HOW TO USE BUSINESS MODEL PATTERNS FOR EXPLOITING DISRUPTIVE TECHNOLOGIES

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ABSTRACT

Manufacturing companies nowadays face a myriad of business opportunities as a direct consequence of manifold disruptive technology developments. When it comes to the innovative exploitation of those technologies, the matter is about winning business models. As a basic characteristic, disruptive technologies lead to a severe shift in value-creation networks as digitalization shows for manufacturing industries. Initially, one of the key challenges is to anticipate the business logic that comes along with technological change. Further, from a company's perspective the effective business model design appears to be crucial in competition. Business model patterns are an innovative approach to tackle these challenges. They can be interpreted as proven, adaptable building blocks of successful business models. The paper at hand, presents a methodology for pattern-based business model design. It covers the identification of relevant technologies and enables the development of promising business models making use of established business model patterns.

Key words: business model patterns, business models, disruptive technologies.

BUSINESS OPPORTUNITIES THROUGH TECHNOLOGICAL CHANGES

Innovative products and production systems based on new technologies enable sustained differentiation in competition (Schuh et al., 2009). Technological progress ensures substantial success potentials for companies, but often causes threats for the established business as well. In particular, this is valid for disruptive technologies such as Additive Manufacturing. Additive Manufacturing might displace conventional manufacturing technology on the one hand, but opens up fascinating possibilities for future value creation networks on the other (Gausemeier et al., 2013). Nowadays we observe companies in manufacturing industries and related others that are facing extensive technological developments with a strong disruptive character. These developments are mainly driven by the continuous penetration of products and processes with information and communication technology. More and more devices in our environment will be electronically connected, which is expressed by the term “Internet of things”. Real and virtual worlds merge into so called “cyber-physical systems”. In the context of industrial production a new prospect is opening up, which is often considered the fourth industrial revolution – Industry 4.0 resp. Industrial Internet.
The reference model leads from a product respectively business idea to the start of production and covers the four main tasks strategic product planning, product development, service development and production system development.

- **Strategic product planning**: The cycle characterizes the identification of future success potentials until a success promising product concept. It covers the tasks foresight, product discovering, business planning and conceptual design of the product. Business planning aims at a proof of sustainability from an entrepreneurial perspective and therefore contains the design of business models.

- **Product development**: It covers the domain spanning conceptual design of a product, the domain specific design of product as well as the integration of the results of involved domains such as mechanics, control technology, electronics and software engineering.

- **Service development**: This main task aims at the implementation of a service idea into a market offer. In analogy to product development the interlinked tasks conceptual design of the service, service planning and service integration are passed.
• **Production system development**: While products and production systems depend on each other, their development needs to be synchronized. Starting with the conceptual design of a production system the aspects process, place of work, logistics and working appliance are considered integratively. These aspects are specified during the main task which leads to an integrated production system.

In tomorrow’s competition innovative business models are required that reap the benefits of technological advancements (Chesbrough, 2010), (Christensen et al., 2009). More and more, business model design tends to be a key ability of competitive companies operating in technology driven markets. The main challenges in developing new business models are managing the complexity of the upcoming disruptive technologies and anticipating the business logics in nascent markets. Business model patterns promise to tackle these challenges (Gassmann et al., 2013).

**PATTERNS IN BUSINESS MODEL DEVELOPMENT**

The UK aircraft engine manufacturer Rolls-Royce innovated its business model in 1962. Since then, the operators of an aircraft have no longer been charged for an engine’s purchase, but for the number of hours the engine had been in operation. Rolls-Royce simultaneously takes full responsibility of maintenance and repair, whereby the maintenance business is kept in-house and the company generates constant revenue streams (Rolls Royce, 2014). Philips pursues a similar business model with medical devices, based on a pay per patient principle and also includes professional maintenance (Phillips, 2014). Rolls-Royce and Philips obviously use a similar solution principle within their business models – a pattern, which can apparently be transferred to products and maintenance services of completely different industries (Ng et al., 2009).

The basic concept of patterns follows the works of architectural theorist Christopher Alexander. At the end of the 1970s he formulated 253 patterns for designing towns, buildings and constructions. According to Alexander patterns describe proven solutions for recurring problems (Alexander et al., 1977), (Alexander, 1979):

> „Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice“ (Alexander et al., 1977).

The basic idea of the pattern concept is reusing solutions that are documented generally and abstractly in order to make them accessible and applicable to others. In this way, patterns seek to contribute to reducing complexity and increasing effectiveness and efficiency in problem-solving processes (Buschmann et al., 1996). Patterns are meanwhile used across several domains (Cloutier and Verma, 2006).

Work on patterns in the context of business models has been done by several authors (Abdelkafi et al., 2013), (Bonakdar et al., 2013). Weill et al. define a typology of 16 business model archetypes and use it to classify the business models of the top 1000 firms in the US economy (Weill et al., 2005). Johnson compiles 19 business model patterns that are used analogously across industries as a tool for business model innovation (Johnson, 2010). Osterwalder and Pigneur define five business model patterns (Osterwalder and Pigneur, 2010). The most extensive work was carried out by Gassmann et al. so far. They identified 55 universal business model patterns and made them accessible for the development of new business ideas (Gassmann et al., 2013).
Business model patterns in literature basically differ with respect to their granularity. We propose three different categories that can be used to classify business model patterns (Gausemeier and Amshoff, 2014). The three different categories of business model patterns are frameworks, prototypical business models and solution patterns for business models. The paper at hand primarily aims at solution patterns, which serve as building blocks for the design of new business models.

Since a solution pattern addresses different parts of a business model, an overall framework is required. Köster suggests a framework, which includes the partial models supply model (“Which product or service do we offer and what kind of value do we bring for which customer?”), customer model (“How do we design the interface to our customers?”), value creation model (“How do we create the product or service?”) and financial model (“Which costs does the business accompany?”). Every partial model contains further business model elements (e.g. customer segments, value proposition, etc.). The framework compiles business model elements literature mostly refers to.

Figure 2 shows the framework, in which the financial model has been extended by the elements investment costs and operational costs (Köster, 2014).

![Figure 2: Business model framework](image)

Each business model element is describable by means of business model variables and conceivable configuration options. Business model variables are levers a company uses for actively designing its business model. Configuration options characterize the alternatives that are available for shaping a business model variable (Köster, 2014). “Customer service” is an example for a business model variable of the business model element customer relationships. For shaping this variable a company can choose between the configuration options “customer acquisition”, “customer retention”, “customer development” and “sales promotion” (Gausemeier and Amshoff, 2014), (Gassmann et al., 2013).

We found that this approach is also suitable for identifying solution patterns in business models. Business models of companies that already commercialize a disruptive technology successfully are described by means of business model variables and related configuration options. According to figure 3 a solution pattern can be defined as a combination of configuration options, which repeatedly occurs in successful business models (Bissanz and Hagedorn, 2009), (Gausemeier and Amshoff, 2014). For instance, the combination consisting of configuration options (3B), (4C), (5A)
and (5B) is used across several companies successfully exploiting a technology. Thus, these configuration options reveal the existence of a solution pattern.

### METHODOLOGY FOR PATTERN-BASED BUSINESS MODEL DESIGN

Up to now, method-based business model design has been intensively tackled by researchers. Common methods lead to business models covering different levels of detail (Bieger and Reinhold, 2011), (Eurich et al., 2013), (Osterwalder and Pigneur, 2010), (Köster, 2014), (Wirtz, 2010). To the best of our knowledge, the only approach including pattern-based business model design has been presented by Gassmann et al. so far (Gassmann et al., 2013). This approach, however, does not aid the identification of new business model patterns as they can result from evolving technologies like Additive Manufacturing or Industry 4.0. To bridge this gap, we subsequently introduce a methodology designed to identify nascent business model patterns and to combine them to new and innovative business models. The methodology follows the five-phase process shown in figure 4.

In the following, the methodology is going to be outlined in detail. To ensure a better understanding, the methodology is hereafter presented using examples from an industry project conducted with a medium-sized German engineering company, which manufactures blowers and compressors.

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**Figure 3: Principle for identifying business model solution patterns**

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<thead>
<tr>
<th>Business model</th>
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<tr>
<td>BV 1 CO A CO B CO C</td>
<td>CO A CO B CO C</td>
<td>CO A CO B CO C</td>
</tr>
<tr>
<td>BV 2 CO A CO B CO C</td>
<td>CO A CO B CO C</td>
<td>CO A CO B CO C</td>
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<tr>
<td>BV 3 CO A CO B CO C</td>
<td>CO A CO B CO C</td>
<td>CO A CO B CO C</td>
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<td>BV 4 CO A CO B CO C</td>
<td>CO A CO B CO C</td>
<td>CO A CO B CO C</td>
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<td>BV 5 CO A CO B CO C</td>
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<td>BV n CO A CO B CO C</td>
<td>CO A CO B CO C</td>
<td>CO A CO B CO C</td>
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**Business model pattern:**
The combination consisting of configuration options 3B, 4C, 5A and 5B is repeatedly part of the analyzed business models.

**Caption**
- **BV** Business model variable
- **CO** Configuration option
- **In a business model chosen configuration option**

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**Figure 4: Methodology for pattern-based business model design**

**Technology analysis**

Within the first phase, technologies, which might have disruptive effects on a company’s existing business model, are identified. This is carried out using established methods and IT tools of technology scanning and monitoring (Wellensiek et al., 2011), (Bullinger, 2012). Based on a precise description, the identified technologies are assessed in the light of three criteria: (1) probability of occurrence, (2) disruptive potential for the prevailing business models of the own industry and (3) relevance for the own company. The result of this phase is a disruptive technology, which is highly relevant for the future business and has strong impact on a company’s existing business model. Therefore, future success might depend on new and innovative business models designed to exploit the technology’s business potential.

As part of the project, the disruptive technology condition monitoring has been selected. Condition monitoring describes the process of determining the condition of machinery during operation. This technology is not entirely new, but currently experiences a new dynamic by the possibilities of comprehensive data analysis (big data). Moreover, it is highly relevant for predictive maintenance in mechanical engineering.

**Business model analysis**

The analysis across several industries takes into account the most successful companies, selected by economic criteria. Within the project we chose 20 companies already offering condition monitoring services based on the two dimensions company size and company development. In order to gauge a company’s size we considered criteria like revenue streams and number of employees. For evaluating a company’s development we took a thorough look at the temporal changes in these criteria like revenue growth and increase in employees. Since smaller companies, especially start-
ups, often pursue new business models (Criscuolo et al., 2012), we included a mixture of small, but quickly growing companies and big companies in our analysis.

Subsequently, a business model framework is required for describing the companies’ operated business models. We used the framework proposed by Köster (figure 2) (Köster, 2014). The operated business models of the selected companies are described by business model variables and related configuration options. The focus rests on those variables and configuration options that are relevant for the business with the selected technology. Basically, they can be obtained from the following sources (Gausemeier et al., 2013), (Köster, 2014), (Gausemeier and Amshoff, 2014): (1) web pages, e.g. company web sites and industry portals, (2) industry reports and literature, (3) trade fair surveys and expert interviews.

For describing the business models in the context of condition monitoring, we identified 43 business model variables and 140 corresponding configuration options which can be assigned to the business model elements. Figure 5 shows a few business model variables and configuration options for the business model element products and services in the partial model supply model.

<table>
<thead>
<tr>
<th>Business model variable</th>
<th>Alternative configuration options</th>
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| Kind of condition monitoring | A Continuous remote monitoring for operator (online)  
|                         | B Remote monitoring by operator  
|                         | C Periodic monitoring for operator (offline) |
| Scope of condition monitoring | A Automatic alerts (e.g. E-Mail, SMS)  
|                         | B Regular reporting  
|                         | C Remote diagnosis and error analysis  
|                         | D On-the-spot diagnosis and error analysis |
| Condition maintaining resp. condition restoring | A Supply of spare parts for machines and plants  
|                         | B Repairing of machines and plants  
|                         | C No maintaining resp. restoring |
| Advising and training | A Advising  
|                         | B Customer training |

*Figure 5: Examples for business model variables and configuration options*

To describe the business models of the considered companies, a binary characteristics list is drawn up indicating the configuration options each company uses in its business model (figure 6). The list sums up the combinations of configuration options that characterize every company’s business model with regard to its supply model. However, established business model patterns cannot be seen from this list. The identification of business model patterns is carried out within the third phase.
Pattern identification

We define a business model pattern as a combination of configuration options, which repeatedly occurs in successful business models. In order to determine recurring combinations, for each pair of configuration options a similarity value is calculated based on the characteristics list. The similarity value is high, when two configuration options are used jointly in a very large number of business models. The final outcome is a similarity matrix, which can be transferred into a multidimensional scaling (MDS) (Borg and Groenen, 2005). The MDS visualizes the configuration options in a two-dimensional space regarding their similarity to each other. Configuration options with a high similarity value are positioned in close proximity within this figure. By doing this, business model patterns can be identified in an easy and comprehensible manner. Figure 7 shows the MDS for the partial model supply model. We call it a pattern map. Such a pattern map has been created for all partial models.

As depicted in the pattern map, we identified 10 patterns for the supply model. Each pattern consists of at least two configuration options. Pattern 2 “Condition Monitoring Systems for own Machines and Plants”, for example, describes the service to equip own machines and plants with condition monitoring systems (configuration options: (1C) Own machines and plants, (9D) With online condition measurement systems equipped machines). The systems are not installed in machines of other manufacturers (configuration option: (3A) Focus on single application). This

![Characteristics List Supply Model](image)

\textbf{Figure 6: Characteristics list for the partial model supply model (extract)}
pattern does not yet specify, how the required components and subsystems can be developed, produced or purchased. For this purpose, patterns of the value creation model are available. For each the value creation and the customer model 9 additional patterns were identified.

Figure 7: Pattern map for the partial model supply model

To facilitate an unequivocal determination of a pattern within the pattern map, we defined two general rules. As it can easily be seen, a large number of configuration options often is located close to each other. A business model pattern always exists, if (1) two or more configuration options are complementary and (2) not divisible into further patterns. For instance, in figure 7 the configuration options (1C), (3A), (9D), (5A), (13A) and (13B) are very close to each other. The pattern “Maintenance as Additional Service” (pattern 5) is, however, not necessarily part of the pattern “Condition Monitoring Systems for own Machines and Plants” (pattern 2). That is why we defined two patterns here.

All identified patterns are documented according to a rigid scheme. Following the thoughts of Christopher Alexander, a pattern is described by the elements name, problem, context and solution (Alexander et al., 1977), (Alexander, 1979). These elements have been extended with additional elements like examples of companies, which already use a pattern in their business model. All elements are outlined in keywords. The description of the solution consists of the configuration options included by the pattern. Figure 8 exemplarily shows the documentation of pattern 2 “Condition Monitoring Systems for own Machines and Plants”.

Caption
- Configuration option
- Business model pattern
- in considered partial model

Supply Model
In the last step of the third phase, the relationships between the identified patterns are analyzed. A pattern merely represents a building block of a business model, so that the expressiveness of a single pattern is limited. An overall business logic becomes evident only when there is precise information about the interaction of patterns. The analysis of the patterns’ relationships proceeds via two steps: In the first step, it is specified for each company which business model patterns it uses within its business model. This allocation is done by aid of a pattern usage matrix (figure 9).

The pattern usage matrix documents the decomposition of business models into single patterns. In the second step, a further matrix is generated, which we call pattern combination matrix (figure 10). The pattern combination matrix is calculated as a product of the pattern usage matrix and the transposed pattern usage matrix (Lindemann et al., 2009). It specifies for each business model pattern, how often it is combined with a certain other pattern regarding the analyzed companies. For instance, pattern 2 “Condition Monitoring Systems for own Machines and Plants” and pattern 11 “Personalized Direct Selling of Condition Monitoring Systems” are combined in 40% of the analyzed business models. We call this value “degree of combination”. A “degree of combination” of 40% means that 8 of 20 analyzed companies use this combination in their business models. Thus, with the help of the pattern combination matrix patterns can be revealed, which are frequently used together.
The pattern combination matrix serves as the basis for the so-called pattern system (figure 11). The pattern system is a collection of all business model patterns derived from supply, customer and value creation model containing all the pattern combinations used within the market (Buschmann et al., 1996). Starting point of the pattern system is a basic pattern, which can freely be selected. The colour graduations visualize how often the basic pattern is combined within successful business models. Frequently used combinations are shown in dark blue, rarely used combinations are
coloured brighter or even white. In doing so, the pattern system reveals the dominant business logic with respect to the chosen basic pattern.

![Pattern System Table]

**Business model design**

The identified business model patterns are subsequently used for designing a new business model from the standpoint of the considered company. The general design approach of new business models is depicted in figure 12. We consider two types of levels, on which the business model design can be carried out: the specific and the abstract level. Linking both levels, there are three overarching tasks, which need to be done: Business idea definition, Conceptual business model design and Business model specification.

Starting point of any business model is a business idea. A business idea gives a rough idea of the products and services, a company offers for a certain type of customers, regions and needs (Bach et al., 2010). A business idea therefore is specific to a company and needs to be defined at the early beginning of the design process (Business idea definition). Further, a consistent business model needs to be designed in order to substantiate the idea. The business model design is done by building combinations of business model patterns, which are unique at the company’s target market. Since the patterns are abstract in nature, the specific business idea gets transferred in an abstract pattern (basic pattern). Afterwards, combinations of business model patterns are built keeping the basic pattern fix. Due to their high degree of abstraction, combinations of business model patterns represent principal solutions of business models, so called business model concepts (Business model conception). Finally, these business model concepts are specified against the background of the considered company. This leads to entire business models, which are customized
to the company’s specific business (Business model specification). In the following, the three tasks are outlined in detail.

**Business idea definition**

As an initial task, an innovative business idea for the future business with the selected technology needs to be defined. In order to generate business ideas we distinguish between two different principles (Gassmann et al., 2013):

- **Pattern association:** Following this principle, business ideas are developed by means of creativity techniques and established methods of strategic foresight (Gausemeier and Plass, 2014). Every business idea is subsequently assigned to a suitable business model pattern from the pattern system.

- **Pattern confrontation:** Using this principle, business ideas are developed by confrontation with the identified business model patterns. Therefore, every pattern from the pattern system is checked to determine its potential for an own business idea.

Regardless, which principle is used, there always is a clear assignment of the specific business idea and an abstract business model pattern. As part of the project, the business idea “Production of remote controlled compressors” was defined. The business model pattern belonging to this business idea is pattern 2 “Condition Monitoring Systems for own Machines and Plants”.

**Conceptual business model design**

Within this task, a business model concept for the previously defined business idea has to be developed. A new business model should generally create a unique position in the competitive arena (Christensen et al., 2009). For this reason, a profound analysis of the dominant business logic is carried out in the first instance. The dominant business logic can be obtained from the pattern combination matrix (figure 10). Since the pattern combination matrix is based on an analysis of companies operating in very different markets, it shows the dominant business logic across markets. For the considered company, however, only the situation in the market to be entered is relevant. Thus, a new pattern combination matrix only including the direct competitors is carried out. Thereafter, the dominant business logic and the business logic in the target market can be compared in order to derive a strategic direction for designing the own business model.

![Figure 12: Approach for pattern based business model design](image-url)
For the comparison, a so called comparative profile is created (figure 13). Within the profile, the two business logics are compared with regard to the basic pattern which belongs to the business idea. In order to quantify the matching of the two logics, the so called Logic-Fit is calculated. The Logic-Fit indicates the average share of the business logic in the direct competition relative to the dominant business logic. The range of the Logic-Fit is limited by normalization to the interval [0; 100]. In this way, three characteristic direction domains can be defined. For each domain a recommendation for the choice of the strategic direction is given:

- **Low Logic-Fit [0; 25]:** A low Logic-Fit exists if the determined value is in the range between 0% and 25%. In this case, the dominant business logic can be adopted because no competitor follows it in the target market.

- **Medium Logic-Fit [25; 75]:** A medium Logic-Fit exists if the determined value is in the range between 25% and 75%. In this case, a takeover of the dominant business logic should be checked. Essential differences should be identified and possible weak points must be discussed. Individual pattern combinations can be used for the own business model.

- **High Logic-Fit [75; 100]:** A high Logic-Fit exists if the determined value is in the range between 75% and 100%. In this case a takeover of the dominant logic is not promising. The dominant logic must be broken by recombining the business model patterns.

As it can be seen in figure 13, the Logic-Fit calculated within the project is 76%. This means that the dominant business logic for the pattern “Condition Monitoring Systems for own Machines and Plants” is already pursued in the company’s target market. In this case, a simple takeover of the dominant logic would not offer auspicious potential for differentiation. Thus, breaking the business logic seems to be most promising.

![Figure 13: Comparative profile](image-url)
In dependence of the strategic direction, alternative business model concepts subsequently are developed. For this purpose, the business model patterns are combined in a unique way. The combination of business model patterns underlies a major challenge, however: Since a company lacks knowledge in the target market, it is usually not able to assess the quality of a pattern combination. This is why pattern combinations must always be generated from a market perspective. Prevalent methods like the morphological scheme are consequently not applicable here. To tackle this challenge, we developed a computer-aided tool providing effective support for successfully combining patterns. The functioning of the tool is depicted in figure 14.

In the first step, permitted intervals for the degree of combination and the chain length are set. The degree of combination stems from the pattern combination matrix, which represents the dominant business logic (figure 10). The setting depends upon the strategic direction derived before. To break the dominant business logic it is appropriate that the interval includes low values. Intending to follow the dominant logic means high values should be included. The chain length determines the number of patterns a valid chain consists of. Short chains lead to simple conceptual business models providing scope for creative specification. Longer chains result in a comprehensive conceptual business model simplifying the final specification. In the second step, all pattern combinations fulfilling the constraints are formed according to the mathematical rules of combinatorics. They are sorted by their average degree of combination, e.g. combinations occurring more often in the analyzed markets are displayed first. In the third step, promising combinations are selected. For this purpose, each pattern can either be included in or excluded from the conceptual business model. This procedure allows a company to actively design its business model while simultaneously orientating at the analyzed markets. Using the elaborate tool, we developed 10 promising conceptual business models. Figure 15 exemplarily shows the business model concept no. 3 „Production of remote monitoring with a continuous monitoring as a service“.
The business model concepts are valid possibilities to place the business idea successfully in the target market. Up to now, they only consist of business model patterns of the supply, the customer and the value creation model, however. The financial model has not been considered so far since the costs result from the chosen business model patterns of the other partial models. To complete the business model concepts, the financial model must be added to each alternative (Köster, 2014). Doing so, the individual cost positions that result from the selected business model patterns are listed (figure 15).

**Business Model Concept (no. 3):**

"Production of remote-controlled compressors with continuous monitoring as a service"

![Figure 15: Business Model Concept (no. 3)](image)

**Business model specification**

The business model concepts represent a first draft of the business models. They are formulated in an abstract way and they are not adapted to the specific business of the considered company. In order to obtain entire business models, the conceptual business models need to be specified against the background of the considered company.

For the specification of the business model concepts, the configurations options included in the business model patterns are assigned to the business model elements of the business model framework (figure 2). Thereafter, the abstract configuration options of each business model element are transferred to the specific business of the considered company. Figure 16 shows the specification of business model concept no. 3 "Production of remote monitoring with a continuous monitoring as a service". For instance, the business model concept contains for the business model element "Products and Services" the configuration option "With online measurement systems equipped machines" (9D). This configuration option is generally valid for every manufacturer of machines and plants. For the considered company, which manufactures compressors and blowers, the pattern was specified as "Compressors with online condition monitoring systems". The business model element "Customer Segments" includes the configuration options "Own Machines and Plants" (1C) and "Focus on single application" (3A) on the other hand. In the particular case of the compressor manufacturer the business is limited to "Automated production systems with high follow-up costs in case of breakdowns". The corresponding customers are "Industrial Companies from the Automotive-, Food- and Chemical Industry".
Specified business model concepts require a concise visualization. The visualization of the business models is done with the help of a business model canvas, in which the specific configuration options are entered (Osterwalder and Pigneur, 2010). Figure 17 shows the business model canvas for the specified business model no. 3 „Production of remote monitoring compressors with continuous monitoring as a service."

**Figure 16: Specification of business model concepts**

**Figure 17: Business model canvas**
Business model assessment

The specification finally leads to alternative business models, from which the most promising is to be chosen. The selection of business models is based on a three-dimensional assessment. The three considered dimensions are (1) attractiveness, (2) accessibility and (3) future robustness. The attractiveness describes, how success promising a business model’s implementation is for a company. Accessibility measures, how difficult it is to implement a business model. Future robustness gauges the sensitivity of a business model to environmental changes. To determine the future robustness, the business models should be considered in the light of future developments. For this purpose, methods like the scenario technique or trend analysis are suitable (Köster, 2014). The final result of the methodology is a selected business model, which is most auspicious from the company’s perspective.

SUMMARY AND CONCLUSION

Far-reaching technological developments like Industry 4.0 or Additive Manufacturing have major impact on companies’ future business and value creation structures. Against the background of these developments, companies find themselves confronted with threads, but also perceive attractive opportunities for new businesses. In order to translate business opportunities into business success, viable business models are required.

In the paper at hand we introduced a pattern-based methodology for designing business models. The methodology enables a systematic examination of business potentials based on disruptive technologies. In the course of our research, we made the following findings: (1) Business model patterns are a valuable approach to describe and understand business logics of new, unknown markets. (2) Commercial exploitation of disruptive technologies establishes new business logics and therefore new business model patterns. These patterns are applicable across industries. For instance, business model patterns for condition monitoring can be operationalized in mechanical engineering. (3) New business models for disruptive technologies are often based upon an unconventional recombination of proven solution elements. Thus, an analysis of successful technology players provides valuable insights. They serve as a valid data basis for the identification of new business model patterns.

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