A Platform for Data-Driven Self-Consulting to enable Business Transformation and Technology Innovation

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Abstract. Digital transformation has long since become an important topic not only for large companies but also for SMEs. However, it is becoming increasingly difficult to keep track of new technologies, assess their benefits for the company and its business model. Frequently, companies hope for cost reductions and time savings. So why not learn from projects that have already successfully introduced and applied new technologies and come into contact with the companies that carried out that project. The idea is to offer electronic consulting services by means of an information platform at low cost, flexibility and transparency. For this purpose a platform to support companies in their digitalization process is being developed that offers them multiple entry points for business transformation and / or technology innovation, to explore the potentials of new concepts and to find partners to transform their business.

Keywords: business model innovation, e-consulting, value-creation networks

1 Introduction

1.1 Motivation

Companies are currently confronted with the digital transformation [1, 2]. Due to the advent of new technologies, companies are under pressure to make profitable use of them or to promote innovations themselves [3–5]. Unlike the traditional business world which is characterized by stability and lower levels of competition, the arising world of digital business is complex, dynamic and involves higher levels of uncertainty [6]. In order to overcome the challenges of digitalization, business consulting can provide assistance. Consulting addresses various aspects such as strategy consulting, organizational consulting, technology or IT consulting. Corresponding projects usually consist of several, technologically different and successive phases, which also offer different levels of support, for example planning, concept development, implementation or evaluation. Apart from that, consultants are constantly confronted with different industries and technologies [7, 8].

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This development affects company's business models (BM), which represent the strategy and value creation applied throughout a company [9]. This also explains their relevance for process- or product-specific consulting [10]. In general and especially for BM, there are two innovation directions: market/technology pull and technology push. While technology pull describes the inadequate satisfaction of customer needs, which results in demands for problem-solving, Technology push is initiated by internal or external research aiming at a commercial use of know-how [11].

Especially, small- and medium-sized enterprises (SMEs) are struggling with business transformation and technology innovation, because they are often unaware of the chances and risks and lack the financial, technological and strategic resources to carry out this transformation. Therefore, this paper specifically addresses this customer group.

1.2 Problem Description

As the digitalization makes BM innovation more and more complex, companies are facing the challenge of needing many different competencies. This means that no single person in a company or a single consultant can consistently solve the problem [12]. For the consultant, it remains unclear which competencies are needed and thus who has to be involved, while the customer cannot estimate how technologies influence BM aspects and vice versa. Furthermore, it is not easy for companies to find technology and strategy partners or to recognize the advantages of value-creation networks.

1.3 Goal

The goal of this paper is to present a novel design approach for tool-assisted competency and partner search to solve problems of BM innovation. The concept of the electronic provision of consulting services by means of an information platform offers the possibility of providing consulting services at low cost, flexibility and transparency. We also aim to match Industry 4.0 technologies and BM components to derive recommendations.

1.4 Methodology

To develop the online consulting platform, we are following the design science approach [13]. In a first step, the state of the art in BM innovation supports in general and specific tool support was analyzed and research gaps were derived.

In order to comply with the Research Rigor and the Design as a Search Process guidelines, the Scrum methodology is used during the iterative development of the prototype. For the BM aspects in the platform, the building blocks of the BM Canvas according to Osterwalder et al. [9, 14] are used. To find Industry 4.0 technologies and their influences and connections on BM aspects we used the platform Industry 4.0 of the German Federal Ministry of Economics and Energy [15]. Since the development of the platform is still ongoing, a final evaluation has not yet been carried out.

The remainder of this paper is structured as follows. We shortly review research on BM innovation support and research gaps in section 2. In section 3 usage scenarios that demonstrate the benefits of an online consulting platform are described. The concept and design of the platform are then explained in section 4 before a proof-of-concept itself is presented in section 5. Section 6 concludes the paper and identifies further research and development needs.

2 Related Work

2.1 Business Model Innovation

Although the term "business model" was already mentioned in contributions around 1957, the concept of BM can be seen as a rather young field of research, which has emerged during the internet boom in the late 1990 [16–19]. Therefore, research and studies on BM innovation have mostly been published since 2000. Wirtz et al. give an overview of existing BM innovation approaches within the literature. These often have a process-related structure [20]. These approaches describe in a general way which phases should be covered at BM innovation. As a basis for optimization, Osterwalder's BM Canvas [9] and the St. Gallener BM Patterns [2] are widely used.

2.2 Existing Tools to Support Business Model Innovation

The first attempts to provide consulting services via an internet-based consulting platform date back to 1996 [7]. Current efforts in the field of eConsulting are shown in prototypes like the ARIS eConsulting Store[1] or the Digital Consulting Platform[2]. These existing tools do not deal specifically with BM innovation through technology and have no value-creation network aspect. The available tools in that field are limited to facilitating the visualization of a business model and provide not more than rudimentary support for calculations (e.g., e3-value editor[3], strategyzer app[4]). An exception is the Business Model Wizard, which is intended to comprise functionality for integrating market data to evaluate a business model and deducing process models [21, 22].

2.3 Research Gaps

In the existing literature there are no comprehensive or detailed classifications of Industrie 4.0 technologies. There are only some publications which identify fields of technologies [23, 24]. The picture is similar for business model aspects. Although models such as the BM Canvas are a basis for the creation and optimization of BM, they are very abstract and do not go into the depths of individual elements. In addition, the effects of changing a BM aspect on other building blocks are insufficiently

[1] https://www.aws-institut.de/digitale-beratung/econsulting-store
[2] https://www.aws-institut.de/digitale-beratung/digital-consulting-platform
[3] https://www.e3value.com
[4] https://strategyzer.com/app

investigated. The more data can be analyzed, the better the relationships between technologies and BM elements can be estimated. This way, recommendations regarding technologies and possible implementation partners could be derived. This demonstrates the need for a digital solution in the area of BM innovation.

3 Usage Scenarios

The usage scenarios describe how customers can use the self-consultancy services of the platform and how they profit from their outcome. Each usage scenario will be described by naming the main actors, the storyline and the success criteria.

- **Business-Pull / Technology Push:** For inventive companies, it is often not self-evident, which markets can be penetrated and addressed by their technology. Often inventions have been used in a different context as initially intended. The main actor is the company that wants to transform its business and explore new channels and markets for their products or services. The scenario is successful, when appropriate areas of improvement are being identified within the business model.
- **Business Push / Technology Pull:** Business transformation is usually goal-driven wrt certain business KPIs. Hence, appropriate means have to be found and applied to bring about this change. Technology can be a game-changing catalyst to boost operational performance.

For each of the outcomes, the company may not have the required know-how or operational capacity to implement the changes. Hence, both strategy and technology consulting firms could help them to achieve this goal.

4 Platform Design

According to the usage scenarios, the self-consulting platform consists of a usage layer, that enables users to find consultancy services from multiple entry points and to manage their profile and capabilities. The analytic layer provides intelligent functionalities to explore the knowledge space from multiple angles to support many forms of improvement such as business transformation and technology innovation.

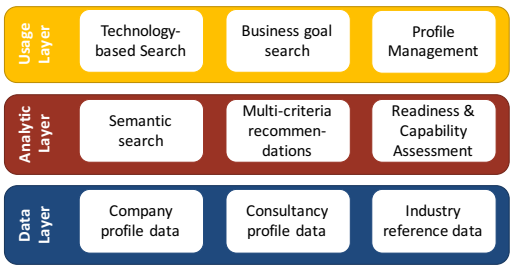

Figure 1. Self-Consultancy Platform Concept

Besides the abovementioned usage scenarios, the company can define its private profile including information about their business model and their technology capabilities. In the analytics layer, semantic search is being used to find business model aspects, technologies, consultancy companies and knowledge tags according to their fit to the search query, in order to discover implicit connections among these concepts that the user is unaware of. The multi-criteria recommendations leverage this knowledge space, industry reference data and usage statistics, in order to determine the best matches for the respective search query. An example is given in the next section.

5 Prototype Design

In the following a sketch of the system is provided to exemplify its functionality:

Figure 2. Technology search result "RFID"

The screenshot shows the result of a technology search (Usage scenario: "Business pull / Technology push"), in which a customer wants to explore the possibilities of the specific technology RFID. A basic description of the technology is shown, a long with a list of partners that could help the organization with the adoption of the technology. Moreover, a sketch of the Business Model Canvas is being provided, in order to explain how the technology adoption of RFID will affect certain areas of the business model. In that case, it clearly depicts, that improvements of the cost structure could be realized via RFID. Moreover, an assessment of the technology readiness level is given. Overall, it helps the customer to get acquainted with a formerly unknown technology, see its potential business impact and get contacts with consultancy companies that could help him/her to transform his/her business.

For a business-driven search the result would look similar, it would just originate from an improvement area from the building blocks of the business model canvas and would show technology alternatives to implement improvements in that area. The reference data are currently being extracted in a PhD project that analyzes the business model impacts of technologies. As an example the projects listed at Plattform Industrie 4.0 are used as a starting point to investigate these relationships.

6 Conclusion

6.1 Summary

BM innovation is an essential component of corporate success. Although there is a need for BM innovation tools, there is relatively little research in this area. Existing tools of consulting companies aim at digitalizing consulting services, but for now only for simple, well-structured problems. The role of the consultant is still seen as pivotal. In our platform approach, companies can inform themselves and receive suggestions regarding the technologies to be used as well as possible effects on their business model. If they want to implement their projects, they can find and contact project partners on the platform. By describing the individual implementation projects, other companies then receive best practice examples as suggestions for their business ideas.

6.2 Outlook

Some of the platform's contents and functions will be extended. More technologies and relationships with the BM than just from the Industry 4.0 Platform need to be considered. A machine learning approach using the later project data on the platform can prove to be effective. In addition, a comprehensive analysis functionality for the created BM must be available, e. g. in the areas of financial ratios or marketing strategies. Another point is the further development of the collaboration possibilities on the platform, which could, in addition to the pure project partner search, include elements such as a common workspace for BM or document exchange. These limitations suggest avenues for further research. An interesting question for the future is also how the approach can be transferred to other domains.

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