Self-Service Consulting: Conceiving customer-operated digital IT consulting services

Full Paper

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Abstract

One of the major potentials of digitization is scalability. The most prominent examples like Amazon, Dropbox or Uber show that this is one of the key success requirements. In human-centric industries like IT consulting, this is limiting their usage of digitization and therefore their growth. In this paper, we conceive an approach how to realize scalable IT consulting by replacing the consultant by the customer. This is done by assisting and guiding the customer using a digital service. We call this service “self-service consulting”. Finally, we also describe a prototypical implementation that acts as our proof-of-concept.

Keywords

Self-service consulting, digitized consulting, customer-operated services, scalable IT Consulting.

Introduction

By now, the consulting industry is a well-established part of the global economy. Due to the fact that global knowledge growths exponentially, there is a need for companies closing knowledge gaps. Acting as providers for external knowledge, consulting firms support companies by solving problems in various domains. Usually, customers expect an immediate solution delivery, since time for learning is not given. Therefore, consulting has to be a fast-changing, fast-learning and an essentially flexible business (Bologa & Lupu 2014). Consequently, consultancies must keep and retain highly-qualified human resources with specialist knowledge and short learning curves. This results in high wage costs. Furthermore, the consulting business is not local but global. That is why travel costs are another main cost driver. Consultants have to be highly available. They need to be in the right place at the right time. These high expectations result in the well-known fact that traditional people-intensive consulting is a cost intensive business.

In the past, clients relied primarily on brands, reputation and social skills in their consulting procurement process (Christensen et al. 2013). At the end of tendering one consultancy got hired to solve the problem. Today, there is an observable trend to split problems in tasks and set in charge different solution providers. The reason for this customer behavior is to avoid complexity. Thereby, they are more often able to compare the offerings, monitor price/impact ratios and strengthen their negotiation position (Christensen et al. 2013). Since the main reason for consulting procurement is performance pressure (Iyer 2006), it is evident that customers pass on this pressure to the consultancies.

A consequence of this trend can be seen in IT consulting. In contrast to the increasing IT-Consulting market (+1.9 % according to Blackmore et al. 2015), the budget per customer is decreasing over the last five years (Kappelman et al. 2014). With nearly five percent, its budgets are a relevant part of business costs and –
from a customer point of view - worth optimizing. For IT consulting budget as a part of IT budget this applies equally, which explains the decrease. High costs at the one side and low budgets on the other side – the facts show that there is a big need for more efficiency and effectiveness in the consulting domain. Therefore, the consulting industry needs to re-invent itself (Srinivasan 2014).

One reinvention strategy, which has enforced massive changes in economy and society for the last 15 years, is digitization (Peitz & Waldfogel 2012). Looking at all the newly risen enterprises of the last decades such as Amazon, Google or Apple, they all are pioneers of digitization. Thereby, digitization is a paradigm for companies, putting the focus on digital technologies and IT driven business models. It is an ongoing transformation process towards more and more computer- and internet-based services – always linked to process improvements and optimization. As consultants are deeply familiar with digitization, since it is probably the approach which consultants generally advice their clients to use, it could as well optimize the processes of consulting companies and enable development of new services and business models (Christensen et al. 2013). This leads to the question how consulting could be factually enhanced by digitization and how the ongoing transformation could be shaped.

In this paper, we propose a novel approach for digitizing traditional IT consulting by transferring tasks from the consultant to the customer. This is a common approach in many success cases of digital services, but not yet applied to IT consulting. We start our analysis by illustrating how digitized consulting services already emerge. Afterwards, we discuss how customer-operated consulting can improve traditional consulting assessments and how this approach contributes to create scalability in IT consulting. Subsequently, we propose a service design for an online self-service consulting (SSC) tool. Thereby, our concept combines online questionnaires and automated report generation with question-group administration and the usage of viral effects. As a proof of concept we present the successfully implemented prototype.

Our research follows a design science research methodology (Hevner et al. 2004). According to this research approach, we need to ensure rigor and relevance in our research design: The relevance is shown in our first sections, where we grant insights in the new research field of digital consulting services. Here, we illustrate the existing knowledge in digitized consulting. Following the methodology, we have designed the concept of SSC, which is the novel artifact. Furthermore, we guaranteed the implementability by a software prototype that serves as a proof of concept and also acts as an IT artifact by itself. Finally, the dissemination of our artifacts is – among others – performed through the publication of this paper.

“Digitized Consulting”

IT consulting is profiting to a large extend from digitization. Consultancies have initiated the projects, fostered and propagated them, consultants were steering and managing them. But for now, they almost did not adopt digitization to their own industry, their own level of digitization is still low. They further on depend primarily on consultants, their knowledge, abilities and network (Greff and Werth 2015). Of course, consultants are using digital devices like smartphones and tablets, relying on digital services like presentation software, but these technologies do not directly affect the service itself, namely the way a consulting is processed. On the other hand, as discussed previously, there is a rising need for a higher efficiency and effectiveness. As a consequence, one might ask if information and communication technology (ICT) may help to transform and develop the consulting service itself as well. Therefore, it needs to be clarified how these new consulting services could emerge. Is it a piece-wise evolution of concepts or a disruptive redesign of consulting products? While evolutionary developments are typically easy to realize, disruptive innovations can have a market-changing impact.

One already adopted approach is video-conferencing software. It offers location independent availability. Numerous successful applications are known, as the example of (Novak 2015) shows. In particular, remote-consulting allows to reduce travel costs and time. Additionally, it is possible to offer consulting on a smaller scale, especially for those situations where services were originally uneconomical due to travel expenses. Other authors also analyzed opportunities of virtual – and especially remote – consulting, exploring further potential benefits. Exemplary opportunities are a reduction of consulting prices, higher reactivity and efficiency of consulting services, as well as an increased flexibility in choosing consultants and sharing workload (Nissen & Seifert 2015). Early practical applications of a digital transformation in the consulting economy can be found, for example McKinsey Solutions as one of the most disruptive innovations in
consulting (Christensen et al. 2013). *McKinsey Solutions* is a collection of Software as a Service solutions, focusing on a widely applicable data analysis and presentation. Another example is clarity.fm, a website that provides remote-consultants on an hourly-rate base in areas as SEO or media consulting.

Although desirable in the context of a disruptive innovation, a breakthrough realization of digital IT consulting is still missing, since none of the known cases supports the complete consultancy process. One of the main obstacles of digitization is the human-centered way of providing consultancy. On the one hand, it is obviously one of the key distinguishing factors. However, on the other hand, it is limiting the potential of digitization. In our approach, we are not going to contradict with this human-centered characteristics. However, we will question, if this human must be the consultant or whether— as we propose – it can be the customer itself performing the consultancy, incorporating a self-service understanding of a consulting service. The very welcome side effect of this is the introduction of scalability into this handicraft business, making growth independent from human consulting resources.

**Conceiving Self-Serviced Consulting**

Consulting is a manual industry. It is considered highly creative and challenging and therefore only very skilled experts are suitable to work in that industry and to advice the customer (Biech 2011). We already discussed the effect of digitization on that domain and what we expect for the future. Looking from a business perspective, one of the main flaws of consulting is the lack of scalability. One consultant can perform one activity within one time period. Thus, the turnover of a consulting company (neglecting the issue of utilized capacity) is directly linked to the headcount (Bromnemayer et al. 2014). Or, in other terms, the growth of a company is limited by the personnel available. This is also why consulting companies act in the forefront of the war of talents (Michaels et al. 2001; Bologa & Lupu 2014).

Looking at successful examples of digitization over the last years, it becomes obvious that those companies have grown exponentially and therefore overcame the scalability limitations. Dropbox has increased its revenues and users on the average by 47% each year (Statista 2016). Uber has even grown with a ratio of 390% in regard to booking numbers (Solomon 2016). Another excellent example is Amazon Web Services (AWS), the IT infrastructure division of Amazon. It is an astonishing illustration of scalability. Most of the rapidly growing companies (e.g. Dropbox, Uber) are actually based on the AWS infrastructure. Here, the scalability is achieved by different means. First, by technical virtualization: Physical hardware resources are transferred into abstract data objects and functions. For our further exploration however, we focus on another principle of AWS: self-services. In contrast to normal data centers, it is not their administrator that is setting up, configuring and maintaining the computer’s operating system, but it is the customer itself. AWS provides functionality and interfaces to enable the customer to act as an administrator, while ensuring the security and integrity of what the customer is doing. The effect is that AWS can limit their own personnel because the customers act as a kind of “virtual administrators”. Thus, each customer increases this virtual headcount and enables growth and scalability. The same principle of self-services applies also to other industries and shows the same effect (e.g. online banks, online travel agencies or online video stores).

The advantages of the self-service concept is not limited to the providing company only: Customers are motivated to use them for numerous reasons. Digitized self-services are available 24/7, enabling access to services not only in typical business hours, but whenever needed. Also, customers profit from lower prices, since self-services can be offered at a lower price than traditional services, with marginal costs decreasing (Iqbal and Nieves 2007). Using self-services may also lower time consumption. Potential traction of human interaction, leading to unsatisfying outcomes and/or high time consumption, is reduced or fully repealed, assuming the self-service provides good usability. Furthermore, potentially necessary journeys from customer to service provider or service provider to customer become obsolete.

As self-services seem to be a powerful instrument in digitization (Taherdoost et al. 2013), we now narrow our focus on consulting activities and conceive a way how this instrument can be applied into this domain. There have been early approaches that combine self-service and consulting, such as Template Driven Consulting (TDC) and Profit Impact of Market Strategy (PIMS). TDC is based on the consultant developing a template which provides an abstract approach to solve a given problem. This template is then used by the customer to conduct a project. Through this approach up to 75% in expenses can be saved and one consultant can supervise 35 to 40 project employees, whereas in the context of traditional consulting, one consultant can supervise around 10 employees (Seebacher 2013). This rise in supervised project employees...
per consultant is impressive, yet we assume that this number can be risen by digitizing consulting services and by automating certain tasks of the consulting process. PIMS is a long-term research study which focused on the performance of strategic business units. One of the study’s products is the PIMS database containing business strategies. The data collected in the long-term study can be used to assist managers in their process of developing and testing new business strategies, possibly leading to a partial substitution of consulting services. However, PIMS is limited since its online application only offers analyses which focus on predicting expected market share, profitability, market attractiveness and marketing expense budget (PIMS 2005). A more dynamic service design offering a framework to create services that are focused on answering a wider range of leading questions, would be able to provide value to a larger and more diverse target group. “Consulting is the process by which an individual or firm assists a client to achieve a stated outcome.” (Biech 2011). In this respect, consulting can be seen as a process that is conducted and run by a consultant. It is always set up in a project setting, meaning that consulting activities have a defined start and end. Additionally, consulting is always performed to achieve a specific objective. Such objectives can be diverse, from the introduction of a new enterprise system till the reorganization of the IT department.

Some of those consultancy processes have the purpose of analyzing and diagnosing an organization, unit or an object of discourse in general. The target is to assess the state or certain attributes of the entity. The usual technique to do so in an organizational environment is to interview the stakeholders and to synthesize the result of those. Thus, the process of this assessment-like consulting is decomposed into seven steps. These steps were derived from two case studies and observations in the area of project management and business process consulting and were reviewed and confirmed by the executing consultants in an expert workshop:

1. **aim (define the objectives):** As described above, consulting is performed to achieve a defined objective. Consequently, the initial step for performing a consulting activity is to agree on and align this target.
2. **identify (the right stakeholders):** In order to run the interviews it must be clear, who to interview. The identification of the right people can be an intensive task, especially if organizational structures and roles are not fully clear. Ideally, all relevant people but not more should be included.
3. **prepare (the right questions):** When performing interviews, preparation is key. It has to be determined which stakeholder is able, qualified (and willing) to answer which questions. Because of possible side effects, it can be also important to specify the sequence of the interviews.
4. **perform (the interviews):** Here, the consultants are running the interviews. It obviously comprises the conduction of the interview itself, but also the documentation task.
5. **consolidate (the results):** After having performed the interview, the results need to be analyzed individually, checked for consistency, linked and correlated. This is one of the core tasks, which requires adequate knowledge of the consultant.
6. **report (the findings):** Closing a consulting process means reporting the results. In this case, the consultant presents and delivers a final report where s/he states the assessed findings and the conclusions, especially in respect to the predefined target.
7. **and potentially iterate:** In some cases, it happens that finding answers is the start for new questions. This also applies to consulting: The successful assessment of an area of interest (e.g. the performance of an organizational unit) may disclose some flaws where in a second step the customer will see the need for an in-depth analysis of causes and consequences.

In this process, the consultant acts in three ways: First, s/he coordinates the process. Second, s/he retrieves the relevant information from the stakeholders. And finally, s/he has the knowledge to create a meaningful result out of the individual information. The two first mentioned abilities are not directly linked to a special knowledge. It is well transferable if the principles are understood. The last ability is mainly the key of such an assessment-like consulting. However, the service as such can be instance several times.

In our approach to digitize such an assessment-like consulting, we aim to a computer-executed consulting (CEC) service. CEC describes consulting services that are entirely run fully managed by a software system, without an involvement of a consultant (Werth et al. 2016). The authors assume that quantitative data collected by such a software system grants valuable insights. Thus, the consultant is replaced by the digital service. However, this only applies to the execution. In respect to designing and configuring such a service, it is still the consultant with his domain knowledge that is in the lead. S/he builds such a service that is now driven by automation. Consequently, the process of customer-serviced assessment services is a digital transformation of the assessment-like consulting shown above. Furthermore, it is a valid example of CEC services. Deriving the SSC process from assessment-like consulting is done by separating customer’s and
consultant’s task and adjusting tasks according to the new self-service environment. The operational work and contribution of the consultant is, except of creating the questionnaire and defining report parameters, completely replaced by the digital service. More precise, it is the software in collaboration with the customer, who is now in charge of the work: Now the customer, i.e. the different persons working in the customer company, are managing and performing all those tasks. This obviously requires a strong support and guidance that is provided by the digital self-service.

**Figure 1: Compensation of consultant-serviced and customer-serviced process**

In particular, the process now comprises the following steps (figure 1):

1. **select (the right self-service):** The concept of CEC transforms consulting into a packageable product. Therefore, for each individual purpose, special products will evolve. Creating a market of SSC products, it will become necessary for the customer to identify and select the right product. In contrast to the traditional approach, it is the customer that not only purchases, but also configures the consulting.

2. **identify (the right stakeholders):** In principle, the outcome of this step is the same as in the conventional case. However, it is now the customer itself that identifies the right people within its organization and states which roles they have in the context of the assessment. For this purpose, the service provides the customers with guides, recommendations and best practices.

3. **run queries (automatically prepared):** The approach to digitize the interviews is quite straightforward: Instead of a consultant asking the questions, it is the internet service, querying the person. However, there is no preparation time. The automated query service is aware of the roles and has been initially assigned with the right question set for the specific roles to be queried.

4. **report (no consolidation):** This step can also be fully automated: The consolidation and report generation is performed based on algorithms that have been set up while designing the SSC. Using this scheme, the consolidation and report generation (including charting, etc.) is done in real-time and available instantly after completing all the interviews. In opposition to traditionally created reports the generated report is not as individualized but fully fact-based and logically structured.

Even if at first sight, our concept removes the consultant from the consultancy provision, this only applies to the provision itself. The knowledge of the consultant is nonetheless the key part within our concept. It is the domain expert and consultant who designs and sets up the SSC service. His knowledge defines the structure and the process of the service, e.g. the roles, the questions and the consolidation logic. In contrast to the handicraft case, now s/he specifies this knowledge in a machine-readable, formal specification. This enables him to exploit his knowledge in a scalable way.

**Service Design**

We have proposed a concept for transferring service processing from the consultant to the customer. A pivotal point in that concept is the computer support for the customer and the automated execution of tasks.
Therefore, the question of how this is implemented in IT is crucial. For this reason, we propose in this section a service design as a design science artifact of our approach.

From a functional point of view, a SSC service can be decomposed into the following six functional building blocks: Service Definition, Question Creation & Editing, Report Parameter Definition, Group Management, Questionnaire Completion and Report Display. For the service itself, there are two main user roles involved that are interacting with these components: the consultant and the customer. We describe the functional components grouped by the interaction with those roles:

**Components interacting with consultant (“build-time”)**

1. **Service Definition**: The consultant needs to define the service. This comprises the target and scope as well as the structure of the assessment to be self-operated. Furthermore, pricing is an obvious issue in the definition of an added-value service.

2. **Question Creation & Editing**: A consultant has to be able to define an audit according to his requirements. S/he has to be able to select between different question types, define various answers and set a value representing a particular answer in the overall evaluation of the audit to generate a report. Furthermore s/he has to be able to show or hide questions, depending on previously answered questions (conditional logic). If the consultant edits an already published audit, it is important that customers who purchased a former or the original version of the questionnaire will not be influenced by the edit. So if a member of the group that is invited to fill out the audit already started to fill out the audit, the group won’t receive the updated version.

3. **Report Parameter Definition**: The report generation represents a core functionality in the service. For a customer it is the most important part. So the consultant has to be able to set parameters based on which the report is generated. One aspect is the ability to set values representing answers in questions. In this way it is possible to compare groups by comparing the points each group accumulated. By grouping questions, it is possible to evaluate a group’s strength and flaws. By watching for substantial deviations in selected answers, it is possible to detect conflict potential in groups. A team’s project manager is likely to perceive situations and states different than the team members. To identify in which areas there is a deviation in conceiving certain aspects is the first step in changing these states.

![Activity flow of creating a new questionnaire, including setting report parameters, while showing the involved building block at any given step](image)

In order to set up a service, the designing consultant is using the respective functionalities described above. The resulting procedure how to configure such a self-service is shown in figure 2.

**Components interacting with customer (“run-time”)**

4. **Group Management**: It is likely that customers do not complete the audit on their own but with a group of flexible size. There are two ways to create a group, whereas group invitations are sent via e-mail:
   - **Centralized Approach**: The person who purchased the audit invites all stakeholders. It might be desired that only a single person has control of the group management. This approach offers the most possible control over a group and its members.
   - **Decentralized Approach**: The centralized approach leads to drawbacks if not all stakeholders can be identified by one single person. In a large company it is not uncommon that skills and knowledge
of staff is not properly utilized. With a growing number of staff it becomes harder to keep track of every person’s expertise. A person who works on a day to day basis might know better about his/her colleagues expertise than one single party. This crowd knowledge can be used in an effective manner to ensure an audit’s maximum potential, which leads to a decentralized approach. In contrast to the hierarchical approach described above, by choosing this option it is not only possible that the person who purchased the audit is inviting stakeholders, but it is also possible that one invited person invites another person. In this way a peer-to-peer, or, decentralized approach, is implemented and it is much more likely that, if it proves to be difficult to identify all stakeholders by one person, human resources are utilized in the best possible way.

An audit can be selected as being done anonymously or non-anonymously. Invited parties are informed about its anonymous or non-anonymous nature in their invitation e-mail. This e-mail is, except of an optional personal message composed by the inviting person, auto-generated, so it is impossible to intentionally or unintentionally misinform about the audits nature. The report is only available if every invited party completed the audit. The first reason for this restriction is that the report is not representative until the whole group finished the audit. The second reason is that if the audit is anonymous, the person organising an audit is still able to see who already completed the audit and who did not. The reason behind this is that, if an invited person is not completing the audit after a period of time, the organising person should be able to remove this party from being invited. Now the person organising the audit could use this information to display the report after only one party completed the audit. The report would only be based on one known person, which would make the audit non-anonymously, at least until more members of the invited group would finish the audit. This behaviour also creates the necessity to restrict the ability to remove a party from the participating group if the group is smaller than two parties.

**Figure 3: Activity flow of purchasing new questionnaire to viewing the generated report, while showing the involved building blocks for core activities**

5. **Questionnaire Completion:** It is possible that an audit is quite long. A person filling it out might have the desire to stop in between and resume at another point. This makes it necessary that it is possible to not only be able to submit the audit once it is completely filled out, but also to save and resume at another point. Giving the user the ability to click two buttons, one to submit the completed questionnaire, which does not submit until all necessary questions are answered and notifies the user which questions are still unanswered. The second button does not check at all, it only saves the already entered answers, ready to be loaded once the user decides to resume with the questionnaire.

6. **Report Display:** After every invited party completed the questionnaire, the report can be displayed. It is based on the supplied answers and the parameters defined by the consultant during Report Generation. Furthermore, the report includes upselling features to grant customers the possibility to get direct assistance in implementing the recommendations or obtain a deeper analysis.

The final service runs by using the functionalities of those components. This follows a predefined procedure. Figure 3 shows this for the run-time of a self-service execution.
Proof-of-Concept

In order to validate our conceptual artifacts, we implemented the concepts described in this paper into a software prototype, realizing the functionalities and flows specified above. We present this implementation as a proof-of-concept and depict the design decisions made within the programming process:

Analysis of related systems

Implementing a (web) application which allows users to create surveys and questionnaires is not a new concept. Systems like LimeSurvey, SurveyMonkey and FormStack are providing functionalities which allow users to create surveys and other kind of questionnaires. Questions can be added to general topics, which leads to more diagnostically conclusive statistics. Answers can be given a value which represents its significance. Created questionnaires can be shared among potential participants by providing URLs which lead to a particular questionnaire. Once users completed the questionnaire, the person who created the questionnaire is able to view statistics based on the answered questions.

There is a wide variety of options available already, yet none of the options fitted the requirements of our SSC concept. While most tools allow users to display statistics about the survey, the analysis is always meant for the person who created the survey and usually not for the person who filled out the survey or questionnaire. Also, statistics and analysis are usually refined by applying filters after completing the survey, whereas the SSC concept makes it necessary to specify the fields which the report will display before publishing the questionnaire. Audits are usually completed not by a single person but by a group consisting of varying numbers of persons. Providing proper ways to manage groups and invite participants is crucial. Reports have to be made automatically available once the whole group finished the audit. These stated reasons are showing that using already existing applications is not an option and implementing our own application is a necessity.

Implementation

The application is built upon a MEAN (MongoDB, Express.js, AngularJS, Node.js) stack with adaptations:

- We decided to build the frontend using Google's Angular2, profiting from features like native TypeScript and ECMAScript 2015 support. Audits and reports are built dynamically on the client side by using small templates as building blocks. This functionality represents one of the application's core functionalities. This leads to shifting a significant part of computational cost to the client, which reduces the server load and leads to better application performances.

- The backend is built on Node.js and Express.js, a popular web development framework for Node.js. Together they represent the web server. Node.js is a good fit for an application which needs to handle a high volume of input/output (I/O) requests and without the need for high computing capabilities. Comparing the speed of I/O requests performed by PHP/Apache, nginx and Node.js (Chaniotis et al. 2015), and measuring the performance of PHP, Python and Node.js (Lei et al. 2014), Node.js' strength in handling a high volume of I/O requests is shown. Since in our case the backend is mainly used for I/O requests and not for heavy computing tasks, Node.js fits the requirements very well.

- Since questionnaires represent highly relational data without the need of flexible schema the decision to move away from MongoDB to MySQL was made. MySQL offers powerful ways to scale the database, as Data Sharding, memcached and indexing. These techniques and technologies are crucial in avoiding that the database becomes a performance bottleneck.

In total, our prototype handles the process of conducting a SSC, which includes four steps as previously discussed. The following activity flow illustrates how these steps are implemented in the application (c.f. also figure 4 and figure 5):

1. select (the right self-service): A customer can, depending on identified requirements, select a type of assessment s/he plans to perform. After selecting the type, a list with created assessments fitting his/her needs is displayed. Questionnaires can be rated by other customers, based on support provided by the consultant who created the questionnaire, the in-depth level of the questionnaire and quality of report. After selecting the assessment which appears to provide the best results and most valuable insight, the
customer can now purchase the audit. If s/he already created an account s/he is asked to log in to complete the transaction, or to create a new account and complete the transaction.

2. **identify (the right stakeholders):** S/he now has the choice between choosing the decentralized or centralized approach to manage participants, depending on which approach is the most promising one.

3. **run queries (automatically prepared):** Invited participants will receive an e-mail including a link through which the assessment can be accessed and resumed if a participant chooses to interrupt the questionnaire. S/he can also choose if s/he is participating in the questionnaire.

4. **report (no consolidation):** After the whole group completed the assessment, an e-mail will be send automatically to all participants, informing them that the report is now available and can be viewed by clicking on the provided link. The report is complemented by a “want more” feature which serves as an upselling potential for the consulting company.

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**Conclusions**

In this paper we describe a conceptual approach for SSC. Compared to earlier approaches, our concept offers several significant improvements through digitization, thus proving its novelty. By providing a framework to create digital assessment-based consulting services it is possible to create a wide range of services, as opposed to PIMS, and their digital nature enables true scalability, unlike TDC. This concept reveals multiple opportunities for both consultancies and customers. Especially the issue of scalability is a significant opportunity. Additionally, such customer-operated services - which can be sold and used without need of human consultants – enable more efficiency. But there are further reasons to put this service in practice. For consultancies the integration of SSC in the holistic consulting process creates synergy effects with other company units. For example, in combination with sales or marketing processes SSC can be the initiator for follow-up human-based projects. The recommendations of the resulting reports have to be implemented, which could depict a new consulting task as well. There is further potential in combining the service with deeper data analytics or also with offering remote consulting, e.g. with an e-consulting store (Werth et al. 2016). For customers the opportunities emerge by the time- and location-independence of consulting services, by free initial consulting or by the advantage only to pay what they need, because needs could be analyzed and evaluated in advance of procurement. Clients could incorporate digitized assessment-like consulting into their traditional consulting as a cost-effective pre-step to identify issues and areas which can be tackled in further human-based consulting.

Limitations can be seen in the lack of individualization of generated reports, which raises the question if CEC is better fitted to supplement traditional consulting services as opposed to completely substitute them, which could be a subject for future research.

Future work will explore the report validation by artificial intelligence or benchmark-based recommender systems, possibly improving the overall value of offered assessments. As SSC assessments are developed by a consultant without communication with the customer at creation time, the possibility of misunderstandings remains. A solution could be additional on-demand live consulting. Moreover, validating the applicability in different domains is a possible topic, especially to learn and improve the domain independence and proof the practical suitability. Furthermore, pricing models should be developed and evaluated. Various existing models from free of charge to premium services could be considered.
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