using slogans that differ from nation to nation. The USA has long been speaking of the "Internet of Things", South East Asia recently coined the theme "Made in China 2025". In Germany the term "Industry 4.0" has become rather popular over the past few years, which puts the spotlight on changes in industrial manufacturing.

As this sector is of major importance to Germany, it is hardly surprising that according to a KMPG study published in 2015 more CEOs than in any other country believe they must change their company's business strategy significantly to continue to be successful or achieve growth in their global markets.³

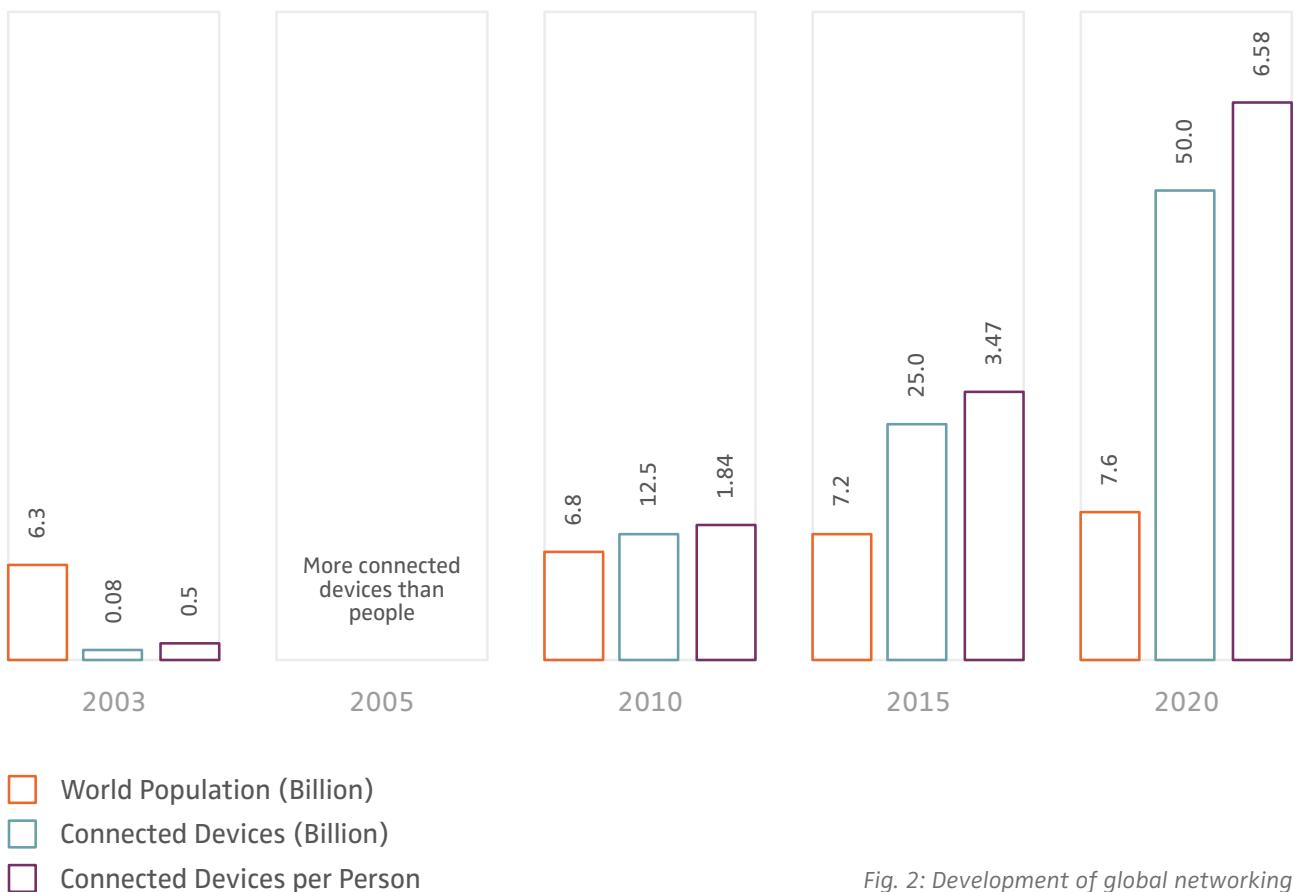


Fig. 2: Development of global networking
(Source: The Internet of Things, Cisco White Paper, April 2011)

INNOVATIVE BUSINESS MODELS AS A GROWTH OPPORTUNITY

In this context we see business models as one of four pillars of a business strategy. To define them, one must answer four key questions, which are related to one another but differ in focus:

1. What customer problem is to be solved for which target groups?
2. What product technology should be used for finding a solution to the problem?
3. How should value creation be distributed between the market players?

The last item concerns the core elements of the business model. It defines what activities in the value chain are to be assigned to the supplier and which to the customer, how the

ownership of assets and data will be divided, and what revenues will be due to whom.

The decisions regarding the first three basic questions on the business strategy will result in an affirmative answer to number four:

4. Does the supplier have a competitive advantage in their field of business?

This "3 plus 1" structure for the definition of a business strategy is summarised in the following figure and explained in more detail in the appendix.

Based on this model, companies have three ways to approach strategic changes.

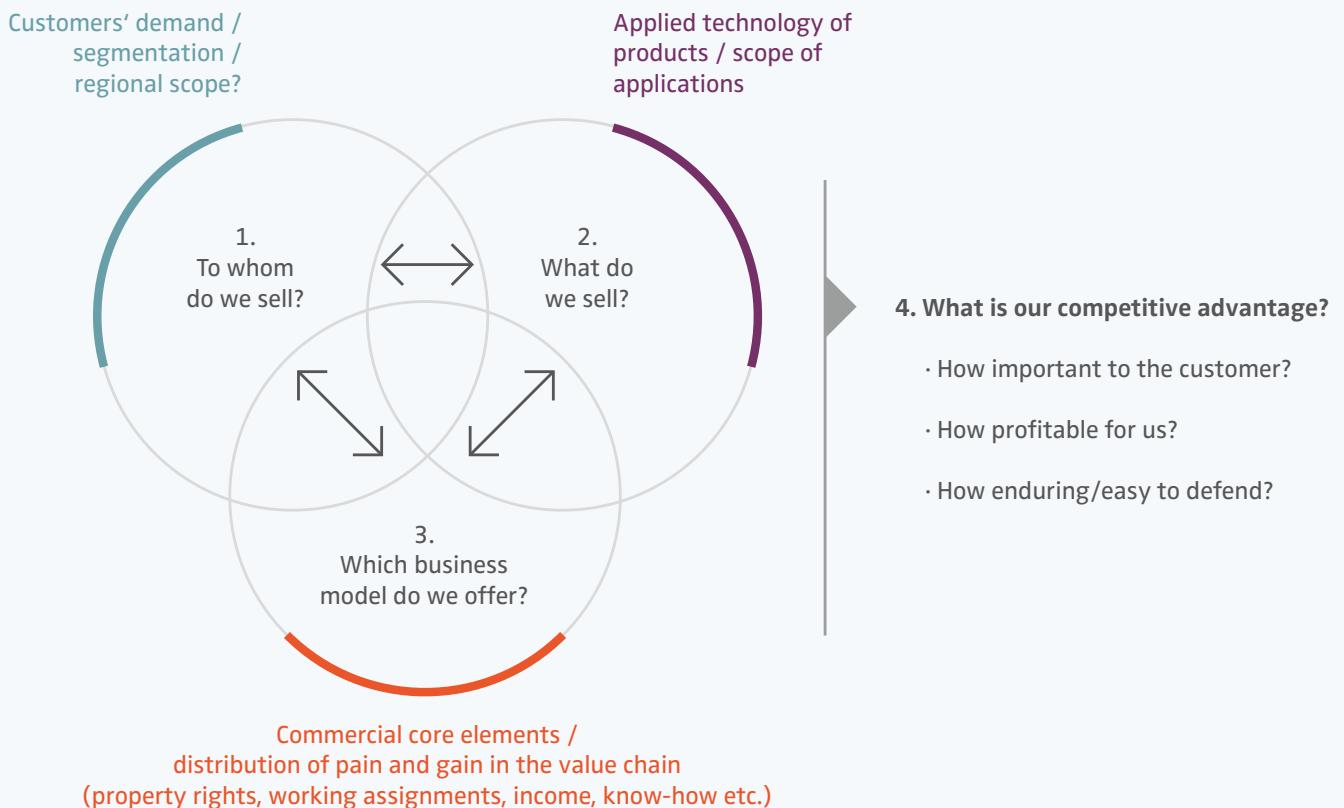


Fig. 3: "Three plus 1" – key questions for the development of a business strategy

Firstly, a company can achieve growth by addressing new customers with its products. Frequently, this means fostering a more international marketing strategy. Over the past few decades this was facilitated by technical and political developments. Apart from some dents in 2001, 2009 and 2015, world trade volume has constantly increased and product exports have grown three times faster than the world-wide production of goods since 1960. Especially for small and medium-sized enterprises there may still be huge untapped sales potential in regions outside their local markets. However, the established major players who were surveyed in the above KPMG study, already market their products in numerous countries; hence this may be less of a growth option for them.

Secondly, a supplier may try to generate sales growth by opting for new product technologies. This option marks the development path of many established companies. Be it telegraphs for Siemens, light bulbs for GE founder Thomas Edison or spark plugs for Bosch – innovations in the field of product technology have usually been the basis for the strong growth of the respective company. Nevertheless, many industrial companies – even if they don't like to admit it – have difficulties repeating such successful achievements. One reason for this may be the need to spend more on R&D and shorten product lifecycles. Organisational factors, described by Clayton Christensen as "The Innovator's Dilemma" may be another reason.⁴ He believes that a company's past market success is the root of the problem. While this success may create a bond with its long-standing customers, it also leads to a certain ignorance towards disruptive novelties with a future potential that customers will also misjudge.

In view of the world-wide presence of a few effective product innovations it is not surprising that many established industrial companies, when seeking to generate growth, focus on the third strategic growth option: the introduction of new business models. Rolls-Royce with its aircraft engines is a case in point: The company is still producing aircraft engines and addressing the military and civil aviation organisations as its most important target customers in this sector. However, the business model has changed: Instead of selling engines and expensive spare parts, products are marketed on a "power by the hour" basis and remain the manufacturer's property.

Rolls-Royce has also taken over the management of its engine maintenance services and is using the data delivered by countless sensors to help the customer as a "trusted advisor" even beyond matters relating to engine technology. Insofar the new focus of the business model also has impacts on the company's portfolio. Its hallmarks are that

- Services (that are not tangible, unlike industrial goods) are in focus of the offering;
- Services are combined with goods to generate customised solutions in the value chain;
- These solutions have a high degree of complexity and a rather high value for the customers.

Hence we define what Rolls-Royce offers as complex service solutions.⁵

However, the strategic changes in the case of Rolls-Royce originate not so much from the development of innovative product technologies but were rather primarily initiated by an innovation of the business model or a restructuring of value creating processes. The following new elements of the business model play a major role in this context:

- Services that used to be the customer's responsibility (e.g. reporting engine malfunctions) are now performed by the supplier; this is known as "forward integration" or "going downstream".
- Ownership of the industrial good, in this case the engine, remains with the supplier and does not pass to the customer; i.e. Rolls-Royce sells use instead of ownership.
- Pricing of the service depends on the degree of utilisation by the customer; this approach is usually referred to as "performance-based pricing".

When industrial enterprises introduce new business models using modern information and communication technologies as part of complex service solutions, we speak of "business models 4.0".

Fig. 4 summarises the reflections of the last two sections.

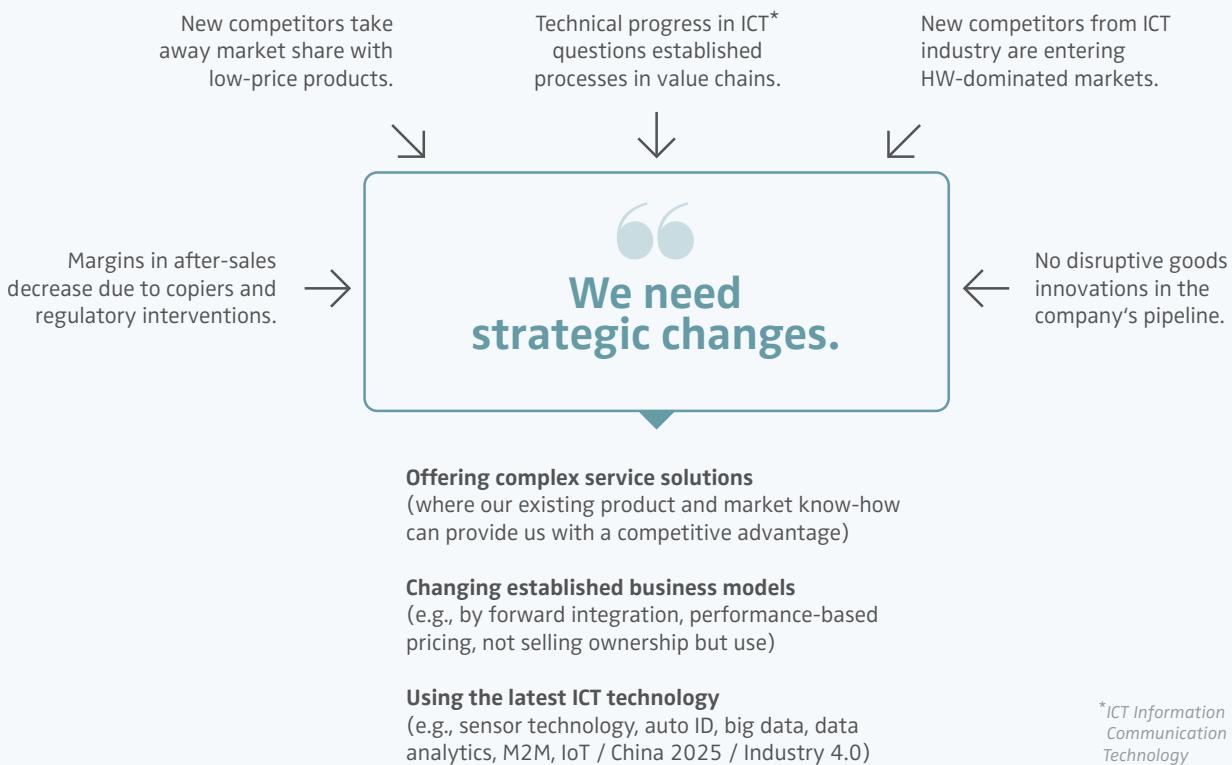


Fig. 4: The logic of business models 4.0

It should be pointed out that although an industrial enterprise no longer needs to fear the above-mentioned threats of traditional business models when introducing business models 4.0, this is no escape from the competitive challenges of free markets.

In this context, companies in the information and communication technology (ICT) sector play an important role and also hope to find major growth opportunities on the new markets. For example, SAP is using its expertise in the field of software to optimise the traffic flow of trucks in ports together with a telecommunications company. A system installed in the truck driver's cockpit constantly updates the forwarding company's head office via tablet computers and smartphones on the current position of the vehicle and load. Partly, SAP's solutions also comprise traditional industrial goods. Sensors for air conditioning systems were installed in the carriages of the Italian train operator Trenitalia and control the maintenance required for these systems. This is remarkable insofar as the manufacturers of the air conditioning systems would probably have wanted to create this added value themselves.

Larger ICT companies like Google are geared to enter the traditional business of industrial enterprises in a completely new dimension. For example, in 2014 Google penetrated the smart home systems market by purchasing Nest, a thermostat and smoke detector manufacturer, for US\$3.2bn. In 2013 Google had already bought 18 other companies outside the ICT sector, including robot manufacturer Boston Dynamics. The logic behind these acquisitions is based on growing demand for solutions that combine industrial goods with software. In this way, companies in both sectors want to compensate for their lack of expertise in each other's sectors in order to benefit from the resulting new business opportunities.

While Google is buying industrial enterprises, Siemens has become Germany's leading software development company. Jeff Immelt, CEO of Siemens' rival GE, even says: "Every industrial company must be a software company."⁶ Referring to this rivalry, consultants of the Boston Consulting Group predicted in 2014 that software companies would one day be four times more profitable than industrial enterprises. But this is just a forecast. Even consultants can err.

GREAT EXPECTATIONS, MIXED RESULTS

Suppliers hope that strategic changes, such as the introduction of new business models, will set them apart from the competition or be a market barrier to new competitors, thus resulting in higher profits. Moreover, due to the higher proportion of services industrial enterprises also expect business models 4.0 to solidify their revenues. For example, even if Rolls-Royce customers cancel or postpone purchase decisions for expensive aircraft engines during a global economic crisis, their aircraft will remain in operation during this period and their operation will continue to generate returns for Rolls-Royce.

As Rolls-Royce was able to significantly strengthen its knowledge of its customers and their processes with the help of new technologies, it also realised that this was a chance to identify emerging customer needs or new business opportunities at an earlier stage and boost its turnover. A win-win situation, no?

Rolls-Royce's annual report for 2014 speaks a different language. It shows that the company did not make a great profit that year but losses. In 2015 dividends were cut, and it was announced that 2,600 of the 55,000 jobs in its aviation division world-wide would be axed. Neither can Siemens Soarian, having repeatedly failed to meet its profit targets, be considered an example of the successful introduction of business models 4.0. Of course, such developments are normally due to many different factors. Nevertheless they go to show that new business models are not a guarantee for success.

This experience is consistent with the results of numerous studies that have explored the performance of similar innovative business models or the introduction of complex service solutions. In one of these studies from 2005 McKinsey interviewed 200 top managers of Fortune 1000 companies. Only 25 per cent rated the new business models as successful; 50 per cent considered them "moderately successful", another 25 per cent complained of losses.⁷ In another study scientists examined the development of the financial results of 10,000 companies between 2006 and 2011. The authors also observed highly divergent performance developments and called this a "service paradox" in view of the mixed results. "While some firms achieve good profits and valuations, an equal number fail to do so!"⁸

We will now take a closer look at what cost traps can lead to an unsuccessful outcome when introducing business models 4.0 and what measures a company can take as a remedy. We will put the cost traps in a chronological order: from goal definition through marketing to implementation with the customer.

But before exploring this from an entrepreneurial business mindset, we would like to point out a scientific study that highlights the topic from a broader perspective. It has been shown that when introducing complex services on B2B markets there is a correlation between a successful launch and the economic or sector-related framework factors. In regions and sectors with low industrial growth strategic changes led to much better results for the companies than in places that already enjoyed strong industrial growth. In addition, the outcome was more likely to be a successful one if the managers participating in the study rated the general "level of turbulence" – i.e. the dynamism of market changes in a region or industry – rather as high than as low.⁹

COST TRAP 1

OVERAMBITIONOUS PROFIT TARGETS

Companies normally combine strategic changes with economic performance targets. Still, the question of how well a division is expected to perform in future often gives rise to countless discussions not only with new but also in the case of old business models.

However, when traditional industrial enterprises set profit targets for the introduction of complex service solutions, there is another aspect that may distort their forecasts: As the new business models have a high service content, executive boards of companies may be inclined to take the high profitability of their traditional services – in particular maintenance and repairs – as a benchmark. The risk of overambitious expectations is all the greater, the less experience there is to go on for the new solutions. In a study by Gebauer et al. a manager is quoted on this problem, who quite rightly vents his frustration at the ambitious goals of his management for the new service business: "We should put a service label on all our products – that's the only way to reach that goal in 5 years."¹⁰

The chronological dimension of these plans is also closely related to the absolute figures. Overambitious planners set too early a date for when they believe the new business will reach the profit zone or investments will pay off. They overlook the fact that companies that are now considered successful pioneers of innovative business models operated at a loss for many years. Jeff Bezos, who founded Amazon in 1992 and went public two years later, only started making a profit in 2003.

By the way, this misjudgement of the chronological dimension is also the reason for the fifth statement of Tom Miller on Siemens Soarian. He was convinced that the Soarian Group would be successful, but realised that it would take longer to be profitable, especially if pricing was coupled to the performance of a hospital. However, he was unable to convince the management of this "logic of the business" before the sale of the Soarian Group in 2014, as Soarian had failed to meet its performance targets too often.

Rosabeth Kanter of Harvard Business School nails the circumstance that especially large companies only show little willingness to change their defined plans: "Established companies don't just want plans, they want managers to stick to those plans. They often reward people for doing what they committed to do and discourage them from making changes as circumstances warrant."¹¹ This is probably a further reason for the observation regarding the Innovator's Dilemma that it is rather small than large companies who are successful with innovations. Start-ups stand out for their high flexibility and willingness to adjust their plans time and again. However, before established companies adopt their approach they should not forget that for every successful example like Amazon there are dozens of start-ups that go bankrupt.

COST TRAP 2

OVERESTIMATING ONE'S OWN CAPABILITIES

Owners of companies and their representatives like to set high profit targets. Under pressure from the owners or board members, some managers agree to these high targets even if they do not believe they can be met. However, most managers accept the goals, as they are convinced that they can achieve them. Still, the managers of the latter group are aware of the fact that the introduction of business models 4.0 will entail considerable internal changes: Processes need to be changed, products adapted or even newly developed, training and pay schemes revised, corporate structures redesigned. This even applies in cases where the new business model only indirectly affects the fundamental product technology and selection of target customers, as in the case of Rolls-Royce. For example, Rolls-Royce had to accelerate its logistics processes, as under its old business model it was unimportant for Rolls-Royce how long an aircraft had to wait for a spare part; whereas the "power by the hour" scheme made fast availability crucial for its revenues.

Apart from the purchase and introduction of new IT systems the engines also required adjustments, e.g. sensors had to be installed. However, usually the impacts of new business models on products are even more dramatic, causing Michael Porter to comment: "Smart, connected products require a fundamental rethinking of design."¹²

Nevertheless, practical experience shows that these changes do not always happen. There are two reasons for this: Firstly, the responsible managers do not know what has to be changed. Secondly, they know what has to be changed, but are unable to put the changes into practice.

The following diagram demonstrates these two problems that become cost traps. The mere existence of these two cost traps probably comes as no surprise. But they are obviously misjudged by managers who fail to meet their profitability targets.

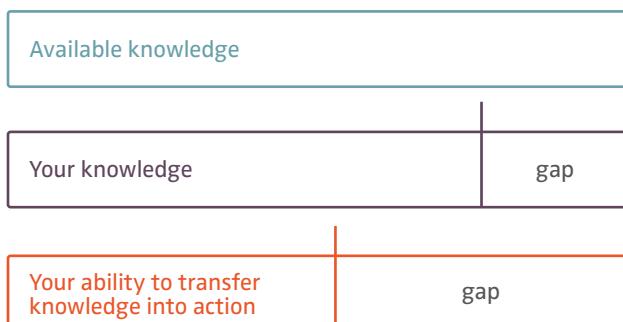


Fig. 5: Knowledge-related cost traps (1)

This is also true in the case of Siemens Soarian and is clearly obvious in statements 2 and 3 of Tom Miller. He points out that he overestimated the capabilities of his group to integrate competitors' products in the offered solutions and adapt the internal processes and internal culture to the new business.

If managers accept overambitious targets, it could be assumed that their risk acceptance is high. Kahneman/Lovallo explored this question in a study but came to a completely different result. They found that people are normally unwilling to take risks and rate a possible loss as higher than a possible gain, even if the figure is the same in absolute terms.¹³

Moreover, they came to the conclusion that this risk aversion is particularly strong in managers, because their decision-making and its consequences may be monitored by other executives or staff members. As a consequence, managers tend to be cautious about taking risks. In this context Kahneman/Lovallo speak of "timid choices".

Why do managers then believe they can achieve overambitious targets and fulfil "bold forecasts"? According to Kahneman/Lovallo they are either unaware of the risk and/or believe that they can control the risk thanks to their managerial wisdom and skill ("illusion of control"). This overconfidence is a key cost trap, according to the Chinese saying that you never get lost faster than when you think you know the way. According to Kahneman/Lovallo, this behaviour has to do with an organisational pattern that sees problems primarily from an inside view and transfers successful experiences of the past to future challenges.

However, Kahneman/Lovallo not only diagnose this systematic mistake but also offer advice on how to avoid it. They suggest supplementing the inside view by an outside one. For lack of a company-specific knowledge of details an outside view creates a broader frame than an inside perspective and enables the use of an abstract language. This permits comparisons with firms that have similar characteristics and leads to a more objective risk analysis. Adopting an outside view is harder for employees of a company than for outsiders, especially in companies with a hierarchical way of thinking and consensus culture; an internal consensus on risks is not necessarily an indication of their valid recognition.

IGNORING UNPREDICTED DEVELOPMENTS

The causes of unexpectedly high costs are not necessarily related to the behaviour of the supplier or customer. Rolls-Royce's "power by the hour" concept is a case in point. Aircraft may remain grounded due to force majeure, snowstorms or bomb threats may bring the airport to a halt and ash clouds of erupted volcanoes may rule out the use of flight routes. In this case Rolls-Royce would earn no money with its business model. It is true that all market players would like to know of such events in advance but it is impossible to make such forecasts.

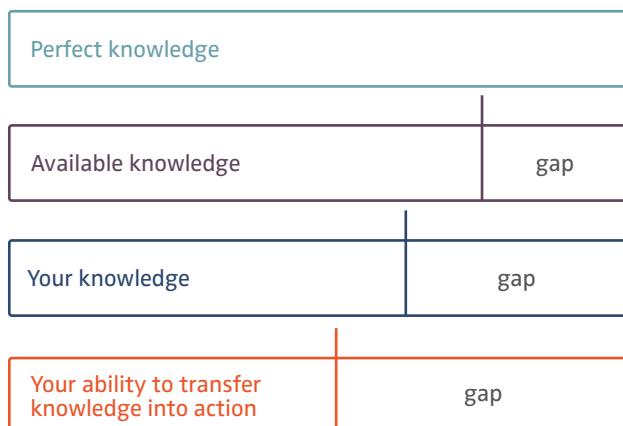


Fig. 6: Knowledge-related cost traps (2)

For this reason "perfect knowledge" has been added to fig. 6. This category includes knowledge of risk-related events that cannot be predicted. Companies must think of how to deal with the gap between available and perfect knowledge and what risks need to be considered in this respect.

Just because future events are unpredictable, it does not mean that their cost risks are incalculable. The insurance industry is an entire sector that has dedicated the focus of its value creation to rating unforeseeable risks.

A simple example: Assuming the three companies in fig. 7 own the respective number of cars. Which company is best equipped to cope economically with the uncertainty of an unforeseeable loss in value of its fleet?

Company 3 looks the most promising, doesn't it? Company 1 lacks a critical mass and the unexpected loss of its only car cannot be compensated by other vehicles. For company 2 the loss of a vehicle would be less of a threat. However, as this company only uses one type of vehicle it would be fatal if it turns out that all models of this type suffer from an unforeseen problem that lowers the value of its fleet. This would also have less of an impact on company 3, as it already has several different types of vehicles. The critical mass and mixed portfolio make it easier to deal with unforeseeable risks.

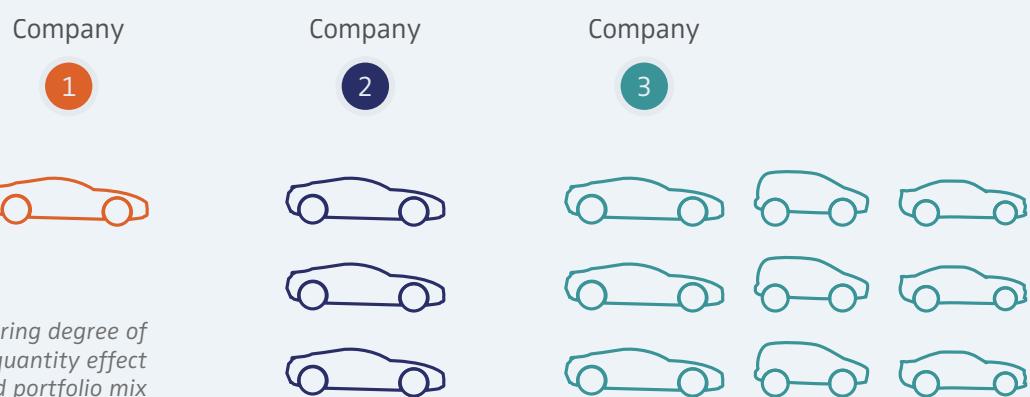


Fig. 7: Differing degree of risk due to quantity effect and portfolio mix

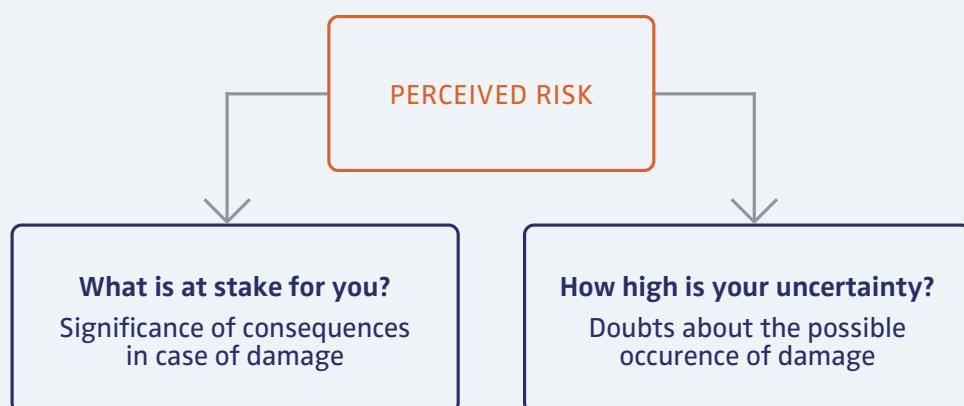
Simple as this example may be, it has a high practical relevance. A truck manufacturer who switched his business model from sale to leasing when launching his latest generation of vehicles on the market, found that his trucks ran into technical problems after 150,000 to 200,000 kilometres. As the leasing fleet consisted mainly of this model, the costs of remedying the damage were higher than they would have been for a truck rental firm with a mixed fleet of vehicles. The truck company was not prepared for the losses; in view of their amount the HQ promptly queried the further implementation of the new business model. A similar problem can be assumed for VW's car leasing fleet, with the emissions scandal in 2015 having led to significant write-offs on the value of their diesel cars.

In general, any company should be prepared for unforeseeable problems at an early stage. This requires a professional risk management that identifies the risks, rates them on a calculatory basis and then decides how to deal with them. This may be done by building reserves or buying insurance. It is self-evident that the less insurance cover and financial resources are required, the less the supplier stands to lose. Being an entrepreneur always means taking risks but investment risks should still be contained.

According to the theory of perceived risk, which was developed in the 1970s and strongly influenced in particular by Frank H. Knight,¹⁴ risks consist of two components: uncertainty about the possible occurrence of a damage and the significance of negative consequences in case of damage.

Fig. 8 demonstrates this in context. Hence, there are two levers for reducing risks: Firstly, measures can be taken to reduce the possibility of a damage and secondly the negative effects can be contained, if a damage should occur. Negative consequences may be mitigated in companies that have introduced a new business model by limiting investments. In particular, established companies that are successful with a traditional business model should invest in new business models in such a way that a failure will not endanger the existence of the company as a whole. Moreover, it is easier to obtain assistance from banks and shareholders, if new revenues are to be generated with a modest capital investment. There are many examples of innovative business models with a rather low capital commitment: Alibaba, the world's most valuable trade company, stocks no goods; Uber, the largest taxi services supplier in the world, is successful without any vehicles to its name; Airbnb, the largest global accommodation supplier, owns no real property.

Fig. 8: Risk components



OUTDATED SALES FORCE

Now we come to the challenges of marketing business models 4.0. If the supplier intends to sell its complex service solutions directly, choosing the right sales team is of major importance for successful marketing. However, the criteria for sales staff are particularly demanding for business models 4.0, which makes matters more difficult for companies traditionally accustomed to selling industrial goods.

Let's go back to Rolls-Royce and its aircraft engines. First of all, we can observe that the introduction of the new business model renders a whole array of sales activities obsolete. For example, the sale of spare parts has become a thing of the past, because they are now no longer needed by the customer but by Rolls-Royce itself. On the other hand, sales staff need to have command of a more complex range of services. They still need to have knowledge of the technology of aircraft engines, but in addition they also need to understand modern information and communication technologies. Furthermore, they must have a working knowledge of business terms and concepts to be able to discuss what commercial impacts the new business model will have on the customer. For example, they must know the details of the customer's ROCE (Return on Capital Employed) to identify what economic advantage it has for the customer if the engines no longer belong to them but to Rolls-Royce.

Apart from the aspect of intangibility one important characteristic of complex service solutions – or of services in general – is that their production requires a collaboration between the supplier and the customer. Siemens Soarian is a case in point. To make the processes of a hospital more efficient, a supplier first needs to be informed by the customer about the current processes. After the subsequent identification of improvement potential the supplier will then jointly start implementation with the customer, e.g. by installing the new software and familiarising the customer's staff members with its operation. Unlike with x-ray machinery, for example, which is produced without the customer's input and which the customer can inspect or even test before deciding whether to buy it, the customer cannot assess the quality of complex service solutions before making a purchase decision. This leads to a feeling of uncertainty on the customer's part. For this reason the supplier's sales manager should not be a conventional salesman in the eyes of the customer, but a trusted advisor who understands the challenges facing the customer and will stand by him during the subsequent implementation phase.

A close and trustful relationship is particularly important if the solutions have major economic implications for the customer. This aspect is also the reason why usually not only departments with different functions but also higher echelons in the hierarchy are involved in purchase decisions on the customer's part. Hence, sales professionals must also be able to communicate convincingly with the CFO or CIO of the customer's company. This means that not only their technical expertise but also their social skills must be of a high standard.

There are numerous sources on the differences between traditional product sales staff and sales professionals for complex service solutions in practice-focused management literature such as *Mastering the Complex Sale* by Jeff Thull.¹⁵ Unfortunately, the number of publications has not increased at the same rate as the number of competent candidates. In fact, the shortage of qualified sales professionals for complex service solutions is a major challenge for companies.

Tom Miller's observations on Soarian go even more to the root of the problem of traditional industrial enterprises. With his comment that "people from the traditional business did not even have the right skills to interview the necessary candidates" he puts his finger on the problem that even if these companies do happen to find the right candidate, they will be unable to identify him or her as such. The recruitment processes in HR departments are too strongly influenced by job profiles and the culture of the established divisions.

This can lead to errors of judgment. Suitable candidates are rejected and/or unsuitable ones are offered a contract. Especially the latter scenario is a further cost trap for the supplier. Still, sales staff who have no marketing success but whose salary costs adversely affect earnings, are not even the worst scenario. Things can get even more dramatic if these staff members make promises during the marketing process that cost the supplier dear. In the following we will highlight this risk.

COST TRAP 5

RISKY PRICING MODELS

In the discussion of business models 4.0 we would like to throw more light on performance-based pricing; firstly, because this is a very popular price concept, and secondly because it entails high cost risks for the supplier. At first sight, it seems obvious to combine performance-based pricing with marketing complex service solutions. Due to the joint production of the service and shared interest in its quality, it is obvious to make payment dependent upon the success of the solution with the respective customer. This is also the basis of the "power by the hour" price concept of Rolls-Royce and Soarian's customer option to have Siemens participate in the efficiency improvements achieved in the hospital.

Of course, these ideas are nothing new. There are reports – albeit without historical evidence – that the personal doctor of a Chinese emperor was paid according to the number of days when the ruler was in good health. Another known example is that of James Watt and Matthew Boulton, who were only successful with their famous steam engines in 1776 when, instead of selling them, they leased them to mine owners for a third of what it cost them to feed their horses. Rolls-Royce's "power by the hour" concept is also decades-old. The company had it trademarked in 1962 but only started using it widely much later with the progress of data management technology.

There are different approaches to performance-based pricing, each with different impacts on the supplier's cost risks. For example, payment of the supplier may be based on use of the product by the customer only or on the success achieved by the customer in using the product. The latter would be the case if Rolls-Royce were paid for the use of its engines

according to the number of passengers in an aircraft. Another option is that the supplier is paid according to the overall success of a customer's company. For example, the consultancy firm Bain was able to gain significant market shares from its competitors McKinsey and the Boston Consulting Group by offering its clients to pay not the usual per-diem rates but a rate based on the client's stock market performance.

The supporters of performance-based pricing see it as the ultimate way to overcome the zero-sum game between buyer and supplier. Instead of one party only being able to win something if the other one loses, they both now have a common interest. Rolls-Royce has just as much interest in keeping the aircraft in the air as the airline itself. The airline no longer has to fear paying too much for spares and can keep its costs more flexible under the new business model – for example, it no longer needs to pay fixed salaries for maintenance staff. However, in view of these customer benefits one easily forgets that this model entails higher risks for Rolls-Royce than the traditional pricing model. Aircraft may have to be grounded for reasons other than engine problems. For example, pilots and crew may go on strike. This can lead to a loss of earnings for the supplier, which was hitherto not a risk they had to consider and which is now beyond their control.

If a supplier participates in their customer's market risks through performance-based pricing, they should know these risks well. Before Rolls-Royce signs a contract with an airline, the company must be able to provide an accurate assessment of the customer's risk of future strikes, to cite just one example. The risk probably varies between individual airlines, and even between business years of an individual company.

In the case of performance-based pricing payment of the supplier is dependent on:

Customer's usage of supplier's product

Economic impact of supplier's product on customer side

Success of customer's company when using supplier's product

INFLUENCE OF SUPPLIER

high

medium

low

Fig. 9: Different approaches to performance-based pricing

Rolls-Royce also needs to know how the customer's flight routes will develop, as more destinations in desert regions mean that the engines require more maintenance due to the sand content in the air. So, instead of just making certain that a customer has sufficient resources to buy an engine, Rolls-Royce must now also be able to assess whether the airline can achieve the required passenger figures in the long run or will be displaced by its competitors.

In the case of performance-based pricing a supplier who doesn't want any nasty – or expensive – surprises needs to know more about the market situation and development of their customers than before. In this context we say that the supplier needs a "deep customer understanding". This aspect must be added to the expertise required of a sales manager as discussed in the section above.

But, of course, performance-based pricing entails not only risks but also opportunities for revenue and profit gains that can hardly be achieved with traditional business models. This probably applied to Rolls-Royce when the company introduced its "power by the hour" concept with the US Navy, increasing the deployability of their aircraft from 70 to 80 per cent.¹⁶ However, the question is how long customers will want to concede large margins to suppliers. As soon as there are sufficient competitors, customers will seek, after the expiry of the first contracts, to improve the terms in their favour. They will take efficiency improvements for granted and only want to allow the supplier to participate in further improvements.

This also shows that performance-based pricing by no means reconciles the natural conflict between supplier and customer. Although both parties are interested in optimising the shared value generation process, negotiations on the sharing of achieved efficiency gains will be just as conflict-ridden as the price negotiations in traditional sales processes.

Given that the customers' pursuit of their own interests remains unchanged, one ought to point out an insight that Siemens gained after handling several Soarian projects: It observed that the hospitals who were convinced from the outset that they would achieve the desired efficiency improvements, favoured fixed-price offers; whereas customers where the implementation of efficiency improvement measures met with great internal difficulties, opted for performance-based pricing.

In economics these phenomena have been analysed as "moral hazards", usually adopting the viewpoint of the customer, who must fear that the supplier is acting opportunistically. In the Soarian case practice showed a reversal of this risk. This forced Siemens to strengthen the deep customer understanding of its sales managers and adjust the processes of customer assessment and customer selection accordingly.

COST TRAP 6

MISGUIDED MARCOM

Industrial companies usually put their products in the spotlight of their marketing communication (MarCom). The stats of a tool machine, truck or gas turbine are listed in brochures and presented at trade fairs. They serve as a basis for sales talks where product descriptions are explained in more detail.

However, for complex service solutions offered in the context of business models 4.0, there are hardly any visible products to showcase. As explained above, the development of a service normally only starts after the purchase decision, and even when the service has been rendered, it cannot be showcased on the Internet or at trade fairs for lack of tangibility. Moreover, testimonials for complex service solutions are less effective than for industrial goods. This is due to the individual nature of the solutions. The more customer-specific the solutions, the less they can be compared to each other and the less a customer can assume that the success of a supplier's solution with a different customer, will also apply to them.

Hence, when it comes to MarCom activities for business models 4.0 industrial enterprises cannot simply think in their usual content categories. And if they do, they risk falling into another cost trap and wasting money, although the financial dimensions are probably lower in this case than for the above-mentioned marketing risks entailed by the wrong sales and pricing decisions.

However, if products and testimonials are only partly suitable as communication contents, what should companies communicate in their marketing of complex service solutions? A look at the MarCom measures of strategy consultants like McKinsey or the Boston Consulting Group offers interesting insights. Their services also stand out for their complexity, individuality and great significance for their clients. However, they hardly talk about what they actually do in their MarCom, but mention the persons they provide their services with instead. This communication approach is one reason why the staff of strategy consultants like McKinsey or the Boston Consulting Group are being perceived as high-performing. To solidify this impression as a communication policy, experienced consultants are asked to acquire specialist knowledge on certain topics, so that they can be featured as

experts in the media. To position consultants as partners of their clients, companies also invest in webcasts and client conferences.

A further staff-focused communication measure consists of sending potential clients the CVs of consultants who are to be involved in the project. The names of prestigious universities and top exam grades are often listed here – two aspects that are to offer customers a feeling of security, even if this information has no direct bearing on the challenges of the respective project.

Companies that are used to marketing industrial goods, have difficulties with such staff-focused communication measures. This may be because they are not aware of the advantages, or because they do not want to emphasise the resulting importance of individual staff members in this manner; after all, these staff members could find a new employer and benefit a competitor with their reputation.

FAILED CUSTOMER INTEGRATION

Having explored the cost traps entailed in goal definition and marketing for business models 4.0 we shall now turn to the challenges of implementation. We just mentioned that suppliers and customers need to collaborate to produce the services. No dentist can treat a patient successfully if the latter starts shaking his head, no taxi driver can successfully complete his tour if a passenger gives him the wrong address, no consultant can turn a project into a success if she is wrongly briefed by the customer. This always requires a "co-creation of value". Against this background, one must also consider that the quality of the results of complex service solutions depends not only on the supplier but also on the customer¹⁷ – a major aspect if problems arise with the service results at a later date.

The need to integrate customers in the development process, requires that they perform efficiently, too. It is less demanding if a dentist asks a patient to keep their head still, but may be a challenge if a consultant asks a client to provide them with all the relevant process and financial data required for a consulting project. However, even if the customer has the required know-how, there is no guarantee that they will contribute to the production of the service, as desired. Perhaps they have no wish to. In B2C markets this phenomenon probably hardly arises – why should I give the taxi driver the wrong address? – but in B2B markets this happens more frequently. Among other things, this is due to the fact that in the case of institutional customers the people who are responsible for deciding on the purchase of a service, are not necessarily identical to those who are involved in its performance and use. In addition, these two groups may have different interests. The management of a hospital's administration may find it desirable to improve the process efficiency of their business. A senior doctor will probably be less interested in this efficiency improvement, if it means having less staff. In this case external consultants may be provided with inaccurate or incomplete information or may receive this information belatedly.

Moreover, especially for complex services the scheduling of activities plays an important role. This is a further cost trap for the supplier, in addition to the customer's inability or unwillingness to contribute.

To structure the production process of a service, Lynn Shostak¹⁸ created a so-called service blueprint in the 1980s, which was later developed further notably by Michael Kleinaltenkamp and Sabine Fließ.¹⁹

The service is represented in the form of a chronological flow chart showing the customer's view of flows in the production process. In its simplest form the activities are assigned to specific action levels categorised by whether an interaction takes place with the customer (line of interaction), is visible to him (line of visibility) and whether it requires internal coordination processes on the part of the supplier (line of internal interaction).

This concept has proven to be successful in practice, as it provides transparency. Hence, it serves as a good basis for coordinating the many activities involved in providing services both internally and with the customer and possible third parties; it helps reduce the expensive consequences of the integration trap.

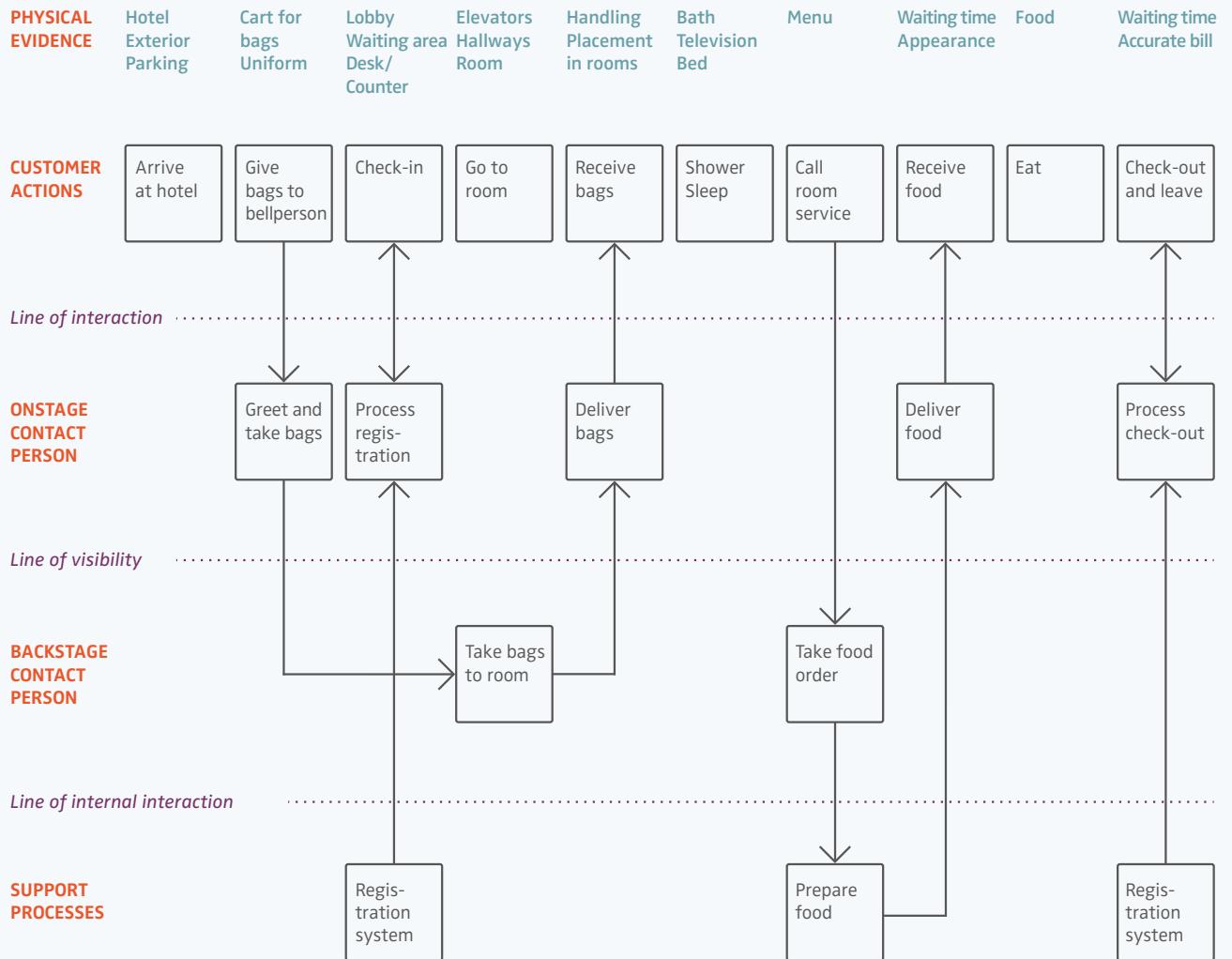


Fig. 10: Example of a service blueprint for a hotel

URGE FOR PERFECTION

If a supplier considers introducing business models 4.0, this also involves the development or adjustment of software. This is a challenge especially for industrial enterprises that traditionally only have little experience with software development and implementation processes.

In the case of Siemens Soarian Tom Miller points out corresponding problems with his comment: "We lost too much time and money developing a software that fulfilled our vision of the customer's functional requirements and lost sight of the true prioritised needs and costs of the actual customer."

Two causes of such problems are significant in this context: First the ambitions of a supplier for their own company or for their products. In the case of Siemens Healthcare this ambition was influenced by its business with x-ray machinery, CT scanners and other equipment that have fulfilled the sweeping demands of Siemens customers for many decades, offering a very high quality standard.

But if a supplier enters new territory with innovative technologies and business models, it cannot be expected that everything will be perfect from the start. The market launch of business models 4.0 with the ambition of addressing established fields of business, entails the risk of being too ambitious in the new field of business. This risk is exacerbated by customers who – partly due to their own competitive pressure, partly out of ignorance – expect too much from the new solutions. This applies both to lengthy lists of required software functions and overambitious schedules for project implementation.

As a result, this leads to a phenomenon, that computer specialists call "technical debt". It is a metaphor for the problems that result at a later date from errors in software programming and documentation. They can occur because software tests have not been performed, coding standards not observed and individual processes for data security and documentation have been omitted. These errors are typical of development projects under a lot of time pressure and cause

additional work and expenditure for the later maintenance and further development of the software. This expenditure is expected to be up to a hundred times greater in the course of a project than if the software is well-written and documented.²⁰

To avoid this cost trap, it makes sense for the supplier to seek a complex overall solution in stages. This means first setting priorities for software functions, then developing clearly defined modules for the overall solution and initially implementing only partial solutions for the first customers. These partial solutions are then completed over time by further functions and later improved by updates.

However, this approach is unfamiliar to many industrial enterprises, as x-ray apparatus or aircraft engine makers do not first market individual elements of the product only to make additions at a later date. Hence, it is difficult for these companies to strike a balance between software development and the time or nature of their marketing efforts – and too much pressure hinders a successful implementation.

This insight may also be the reason for the conclusions drawn by the author of this paper together with colleagues in the context of a study conducted in 2015. Managers from 243 European industrial goods companies were interviewed on their success with the introduction of complex service solutions. Their answers showed that it is more promising if the initiative for their introduction comes from the supplier than if it is demanded by the customer.²¹ The latter puts the supplier under pressure and hinders them from giving sufficient thought to and carefully implementing the new business models.

COST TRAP 9

INFLEXIBLE CORPORATE STRUCTURES

Technology and markets change faster in the IT industry than in the industrial goods sector. The performance of aircraft engines or x-ray apparatus has only improved incrementally over the years, whereas that of computer processors has doubled roughly every year. Updated models of industrial goods are usually launched on the market once a year, whereas new software releases come out every month.

As software-based technologies are a major element of business models 4.0, industrial enterprises must adapt to a faster speed of external changes and strengthen their internal flexibility. This applies all the more as business models cannot be patented like industrial goods, and competitors can try to copy them at any time. Hence, the above-mentioned demand for caution should not be mistaken for a lacking willingness to be flexible.

The theme of organisational flexibility has been discussed extensively for years under the buzzword "agility", and significantly this term was adopted from the field of software development. The ability of a company to respond to changes in a timely manner goes beyond modifying a company's architecture. This is also about structures such as salary guidelines or possibilities of deploying staff members in different positions. The latter not only requires that staff have wide-ranging qualifications but also a culture of thinking in a project-orientated manner instead of in department pigeonholes. The focus is on using one's own expertise in ever-changing project teams with members from various departments. For many established industrial enterprises having the necessary flexibility is not just difficult because their traditional divisions are subject to specific market dynamics but also because their past successes have made them grow to an unwieldy size.

What can be done to avoid the cost trap of lacking corporate flexibility? Scientific research on this topic has produced a vast number of studies. The contributions of Henry Mintzberg are very popular. In addition to many other approaches he suggests introducing so-called "organigraphs", which are to replace the usual org charts by a representation of the company's activities in order to eliminate the hierarchy and division-based barriers in the staff members' way of thinking.²²

The ideas of Charles A. O'Reilly and Michael L. Tushman on the creation of "ambidextrous organisations" are also well-known. The authors developed suggestions how a company can be innovative in new fields of business (exploration) without losing their efficiency in their established business (exploitation).²³ The latter is crucial for saving what has proved to be successful when adopting the new agility and for preventing the launch of new business models in some divisions from endangering the success of others.

The recommendation of O'Reilly and Tushman to create separate business units for entering new markets is mostly endorsed in practice. The Boston Consulting Group summarises its experience as follows: "Given the differences in the business models, we have found that it usually is better to establish a separate business unit to incubate and grow software and service businesses."²⁴

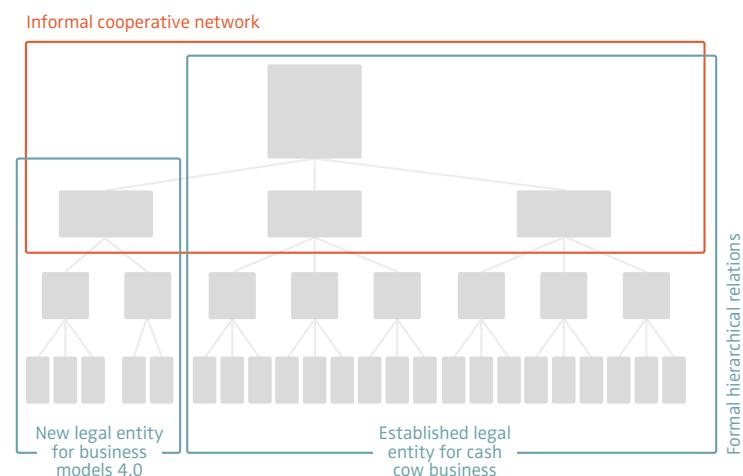


Fig. 11: Possible organisation type for introducing business models 4.0

In many cases the organisational structure is divided even further by forming a separate entity also in legal terms for business models 4.0. In the Soarian case one could have avoided the problem of having to observe the rather inflexible salary regulations that had been adopted by Siemens in close cooperation with the German metalworkers' trade union IG Metall for the entire group of companies.

But the more new fields of business are separated from the established ones, the more difficult it becomes to generate synergies between them. However, for industrial enterprises it is especially the cooperation between experts of the new software-orientated world and the traditional, hardware-orientated world that offers them a possible competitive advantage over competitors in the IT industry, as the latter lack the expertise on industrial products. Hence, care should be taken that the flow of information and cooperation between the traditional and new fields of business is ensured despite the structural separation. Rosabeth Moss Kanter recommends: "While loosening the formal controls that would otherwise stifle innovations, companies should tighten the human connections between greenfield and mainstream."²⁵

THE NINE COST TRAPS IN BUSINESS MODELS 4.0

In the last sections we listed nine cost traps for established industrial enterprises that may occur when introducing business models 4.0. In addition, we highlighted measures that can help avoid these cost traps. Fig. 12 provides a summary.

Some of the presented countermeasures address only one cost trap such as the service blueprints for better customer integration in the production process; other measures, such as input from external resources, may be used to counteract several cost traps.

The intensive exploration of cost traps and the challenges of overcoming them should not deter industrial enterprises from using modern technologies for innovative business models. Current market developments rather make it indispensable to introduce such models in order to remain competitive.

There are now countless examples of industrial enterprises that are successful on the market with business models 4.0.

One of them is Siemens AG, who has used the lessons learnt from Soarian to successfully implement new complex service solutions in other markets. For example, the company now cooperates with the Spanish rail operator RENFE, for which Siemens optimised train operations with the help of sensor technology, remote monitoring and data analytics and shares the efficiency gains of the optimised value generation processes with its customers. As another example, Siemens provided energy management services for over a thousand properties of Credit Suisse using data-driven technologies, which led to a ten per cent reduction of energy costs.

Finally, here is another example to prove that not only financially strong corporations or young start-ups but also traditional mid-sized enterprises can successfully introduce business models 4.0 despite initial difficulties.

DEFINING APPROPRIATE GOALS

COST TRAPS

- Overambitious profit targets
- Overestimating own capabilities
- Ignoring unpredicted developments

POTENTIAL COUNTERMEASURES

- Input from external resources
- Fade-out of past successes
- Professional risk management

BRINGING BUSINESS MODELS 4.0 TO THE MARKET

- Useless sales forces
- Risky pricing models
- Misguided MarCom

- Trusted advisors
- Deep customer understanding
- Resource-based content

IMPLEMENTING COST EFFICIENCY

- Failed customer integration
- Urge for perfection
- Inflexible corporate structures

- Service blueprint
- Involvement of IT specialists
- Separated business entities

Fig. 12: Nine cost traps and countermeasures

THE CASE 365FARMNET BY CLAAS

The agricultural machinery group CLAAS was founded in the small German town of Harsewinkel in 1913, and is still based there today. The family business currently generates sales of approx. €3.8bn and is one of the leading suppliers of combines, tractors, round balers and other harvesting machinery. CLAAS has an export share of over 75 per cent, and the company is the global market leader for forage harvesters.

Compared to other industries, the profitability of most agricultural businesses world-wide is low. Therefore, many of CLAAS customers are interested in possibilities to improve their efficiency. But this can only be achieved to a limited extent by improving the performance of the harvesters; a more effective lever is to optimise decisions with the help of modern data management, such as the time of harvesting or use of resources.

For this reason CLAAS has developed a platform named 365Farmnet that is to help farmers collect, analyse and process relevant information in a user-friendly manner. For example, users can monitor the growth status of plants (by satellite), get price forecasts for farming products and see weather data. The system recommends and documents the distribution of seeds, fertiliser and crop protection down to the last centimetre – information that is increasingly being demanded by the environmental protection agencies. 365Farmnet optimises the use of harvesting machinery and harvest workers as well as the further transport processes of harvesting. Moreover, further applications have been added to the open platform by the many partners of 365Farmnet.

CLAAS vehicles were already equipped with software in 1982. This field of technology was in the hands of a department that had initiated the development of a farm management system in 2011. CLAAS' staff members created a first platform, however without open interfaces. The project was discontinued in 2012 but relaunched in April 2013 with a group of external IT experts and the support of a small consultancy firm that was specialised in such projects. A separate legal entity was founded for this business: 365FarmNet GmbH, based in Berlin. By late 2013 its development was considered advanced enough to inform customers and the public about the new service.

365FarmNet GmbH is wholly owned by CLAAS, but the parent company does not intervene in operational issues such as partner agreements, pricing or salary questions. Nevertheless, a meeting takes place once a month where the top managers of the parent company and subsidiary present and discuss

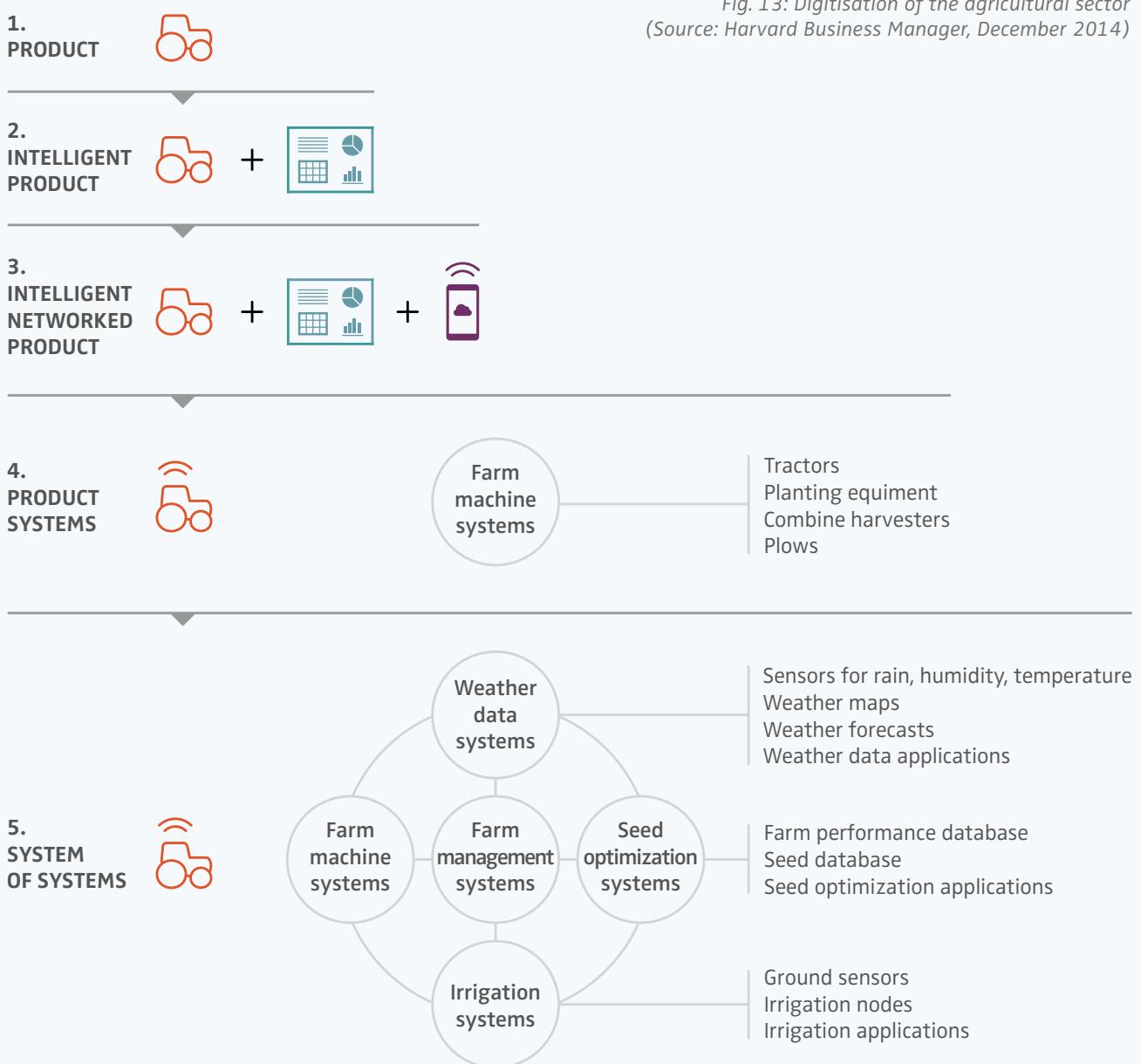
their strategic business plans. The pricing scheme of 365FarmNet focuses on the sale of licences for using the platform. User training for the system is offered to the customers free of charge. 365Farmnet's capital commitment is very low. At present, less than 100 staff members work for 365FarmNet. The number of customers is increasing at a rate of 200 a week. However, the revenue targets of 365FarmNet are aimed not so much at short-term profit optimisation but more on a long-term success of the company. Both the parent company and subsidiary are content with what they have achieved so far.

The case 365FarmNet offers some indications of how the above-mentioned cost traps can be avoided and complex service solutions implemented successfully:

- The new business was launched on the basis of an internal initiative and not due to customer pressure.
- CLAAS consulted external professionals for its second successful launch of the development of a farming management system.
- In its personnel recruitment it did not focus on agricultural expertise but on IT skills. Where required, these specialists were provided with farming know-how instead of trying to convey the know-how, mindset and culture of the IT sector to CLAAS engineers.
- If 365Farmnet should fail, the amount of investments would not endanger the parent's survival.
- 365Farmnet was founded as a legally independent company, insofar salary questions could be regulated independently from the parent's salary systems, for example, unlike in the case of Siemens Soarian.
- The independence of 365FarmNet was also underlined by the choice of location. However, Berlin was chosen, above all, in order to be attractive for the relevant labour market and close to the "IT scene". The majority of top-notch IT specialists prefer working in the metropolis to a job in a small rural town.
- HQ does not interfere in day-to-day operations; nevertheless the top managers of the parent company and subsidiary have a close communication and synergy potentials are proactively identified in this manner.

The success of 365FarmNet to date should not be viewed separately from the core business. Of course, CLAAS financial strength, farming know-how, customer base, and above all its good reputation help the subsidiary find acceptance on the market. On the other hand, CLAAS' engineers gain new insight into the processes and requirements of their customers, which in turn strengthens the company's traditional business. Moreover, one must consider how the agricultural machinery business would develop, if not CLAAS but possibly a direct rival were to establish a platform for CLAAS' customers, putting this rival in command of their technical interfaces. In fact, other companies in the agricultural sector have already entered the field of complex service solutions. First and foremost, Monsanto, a US group, which has been listed among the S&P 500 since 2002 and markets seeds and herbicides above all. It is investing billions in digitising the group and building web-based platforms for farming companies and

spent US\$930m in late 2013 alone on the acquisition of Climate Corp, an IT company in this sector. Hence, it remains to be seen how long 365FarmNet will be able to maintain its competitive advantage and market success.



SUMMARY

The traditional business models of industrial enterprises are endangered. Simultaneously, modern data-based technologies enable the development of complex service solutions that can be marketed as innovative business models. By analogy to the application options that are known as Industry 4.0 in Europe we will refer to them as business models 4.0.

However, in many cases, the introduction of business models 4.0 is not as successful as expected due to cost overruns. In this paper we have identified nine major cost traps that must be observed for target definition, marketing and implementation. In addition, we highlight measures to help avoid these cost traps.

WHAT IS BUSINESS STRATEGY ALL ABOUT?

We see strategies as a plan that defines the core elements for achieving a certain goal. In this case we will focus on the "business strategy", which specifies how a business division can achieve the desired success on the market.

The competitive advantage is the foundation of any market success – at least insofar as non-regulated markets are concerned. A company has a competitive advantage if a customer perceives an advantage in the supplier's product over the products of other competitors. To influence the customer's purchase decision in the supplier's favour, this perceived advantage should be important for the customer. According to Michael Porter of Harvard Business School, who played a major role in defining the term of competitive advantage in economics, this customer advantage should be hard to copy for competitors and hence ensure the supplier's long-term success.²⁶

However, the customer advantage should not consist of the supplier lowering the price of their products to a point where they can no longer meet their own costs. This would be an advantage for the customer, but the supplier would have no competitive advantage in this case (according to Porter). Instead, they would be displaced from the market in the long run. Hence, a competitive advantage comprises not only the advantageousness of a product for the customer but will also secure the supplier's profitability.

In brief, the [competitive advantage](#) must meet the following three criteria:

- Important for the customer
- Hard to copy for competitors
- Profitable for the supplier

Generating a competitive advantage requires many decisions on the part of the supplier, which can be categorised in different ways. This is impressively demonstrated by the categorisation approaches of numerous publications on the topic. We will focus on three fundamental questions:

1. What customer needs do we want to address?
2. With what products do we want to meet those needs?
3. What business model do we want to use on the market?

WHAT CUSTOMERS DO WE WANT TO ADDRESS?

Before defining target customers, we must first clarify what needs we want to address. In the B2B segment, where products are often defined as solutions, the question could be: What are the fundamental problems the customer is trying to solve? The problem may be that customers are faced by the challenge of wanting to firmly connect two materials or having to transport goods from A to B or needing certain parts to produce a car. A more solution-focused strategy definition could also be: What function must a product offer to meet the customer's needs?²⁷

The customer's fundamental problem – e.g. transporting goods – can be broken down to a specific subset of problems. What distance needs to be covered? How fast must the goods be transported? What security measures need to be met? Buyers' expectations may differ in this respect, resulting in certain preferences when evaluating offers. However, some customers show great similarities in their preference profiles and will hence base their purchase decisions on similar criteria and assess offers in a similar manner. Such customers can be grouped together; in this case we speak of customer segments. It is up to the strategic decision of a supplier whether to consider a single customer segment, several (and if yes, which) or all customer segments of a market.

Customer segmentation is closely related to the regional focus of a supplier, as the customers' purchase behaviour may vary significantly in different markets due to national legislation. However, in most markets other criteria are more decisive than nationality for the segmentation of customers, and customer segments are formed across borders. In this case it is important for the supplier to consider in what regions of the world they want to address customers of a target segment and in which they do not. This is due to the large resources a supplier may need to work foreign markets. Hence, fundamental decisions should be made on the regions you want to focus on in your strategic planning.

WHAT PRODUCTS DO WE WANT TO SELL?

The scope of products is defined on the basis of customer needs. In the context of strategic planning it should be determined what functions or what technology – in the broadest sense of the word – is to be used by the supplier to solve the customer's problem. Two materials may be connected by glue or screws, for example, goods may be transported by rail or truck, car body parts can be manufactured out of steel, plastic or aluminium.

In this context, a supplier will often use its predominant technological application to align itself with a specific industry or sector; a company will then become part of the steel industry, for example. However, a supplier may also use several technologies to solve a customer problem and then fall within a broader sector category. A company like Trenitalia, say, a provider of rail transport for passengers and goods, is seen as a rail company. DHL, in contrast, which uses various technologies to transport goods, is considered a logistics company. Hence, it is interesting from a strategic point of view that companies like Daimler, General Motors and Volkswagen now no longer see themselves as automotive but as mobility companies in view of current demand and technological developments.

Apart from the central technologies to solve the customer's problem, strategic planning should also make a general statement on the scope of the offered products. A truck manufacturer must define whether they only want to offer a few standard versions of a vehicle or a wide range of models, whether trailers or cranes should also be part of the product range and if financing options should be included, as well. In our understanding, a product may also contain both tangible and intangible components, i.e. both goods and services. To meet all customer requirements, or not miss out on any opportunity to generate sales, there is a tendency in practice to make the portfolio as broad as possible: The menus of some restaurants fill several pages, engineers offer hundreds of product options. But it is often overlooked that a wide product range may entail high complexity costs, even if modern technologies like Industry 4.0 or 3D printing promise to lower costs. Moreover, the supplier of a broad range of products should know that they have to compete with specialists in some areas, who can offer greater benefits to customers with specific needs. In order not to lose sight of the competitive advantage, it makes sense if strategic planning indicates what elements are not part of a company's product offerings, where necessary.

WHICH BUSINESS MODEL DO WE WANT TO USE ON THE MARKET?

Apart from defining target customers and deciding on the functional principles for solving a customer's problem, one must also determine the framework conditions for the whole business. In this context we speak of the business model. It defines what input and output of a transaction is to be attributed to the supplier and customer respectively, and how the pain and gain of value creation is to be divided between the two parties.²⁸

Hence, it needs to be defined who has which rights of use and ownership. Is a product to be offered for sale or rent or leasing (and hence remain the supplier's property)? The question of whom the data belongs to that is generated in the value creation process plays a major role. Trenitalia shares its air conditioning data with SAP, Deutsche Bahn keeps the data of the products that are being used for itself – and performs value-creating activities with the knowledge generated in this manner.

Furthermore, in the strategic decisions regarding the business model one must define the basic patterns according to which the revenues of value creation are to be divided between the supplier and customer. Aircraft engine maker Rolls-Royce links its returns to the use of its products by the airlines and offers a "power by the hour" pay scheme. This is closely related to the division of risks between the buyer and supplier. Rolls-Royce shares the risk of sales losses with its customers. If airline staff go on strike, if aircraft remain grounded and idle, no money is earned with the "power by the hour" scheme.

Under the heading of "performance-based pricing" there are business models, where the supplier's risk goes beyond the use of its product by the customer. The strategy consulting firm Bain has made itself dependent on its customers' success on the capital market by linking its fees to the development of its customers' share price, although this is also influenced by factors other than consulting.

When defining the key elements of a business model one can also specify which steps should be left to the supplier and which to the buyer in the value creation process. For example, furniture retailer IKEA is famous for offering its customers low prices in return for leaving part of the final assembly to them.

These decisions regarding the business model are closely connected with decisions on the product range or variety of the product portfolio. However, overall, there are some inter-dependencies and overlaps between the areas of strategic business decisions discussed here.

In the end, everything is interconnected, but it still makes sense to give the strategic reflections a structure in order to better handle their complexity in practice. In this paper we have followed the "3 plus 1" structure described below. (see Fig. 1)

It has been pointed out that strategic planning should only concentrate on the key elements of business development. This serves to make the strategy communicable. If it is too complicated, it will not be understood and hence not implemented correctly.

But the key questions mentioned here can be even further subcategorised. If, for example, a supplier opts not to sell but

to lease their products when making a strategic decision for the business model, they must also decide on what guideline to follow for determining the leasing rate, at what intervals it is to be paid and who should take responsibility for what damages to the product.

Answering these questions takes us into operative planning which goes beyond the key elements of strategic planning and is more detailed. The lines between strategic and operative planning are also blurred. To distinguish them we can use the following guideline: Strategic planning asks "Are we doing the right thing?" whereas operative planning asks "Are we doing it right?".

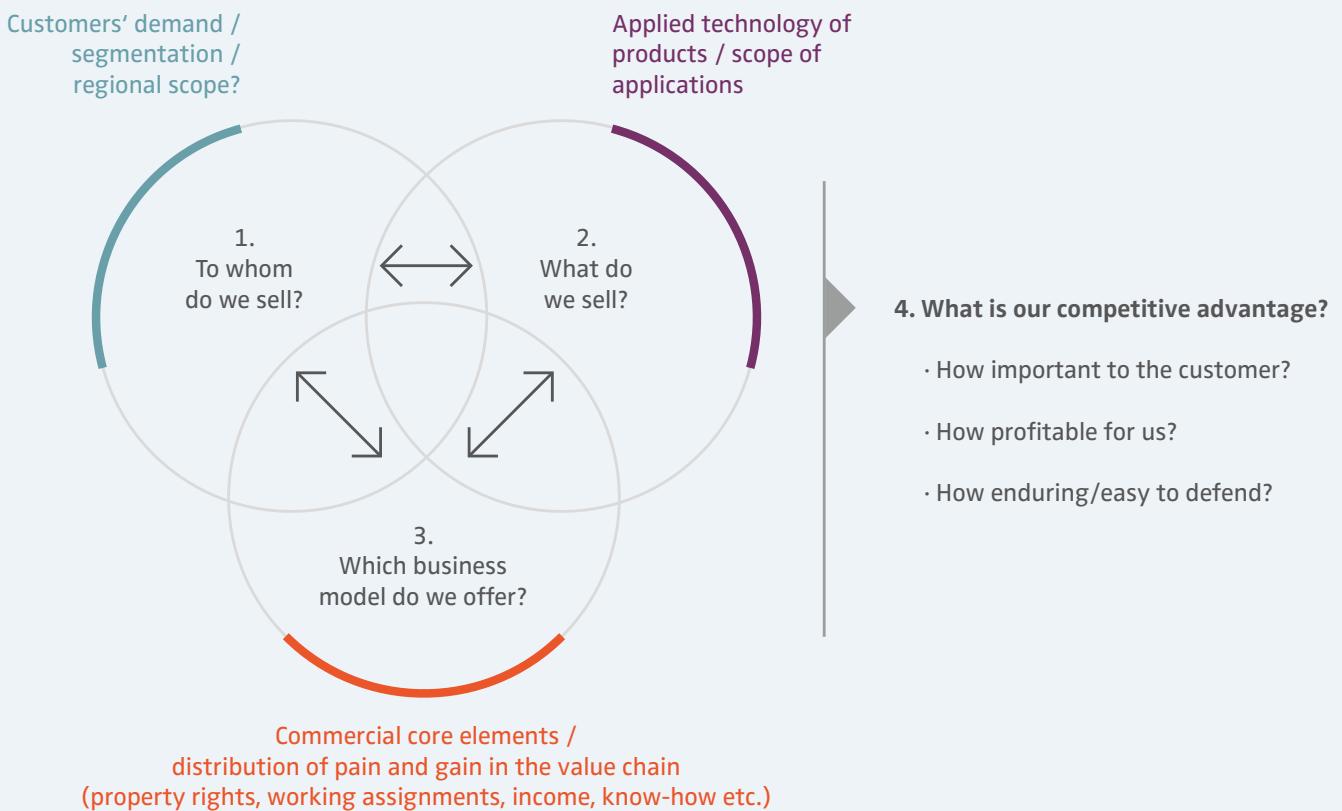


Fig. 1: "Three plus 1" – key questions for the development of a business strategy

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