Whitepaper
Lenze Knowledge #7

Business Models for Industrie 4.0

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Management Summary

General Situation – Is Disruption just a Buzzword?

When top decision-makers in the field of machine and plant construction begin to discuss Industrie 4.0 and digital transformation, the pattern is often as follows: After the interlocutors agree that it is still not clear what these terms really mean, or whether they are just hollow words or mean a lot, they hastily assure themselves that these actions are something people have been doing for a long time – or at least for considerably longer than the terms have existed.

Why is that so? The demonstration of one's own innovative abilities is certainly one reason, but probably also the understandable fear that not only are current trends causing a relatively foreseeable technological revolution, but also that the market could be turned upside down by these new technologies. The confidence that in five to ten years, everything will still be following the same pattern, has gone, and it is safe to say that no business leader or key innovator wants to give off even the slightest impression that they are missing or have missed something.

Quotation: According to [4], p. 25, many companies are expecting Industrie 4.0 to bring about a noticeable change to their customer relations: When asked about the specific effects, the German industry says the tangible changes it expects mainly relate to customers. 83 percent presume that in the next five years, there will be new developments. Almost as many people also expect such a change on the suppliers' side – five percent more than last year, in any case.

Well-noticed in terms of marketing, new technological innovations in combination with disruptive business models should be a secret recipe for the future. They should surprise and outflank the competition. For dramatic effect, a few plausible negative examples that are often mentioned for comparison are Kodak and Nokia, which missed the megatrends of digital photography and smart phones, while positive examples are Xerox with the introduction of its

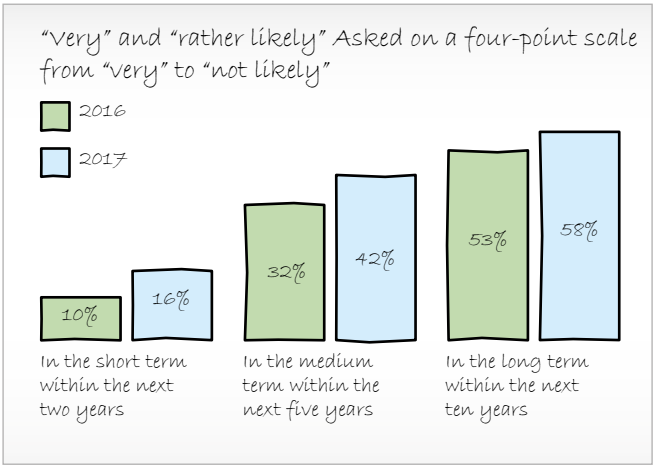

Figure 1: Surprisingly few companies expect a disruptive attack in the next five to ten years.

operator model for photocopiers, Nespresso with a new way of making and selling coffee, and Apple with the iPhone, which not only created a revolutionary hardware platform but also created an unprecedented software market with iPhone apps – at a time when, to put it provocatively, the rest were still selling ringtones.

However, industry actually seems to be vastly and surprisingly unfazed (see Diagram 1). An industry study [4], p. 28, shows that just under 60% of the industrial companies surveyed expect a disruptive attack in the next five to ten years. Looking at the time span, not only is this surprisingly few, but a time frame of five to ten years can hardly be estimated in terms of disruptive changes. The obvious assumption is that business leaders are vastly underestimating the non-linear market dynamics (Figure 2).

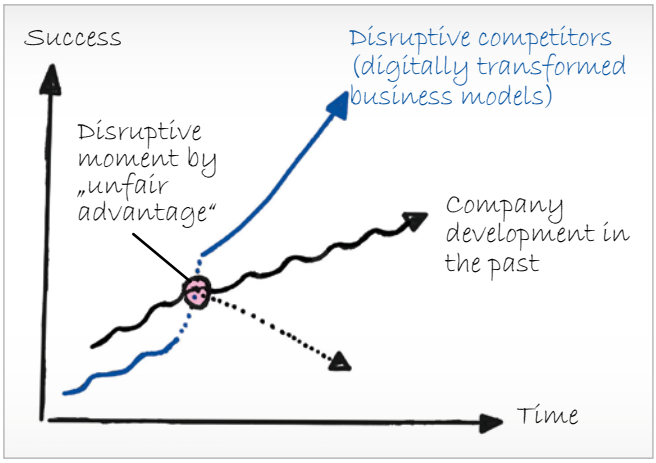

Figure 2: The dynamics of disruptive change processes are non-linear and once they are put into motion, it is generally extremely difficult for the competition to catch up – in most cases it is permanently outpaced. The reason for this is an extreme competitive edge on established players, which is also known as an "unfair advantage".

However, for those who actively rise to the challenge, there are urgent, difficult questions to be answered:

- Can the examples and patterns mentioned be transferred to mechanical engineering and construction at all, and if yes, how?
- Who has already successfully implemented such a change in an industrial environment beyond the marketing show, and who can one learn from?
- What are the disruptive combinations that could enable the market to be taken by surprise in a similar manner in an industrial environment?

Seen purely as a technical base, or enabler, the digital networking of sensors, machines, systems, lines, factories, and whole companies comes to mind first and foremost. The flow of data and information this enables results in new data-based products and services, and means that potential for optimisation can be exploited even better, and that completely new, previously inaccessible optimisation areas can be targeted. However, at the same level as the potential disruptive business model enablers, there are also production and handling technologies which are based on the concept of creating the majority of their added value in the digital world and only creating, assembling, and using a physical end product right at the end of the process chain, in an extremely flexible manner which was previously considered far too expensive. Digital and 3D printing in production, and all aspects of robotics, for

example, must be mentioned in this context.
At business model level, however, operator models, pay-per-use approaches and (service) platform strategies are seen as the core of a disruptive process.

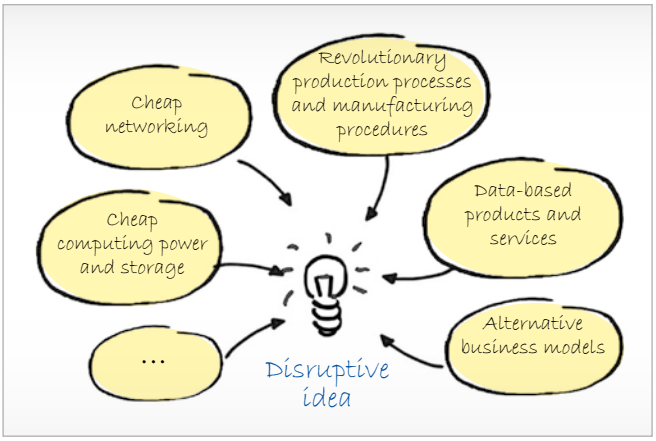

Figure 3: Framework conditions for modern disruptive ideas.

The question of transferability and positive reference examples as the unicorns [8] of industry is significantly more difficult to answer. Looking at mechanical and plant engineering, there are no Nespressos, Ubers or Facebooks, and one will become quickly sobered by the fact that there are no easy-to-copy formulas for disruption or irresistible business models with an "unfair advantage" [9], as startups often say, or opportunities to conquer the market.

In a market that contains many successful hidden champions who are experts in specific aspects of added value, special rules and standards apply in each market segment. They seal areas off from the outside world and secure the segments for the market participants, but they also mean that growth beyond the segments is extremely difficult.

Of course, this is not an excuse; it is vital not to miss the leading market transformation train, and to benefit economically – instead of ending up being merely an electronics and hardware supplier for large and small IT companies, and being dictated what business rules to follow.

However, one thing is certain: It will not be easy, and the new revolutionary business model will not appear in a strategy meeting or be dropped from the sky by external consultants; it will have to be painstakingly developed and tested. As in many cases, it is the skill and staying power of the players involved that count ultimately. It is not without reason that investors believe that "a good idea and a poor team is a no-go", while a "bad idea and a good team is a maybe at least"!

What is a New Business Model Worth in a World Where Business Models Have Always Been Clear?

What is the definition of a business model [2]? A business model is a model representation of the logical relationships that shows how an organisation or company can generate added value for customers and ensure income for the organisation.
In order to create a detailed plan of a business model, the following five questions must be answered and the respective structures must be coordinated:

- What is being offered, to whom, and with whom?
- How will the service be provided?
- What will the service be provided with, and what makes it stand out from the competition?
- How will the service be protected against competitors?
- How will income be generated?

It quickly becomes clear that superior technology alone does not constitute a business model, and this leads to an imaginative restriction for many engineering and technology driven companies which cannot be underestimated – particularly since in the past, such companies have often been able to consider a technology-driven plan a success story.

In order to answer the question of the potential successful business model, it is a good idea to clarify precisely the values or underlying valuation models of the customers or end users of machines (in other words, producing companies).

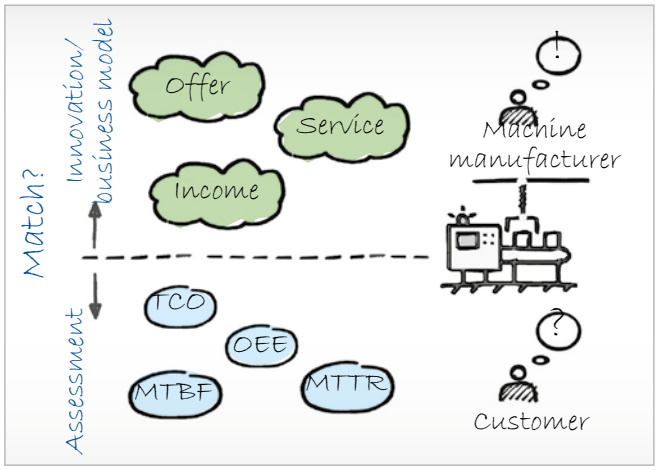

Figure 4: Only when the business model is innovative enough to ensure the true decision-making factors, can it be successful.

The following current criteria are known and established as a basis for plans of machine and system buyers:

- TCO (total cost of ownership) and ROI (return on investment) – in other words, an attractive purchase price and cost-effective financing
- OEE (overall equipment effectiveness) and the performance of the machines or machine processes
- Set-up times, cleaning times, planned maintenance costs, costs of material loss and waste, and the space required
- MTBF (mean time between failures),
- MTTR (mean time to repair)

There is no reason to assume that for a producing company, these main decision-making criteria will change. Of course, these criteria will also continue to apply by having a considerable influence on production costs and therefore the profitability of the respective producing company.

In summary, the optimisation of currently known solutions and existing concepts, aligned to the known key figures, is and was the basis for the market success of machine and plant manufacturers. The business model itself was characterised by the offering of masterful technology in accordance with the current state of the market – or put differently, until now it was enough to build a better, faster machine at regular intervals. [1], p. 23 describes the current usual business model in mechanical engineering as follows: For the

solution of his/her problem, the end customer (the producing company) generally invests in the right machines and systems. Therefore, the generation of revenue from product sales is at the centre of the predominant business model in machine and plant construction. Product sales are frequently complemented by high-margin service bundles, and there are also performance-orientated business models that are more like operator models – however, it cannot be recognised nowadays that these models will be implemented on a large scale.

Does this mean that these approaches will still be reversed? On the contrary: The classic optimisation of basic electromechanical systems and physical processes will still form an important basis for the success of automation solutions and machines. However, there is a high risk that this will indeed be seen by future customers in an increasingly dense market as an important prerequisite that each market participant must master just as well or at least sufficiently. However, it is a sufficiently powerful main distinguishing characteristic to argue a price advantage over another provider, for example. In the future, the achievement of key figures that customers consider decisive for the purchase of a machine/system will be very strongly defined by features of a highly digital nature. Specific examples are the reduction of logistics costs by active communication between the machine and autonomous/partially autonomous order and delivery systems, the guaranteed OEE increase due to continuous, direct and autonomous process optimisation from the start of operation, and the reduction of the MTBF or MTTR by intelligent diagnostics, warning and condition-based maintenance plans that are, in turn, based on cloud services. In conclusion, [4], p. 10, for example, does not see the potential new business model at the centre of the machine process, but in its surroundings: "Instead, the focus is on processes and human activities that make these processes efficient and reliable. In the case of a tool machine, this would be the equipping, management, preparation, and maintenance of tools, and the introduction of a processing chain."

However, this also presents a tremendous challenge: Due to the greater context, it is often no longer clear in the core knowledge area of machine manufacturers, who are highly dependent on complex IT systems, for which features of the machine and its software, let alone the software ecosystem, the customer values the functional (added value) and how much he/she is willing to pay – the basis for any business model.

This is also seen by [1], p. 22 as a barrier to mechanical engineering, because the good aspects of a company's own plan is surprisingly not welcomed with open arms by customers, who may even reject it:

"Value-added services such as customer process optimisation and the takeover of logistics tasks can indeed be found, but according to the experts surveyed, they are not widespread or even wanted by customers. The benefits for customers in machine and plant construction are created by the availability of highly integrated or linked machines and systems, mainly consisting of hardware and software that optimally achieves the specific objectives."

A critical point for machine manufacturers and therefore an essential requirement for new business models for machine and plant manufacturers, which must be taken into account, is often the low equity. Capital-intensive platform and operator models as business models therefore cannot be readily implemented without external financing or partners. Conversely, however, this situation could result in interesting constellations for business models in the value chains of suppliers, machine manufacturers and producing companies.

Innovator's Dilemma despite Industrie 4.0

As well as the challenges of finding new business models on the market and making them successful, innovation research also creates known and very rigid barriers to success for many companies with a successful product range. These system-related hurdles are called the Innovator's Dilemma [7].

What is the Innovator's Dilemma, and why is it very prevalent in an industrial setting? It can be described and summarised as follows:

In a market with a long tradition, existing products and the responsible organisational units often have great political weight and over time, they reflect their own interests.

In contrast, new innovations have to prove themselves first. It very quickly becomes a chicken-and-egg situation, in which the time window one has to prove oneself is so narrow that the innovative idea has no time to develop itself and inevitably loses to existing cash cows.

The "kill your cash cows" idea therefore applies in fast-paced consumer markets. It is based on the notion that new products are already being developed and placed on the market while the products bringing in the most revenue are blossoming, so that they can specifically cannibalise their sister products. An example would be the way in which the iPhone more or less ousted Apple's iPod from the market – before competitors managed to do just that with their new products, and before Apple company lost the reins.

This process is not optional in an innovative, fast-paced, and above all finance-heavy market. The risk of a startup or competitor disrupting the market is too great for a company to wait and see. Once the more successful product is on the market, there is no more time to react. Nokia and Blackberry, for example, could not react once the iPhone appeared as a smart phone, and they were pushed out of the market. After Google and Facebook were set up in the Western world, no similar, relevant alternative product could be created – only in the politically protected Asian markets, inter alia.

In the capital goods market, however, one can easily come to the conclusion that these examples cannot be compared with industrial automation and machine construction on a 1:1 scale, because in the capital goods market, product life cycles, often lasting more than 10 years, have a very calming effect.

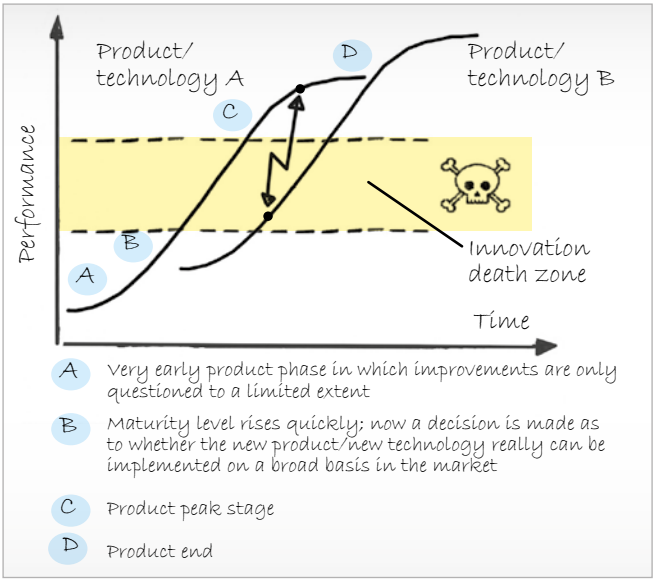

Figure 5: For every innovation, there is a "death zone" that decides whether it really can assert itself against the "establishment" internally or in the market.

Nevertheless, one must not be deceived, because the underlying mechanisms also apply in this case: disruptive examples that result and have resulted in major changes, albeit with generally longer time spans in the industrial world, e.g. (shortened list from [7]).

Nevertheless, longer product life cycles make the Innovator's Dilemma considerably worse, because they involve long decision-making cycles on the part of the customers, and the time from the innovative idea to sustainable revenue is also increased significantly. Under these fundamental conditions, the dry spell for internal innovations is even longer, with all the associated problems for the new idea. The subsequent temptation to simply milk the current products further as a cash cow until they are vulnerable to competitors or noticeably attacked is huge. The active decision-makers will then either not know whether it is too late to react, or they will be driven out.

The challenge now is that machine manufacturers must protect their true innovations particularly well and guard them so that they are not cannibalised by existing business operations, but it goes without saying that they cannot simultaneously create an ivory tower detached from real customer needs, and they must put the business models linked to the innovations to the test as quickly as possible.

Specifically Promoting the Difference between Optimisation and Innovation within the Company

In order to stop the balancing act instigated by the Innovator's Dilemma, clear differences should be established between the optimisation objectives for existing business with known customer profiles and introduced products, and the following of innovative ideas.

The reward system for middle management, and a positive culture of taking errors into consideration, play a special role.

One should therefore be aware that the current, predominant (reward) culture is generally very strong and cannot be changed by order of the management. The risk of venturing into unknown territory must offer a serious, visible and tangible advantage for the decision-makers within an organisation. The act of merely drip-feeding colleagues the figures about the high-margin existing products, and reminding them at every opportunity and after every important decision, is already a major impediment. Why should top managers want to swap potential power with the powerlessness of being responsible for an innovative, early-stage product?

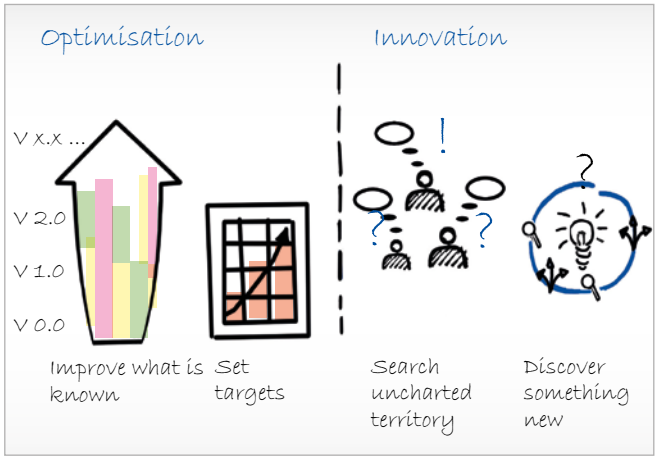

Figure 6: The difference between optimisation and innovation must also be seen organisationally, otherwise innovations will remain a product of chance.

Leading technology/business model of the respective time	Disruptive equivalent
Cable excavator	Hydraulic excavator
Integrated steelworks	Electronic steelworks – "mini-mills"
5.25-inch hard drives	3.4-inch hard drives
Printed newspapers	Electronic newspapers
Installed software	Software-as-a-service
Stationary trade, catalogue trade	Online trade
Combustion engine	Electric vehicle
Offset printing	Digital printing
Printed book	E-book

In order to optimally adjust reward systems, management culture, and targets for optimising and innovating organisational units, the important underlying conditions and influencing factors have been summarised (Table 1).

Lean and Agile Favours Innovations

Giving staff more freedom for an explorative approach does not just mean turning the money tap on and letting it flow, and hoping for a spectacular outcome. Especially in a field with many unknown and large-scale risks, it is important not to lose oneself in explorative processes or end up in an ivory tower. The uncontrolled wastage of time and resources is as much of a killer of innovations as incorrect reward systems. A strict plan based on agile methods, orientated towards lean criteria, benefits innovations significantly.

Lean essentially means learning to recognise and systematically combat wastage at different levels. Good examples of what waste means in a development process are listed under [16]. The basic idea of lean methods is an optimising approach, which could be a not entirely unjustified objection for innovative product development: See, for example, [19].

Lean tends to promote continuous, small-scale improvements, and the big picture is scrutinised less. An organisation based on lean criteria can, for example, achieve top performance in manufacturing and production, but still completely bypass products in the market.

The application of lean criteria in the field of innovation does not have to be focused on the improvement of existing products, but on the learning and search process as such. Otherwise, the application of lean criteria will quickly stifle the actual innovation process.

Agile, or agile product development, means the implementation of a development process that reacts sensibly to external influences and, as described in the agile manifests [10], plans the change (known at short notice) for the benefit of the customers over a long period of time. In order to enable this, an agile development process must follow strict rules.

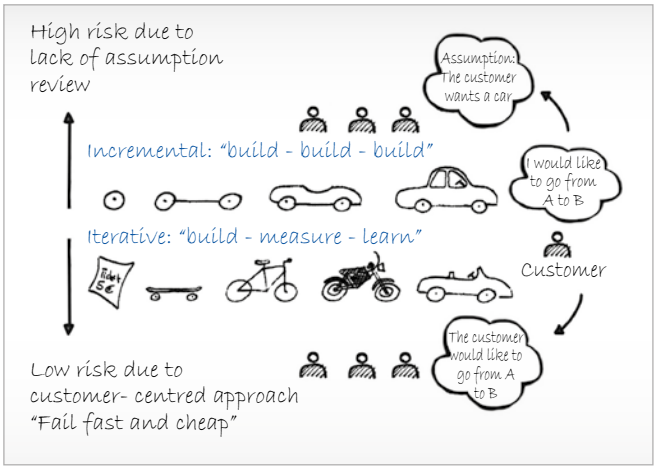

Figure 7: Incremental plans with "Big Design Up Front" approaches are not suitable for agile plans, and often lead to products that are bypassed in the market, wasting lots of money, time, and resources. On the other hand, iterative processes are aimed at precisely fulfilling the true customer needs and are therefore agile in the actual sense of the word, and avoid wastage caused by incorrectly developed products and services.

Agile development is seen precisely as the opposite of creative chaos. One of the most well-known process models for the implementation of an agile development process is SCRUM [11]. The possible adapted form for large development teams and large-scale development plans is LeSS [12].

The application of agile/lean methods, however, does not guarantee a process that results in a successful, innovative product. That said, an organisation based on agile principles is currently the most convenient breeding ground for the development of innovative products with which new or even disruptive business models are enabled. A functioning agile

Influencing factor: optimisation	Influencing factor: innovation
Known customers	Market unknown, no reference customers
Known products	Product cannot be planned in its later, hopefully successful, form
Known, sustainable and established business model	Business value of the product features unknown or uncertain
Can be planned in the medium term at least, based on years of market experience	Business model unknown, or just a prediction and unconfirmed
Calculable efficiency gains as a result of standardisation and increase of steady components in processes, components and parts expected	The approach is shaped by experimenting, looking for errors, and learning from them
Objectives for the implementation team can be based on medium-term planning, e.g. using planned sales figures or quality/efficiency KPIs	Reward system based on the learning progress or learning speed of the team
Reward systems can be based on execution quality and the achievement of optimisation goals	A team that itself believes in the innovation, and also contributes the respective individual skills and personalities to get it off the ground, is a must! Just doing a good job is too little.
A team that believes in the product and pushes it is advantageous. Staff who "just" do a good job, however, are sufficient.	

Table 1: List of fundamentally different boundary conditions for an existing organization which optimizes in contrast to an innovative environment.

development process works like a catalyst, so to speak.

Agile processes in combination with learning processes based on lean criteria also benefit supposed innovations of which the business model forecasts are not viable, and enable them to be recognised more quickly – before too much is invested in the wrong thing. “Fail fast, fail cheap“ would be the proper, well-known motto, meaning simply that it is important to consequently minimise wastage in the innovation process.

What is the Systematic Way to a New Business Model?

How is it now possible, with all the framework conditions and requirements in the process, to begin the innovative product and business model development without having a blinkered view? One tried-and-trusted method used in a lean startup environment (see Eric Ries [13]) is the use of tools such as the “Business Model Generation Canvas” [5, 14] and/or the “Value Proposition Canvas” [15].

The aim of the so-called Business Model Canvas is to systematically develop a new business model. The main purpose of the Canvas is to compile and present all the important influencing and success factors of a potential new business model in nine fields. Various potential business model variants can therefore be created, discussed, and systematically compared in their entirety, for the first time, and with more ease.

The nine fields on the Canvas are Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources & Key Activities, Key Partners, and Cost Structure.

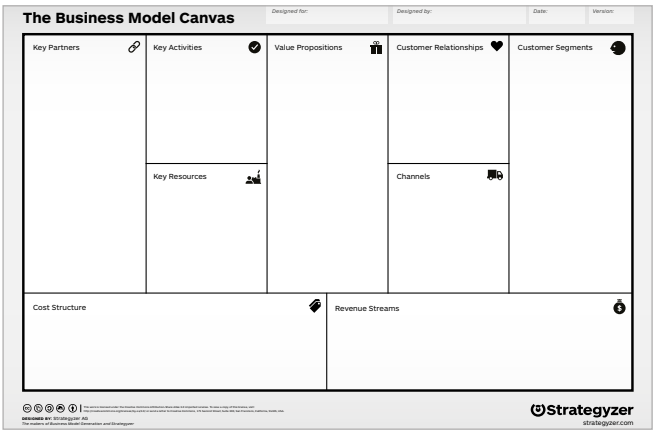

Figure 8: The Business Model Canvas is a very useful tool to gain an overview of business models, and make them discussible and comparable.

When creating the Business Model Canvas, it is often best to start with a description of the customer segment, or in other words, the customers who will be paying later.

For these customers, the corresponding value propositions are developed in the next step, and the channels are defined to determine where and how the customer has access to the products and services, or how he/she can access them.

In terms of customer relations, the relationship levels with the customers are then defined. They set whether, for example, they are anonymous transactions online, or a service provided in person by staff.

This side of the Business Model Canvas is completed by the revenue streams field, which set or predict how and with which pricing model the described business model generates the revenue.

In the next step, the necessary infrastructure must be described to specifically outline how to implement the business model. This includes the description of the key resources, as well as the most important activities to implement and validate the business model.

The Key Partners field lists the partnerships that are either necessary to implement the business plan, or significantly accelerate the implementation, or protect against competitors.

Via the description of the required infrastructure, it then becomes clear how the cost structure of the business model is structured, and this is summarised and numerically portrayed in the Cost Structure field.

These new fields transparently portray and compare important factors for a successful business model. The core of the business model, the value proposition for the customers, and suitable mapping based on specific customer requirements can, however, be represented in more detail and more comprehensibly in another tool, the Value Proposition Canvas (VPC). It demonstrates a very good addition to the business core.

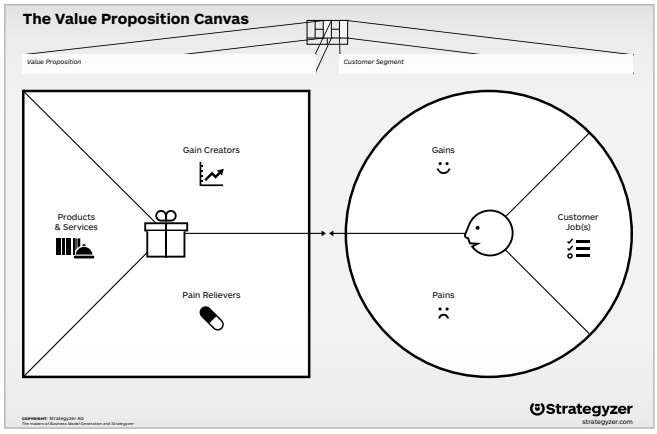

Figure 9: A very good addition to the Business Model Canvas is a detailed view of the value proposition by Alexander Osterwalder in relation to the customer needs, the so-called Value Proposition Canvas (VPC): see also [5].

The VPC is aimed at finding the best possible correlation to the customer requirements in relation to the offered value proposition of the product/service/usage rights, in a structured and comprehensible manner. It consists of a customer side and the side of the values.

The process used to create the Canvas has proven itself as follows:

- First, the customer is characterised.
- **Customer jobs:** determination of the main tasks and responsibilities that must be fulfilled by customers in their professional or private environments.
- **Pains:** What are the negative aspects or blockers when performing the task or fulfilling the responsibility, and what

are the undesirably high risks or costs? The points are sorted in order of relevance, and their probability of occurrence/ frequency.

- **Gains:** What are the positive aspects, or what will positively surprise, or even inspire, the customers? What fulfils their wishes and dreams? The points are sorted in order of relevance, and their probability of occurrence/frequency.
- **The value proposition** is described in a second essential step.
- **Products:** This step lists the products/services/usage rights that are meant to assist the user when he/she carries out his/her tasks or fulfils his/her responsibilities/interests, and that are the core of the business model.
- **Pain relief:** Which product features are aimed at the negative aspects that can affect customers when they carry out their tasks? Where are costs saved and risks minimised, for instance, and which functions combat difficulties during implementation? The points are sorted in order of relevance, and their probability of occurrence/frequency.
- **Gain creator:** Which features serve the positive aspects such as wishes, positive experiences, and positive surprises (significant cost reductions, the complete disappearance of a problem area, or the clearly better personal position that can be achieved by the product/service)? The points are sorted in order of relevance, and their probability of occurrence/frequency.
- **At the end**, the values found are compared, and the respective value proposition with the best match is determined [5], p. 12:

Gathering the pains and gains in the market correctly is vital for success: Forming user groups and employing user-task-context analyses to identify the true (underlying) needs of the users, decision-makers, and buyer groups, may involve more effort at the start, but it saves a lot of time very quickly, because it supports a generally very targeted plan.

Underlying needs are also stable fixed points that may be operated and detached well with technical solutions, but in essence, they are not invalid.

Technically driven organisations can be tempted very quickly not to find out the true customer needs professionally, but base their actions on their own assumptions. The question “it’s clear what customers need, so why do we need more customer surveys?” or other such questions are often asked in this respect. It can quickly become the case that real information about the customers is mixed with assumptions about their needs in such a way that the information can no longer be differed. This creates an enormous risk of betting too much on the presumed right horse, and then wondering too late why the new product/service/feature set has not been accepted in the market to the extent the company had hoped.

Those who want to reduce the cost of the explorative search for potential business models can find the necessary inspiration in the 55 known business models created by St. Gallen. Selected models from the Business Model Navigator by St. Gallen [6] with intuitive titles are, for example:

Add-On	Flat Rate	Performance based Contracting
Cross-Selling	Freemium	Solution Provider
Digitization	Lock-In	White Label

Figure 10: Selected business models from the St. Gallen Business Model Navigator [6].

When the basic assumptions about the pains and gains have been made, and the theory of the business model formulated, the further success is made very relevant by the learning speed regarding the new business model, and from the very start it is possible to measure progress.

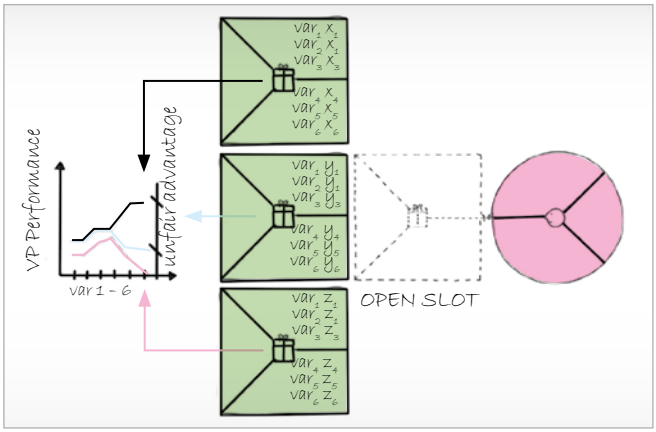

Figure 11: An important but difficult process is the selection of Value propositions with the best match in terms of Customer needs.

At this point, there is a very important crunch point in the process. If the first draft of the Business Model Canvas and the Value Proposition Canvas can still be more or less based on theory during workshops, the more expensive and intensive implementation phase then begins. During this phase, a decision is made as to whether the respective company actually has an interest in new business models. The risk that, for example, for cost/expense reasons, the respectively necessary resources are not provided, and the implementation is started with a team that is far too small or does not have sufficient skills, is huge. The fizzling out of the innovation project and therefore the self-fulfilling prophecy of the Innovator’s Dilemma is therefore foreseeable. In order to avoid waste, it is advisable to visualise this context beforehand.

When it comes to the actual implementation, the essential steps of the subsequent continuous, recurring optimisation cycle are as follows:

Assumptions: Development of specific measures or assumption of how the next optimisation step could take place. Prioritisation of the points found by risk and potential, as well as importance and urgency.

Theory: Segmentation and formulation of the highest-prioritised assumptions in a way that makes improvements or deteriorations/stagnation despite change visible and therefore revisable.

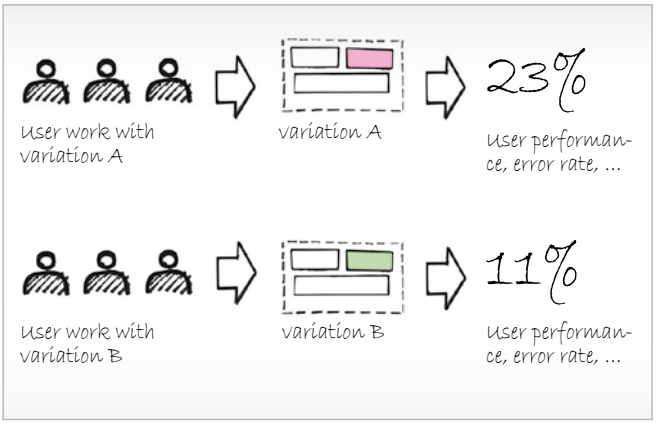

Figure 12: The A/B test is a suitable way of quickly testing product variations to determine their respective effect or added value, in a statistically valid manner.

Minimal functioning improvements/changes: Implementation of the theory with the greatest improvement potential in a manner that is quickest for the team, and with the smallest expense possible. The trick here is to find the right balance between expense and benefits in the sense of measurement results. Further articles about minimal viable products (MVP) and simple, lovable, complete (SLC, pronounced "slick") are recommended here, e.g. [17, 18, 20].

Measurement: Recording and evaluation of the key figures defined previously, within a set time frame. In this case, the original formulation of the assumption as a theory is important, otherwise there will most probably be no measurability. If larger user groups/samples are available, so-called quantitative A/B tests [21] are suitable as they enable a well-founded, direct and statistic comparison of two solution variations. Qualitative processes are more suitable for smaller samples. For this purpose, the use of properly trained experts is preferred, in order to reduce the risk of an unwanted distortion of the results.

Learning: Concluding which "success mechanism" is behind the current state of optimisation, processes, tool infrastructure, feature set, etc. Trying to recognise the "true" reason or find the lever for further improvements, in order to identify and determine specific measures.

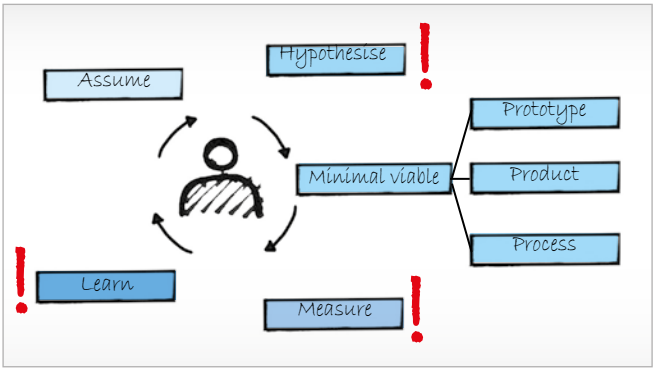

Figure 13: The learning speed can be systematically increased if the entire process is made measurable. The successful creation of hypotheses is the basis for this.

The following positive guardrails in terms of the values of learning are suitable for the accompaniment and alignment of this continuous cycle:

- If you fail – fail fast an cheap
- We win or we learn there is no loosing
- Think big – start small

Summary

Therefore, one should not be lulled into a false sense of security that everything will continue to develop in a linear and evolutionary manner. Instead, it is important to prepare oneself.

There are known examples of successful companies in the consumer world that have revolutionised the market within an extremely short space of time, with disruptive approaches. However, they cannot be applied to industrial environments on a 1:1 scale. Adaptation to longer product life cycles and the varied purchasing behaviour of industrial customers is absolutely necessary.

New technical opportunities alone do not make a successful business model. Good business models can only be partially planned on the drawing board. The direct test on relevant customers in the market is decisive.

The Innovator's Dilemma is particularly pertinent for industrial products. Many companies may be able to recognise potential innovations and could even implement them in prototype stages technologically and successfully. However, these products will then "starve" on their way to widespread market launch. Hanging on is key in this case: using the right team consisting of strong internal champions, creating protected spaces for innovative products and services within the organisation, and particularly the explicit measurement of the potential success or failure of a new product/service in order to quickly and purposefully implement any necessary changes of direction.

In general, however, economic success can never be guaranteed or planned. Organisations that create processes and a corporate culture that enable the fastest possible learning progress are ultimately the winners in the scramble for innovations.

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