Digital Transformation in Business Consulting—Status Quo in Germany

Volker Nissen and Henry Seifert

Abstract Within this contribution, we present the core findings of an empirical study on the virtualization of consulting services, which was conducted with the support of the Association of German Business Consultants at the end of 2015. More than 500 consultants participated in this study. The results document on the one hand, where the industry currently stands in the digital transformation process. On the other hand, we are also looking for answers to the questions of how the further development could look like in this area, what technologies are influencing and how the business models of classical business consulting are affected by the digital transformation.

1 Study Design and Data

In order to assess the status quo of the digital transformation in the German consulting market, consulting firms of all magnitudes and from all fields of business consulting (Strategy-, Organization-, Information Technology (IT)- and Human Resources (HR)-Consulting) were questioned. In the scope of the study described here, new data (primary data) were collected online. An online survey has numerous advantages over other forms of data collection, such as low costs, the elimination of manual data input and the fast availability of the data (Atteslander 2010). However, there are also some disadvantages (Pötschke and Simonson 2001). Due to the anonymity on the Internet, there is an increased risk, that the participant can take part more than once. There is also the risk, that inexperienced Internet users have problems with answering the questionnaire. These aspects were thus minimized as the Association of German Business Consultants (BDU e.V.) sent out specific invitations to their contacts for participation. Furthermore, the

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Table 1 Structure of the online-questionnaire

#	Section	Content
1	Categorization of the participants	Enterprise size, consulting field, client branch and consulting experience
2	Importance of virtualization	General assessment, current and future
3	Use of virtualization	Depending on the level of virtualization and the project phase
4	Progress of virtualization	Progress of digital transformation in each of the questioned companies
5	Barriers to virtualization	Evaluation of barriers and obstacles to virtualization within the consulting business
6	Technologies of virtualization	Evaluation of the importance of each technology for the virtualization of consulting firm services
7	Determinants of virtualization	Evaluation of the determinants of virtualizability in consulting services
8	Applications of virtualization	Open question on the use and application possibilities of virtualization in consulting

Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

comprehensibility of the questionnaire was given particular attention. This will be further discussed below.

The online-survey was carried out using the survey software 'Unipark Questback'. The questionnaire, with 18 questions, was divided into the topics illustrated in Table 1.

The questions were developed according to the principles of simplicity (avoiding complex sentences and technical terms), neutrality (avoiding suggestive formulations) and clearness (avoiding double questions) (Homburg 2015).

Subsequently a pre-test was done and the final completion of the questionnaire followed. The pre-test was carried out with both members of the research project at the University of Technology Ilmenau, Germany, as well as with experts of the BDU. By means of this test phase information on the following aspects could be collected: How comprehensible is the questionnaire, to what extent do the questioned persons have adequate information available, to what extent the answer categories are adequately illustrated and how much time is really necessary to answer the entire questionnaire (Diamantopoulos et al. 1994).

The survey was carried out from the 23rd November to the 18th December 2015. During the following editing and coding of the data, a data cleansing was done. Thus, those questionnaires, which were not completed by the participants were separated. Likewise, very incompletely processed questionnaires were excluded. Altogether 552 questionnaires could be considered for the statistical analysis.

Based on the structure of the German consulting market regarding the market share, businesses with a turnover of less than ten million Euro are somewhat

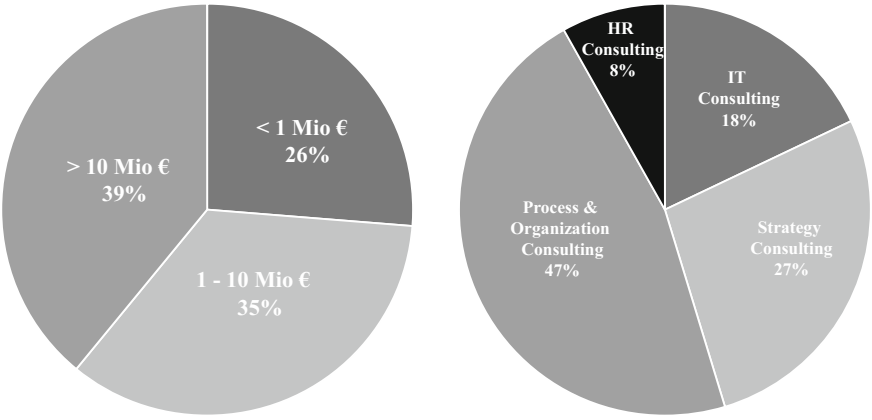

Fig. 1 Composition of the random sample in terms of the yearly turnover of the consulting business (left, n = 520) as well as the consulting field (right, n = 552). Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

over-presented in the random sample (Fig. 1). Overall, the German consulting market is however well represented. Consultants from different consulting fields participated in this survey. Strategy consulting in Germany has a share of 24.8% of the total turnover, according to the Facts & Figures—study of the BDU (BDU 2015). Furthermore, organization- and process consulting has a share of 43.3%, HR-consulting 10.4% and IT-consulting 21.4%.

Even though the turnover was not considered in the random participant sample, it seems that the German consulting market is also adequately represented in this aspect. The sample was rather put together by choosing participants from various consulting fields. It should also be taken into consideration that a distinct assignment of consulting fields is often difficult, as consulting businesses offer services from different consulting fields and combine them with each other.

It was also important to investigate the involvement of both young, as well as very experienced consultants to attain valid assessments of the significance and future of virtualization. Moreover, it turned out that the opinion of consultants with different experience levels could be captured (Fig. 2). Furthermore, the participants were asked to estimate their present experience with virtual consulting services. Half of the questioned participants so far had acquired no experience, or were rather short on experience with virtualization of consulting services. A third of the participants stated that they already have acquired some experience, and almost a fifth of the consultants said that they have much, resp. very much experience in this area. These experience values point to the fact that virtualization is still at an early stage, and in particular experience with complex, virtual consulting services is still scarce.

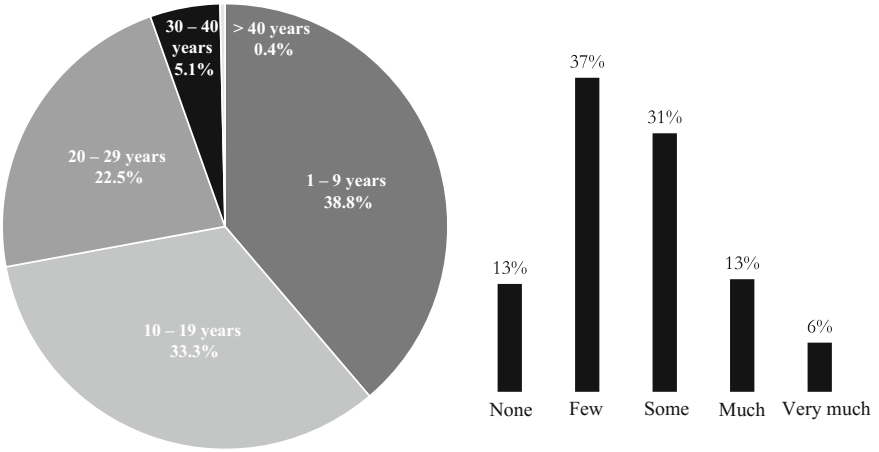

Fig. 2 Composition of the random sample in terms of work experience in consulting (left column: n = 552), as well as the participants' experience with virtual consulting services (right column n = 531). Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

Moreover, later questions in the questionnaire revealed that the participants in our sample tended to overestimate their experience with virtual consulting.

In summary, it can be said that the data of this survey underlies a random sample, which can be looked upon as representative of the German consulting market. The number of participants of over 500 consultants enables us to derive trends and theses, which are well founded for the German consulting market. In the following, selected results of this survey will be described in more detail.

2 Principal Findings

2.1 Basic Attitude to Digital Transformation in Consulting

The classical way of business consulting is a personnel-intensive service. Virtualization involves a paradigm shift and aims at business models, which in specific sections replace human consulting services by technology. Thus, opposition and anxieties concerning virtualization can develop. A majority of the survey participants (Fig. 3) though rate virtualization as a chance to make use of the possibilities and potential of technologies during consulting.

Only one percent of the questioned consultants felt that virtualization was a threat. This distinct minority fears that technology-based consulting services can threaten their own business model and their own market position. The perspective

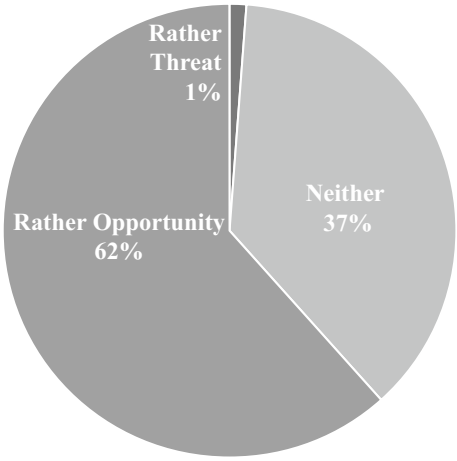

Fig. 3 Basic attitude concerning the virtualization of consulting services (n = 520). Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

to expand existing services in a meaningful way, gives way to the fear of this group, that technology-based consulting services would make classical consulting irrelevant. This group is in danger to become a victim of the "innovator's dilemma" (Christensen 1997).

We want to advise the businesses, which especially see virtualization as a threat, to deal with the wide spectrum of virtual consulting services in a profound, open and unbiased way. This should include a differentiated analysis of their own service portfolio, the competitive context, clients and projects in terms of the possibilities, chances and risks of virtualization. This will then serve as a sound basis for a profound evaluation of the possible applications of the many variants of virtualization.

37% of the participants do not see virtualization as a clear threat nor as a chance. More than a third of the questioned consultants were thus not aware of the fact that virtualization can offer an added benefit when competing against other businesses. The question, how risks, which go along with virtualization, can be dealt with, also still seems to be unresolved. A crucial factor here is the acceptance and use of virtual consulting services by the clients. The active cooperation with clients and the mutual involvement with concepts of virtualization should be gently enforced.

Furthermore, businesses that are currently still neutral regarding the significance of virtualization, should deal in detail with the challenges, chances and consequences of virtual consulting services. It should also be considered that virtualization breaks with some habits of consulting. It is, for example, dubious whether the current accounting model, which is commonly based on the accounting of time units, will keep its supremacy (Deelmann 2009). The concurrency of the service creation and execution can also be changed by using technology (Deelmann 2009). Based on rather little experience, which participants so far have made with virtualization, additional educational work is necessary to explain the features, chances

and risks thereof. Moreover, it is important to demonstrate prototypes and their successful application to show that complex variants of virtualization can also be used beneficially.

62% of the participants see virtualization as a chance. These participants realize that technical progress, specifically in the field of information and communication technology (ICT), will have significant effects on the future performance of consulting services. Meanwhile the current technology has sustainably changed the commercial world in all phases during the product- and service lifecycle. Two thirds of the questioned consultants are of the opinion, that the already high penetration of digitalization in many branches will eventually also influence the added value processes of consulting providers.

Virtual consulting services can be assigned to a wide spectrum, which reaches from video conferences via online business coaching to self-service applications. Already existing technology (e.g. conference tools or mobile apps) enables consulting businesses to optimize their internal and external processes. Virtualization technologies offer new potentials and chances to design consulting processes in a more rapid, efficient and client oriented way. These opportunities were recognized by a majority of the participants.

When looking at the assessment of virtualization, differences among the size groups of the questioned companies can be determined. Rather big consulting businesses with an annual turnover of over ten million Euros consider virtualization as a clear chance. Big providers often have complex service systems, where service portfolios are characterized by a broad spectrum of consulting services. Virtualization then has the potential to further differentiate their own value creation processes. The chances to better connect consultants with each other and to be able to exchange knowledge more rapidly supports the efficiency and quality of service delivery, which is particularly promising for large-scale consulting firms.

In summary, it seems that virtualization is rather noticed as a chance by the participants. Nevertheless, a third of the participants are unsure whether the chances of virtualization outweigh the risks. Therefore, it will be necessary to devise methods and tools, which will help to assess virtualization potentials correctly, to secure the positive effects of utilization and at the same time limit the risks of virtualization.

2.2 The Importance of Virtualization for the Consulting Business Model

Only 7% of the questioned consultants stated that virtualization is unimportant for the business model of their own company (Fig. 4). These consulting providers solely put emphasis on the personal and direct contact between client and consultant. As it can be assumed that these consultants use common means of communication like e-mail etc., virtualization can, however, be rudimentarily present.

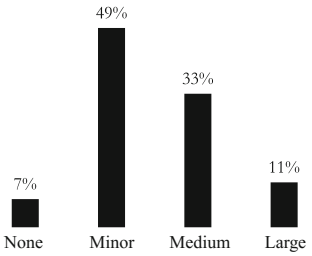

Fig. 4 Significance of virtualization for the *current* business model. Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

A reason why virtualization is not very important may be found in the service portfolios of these consulting firms. It can be assumed that their service spectrum involves complex and interaction-intensive consulting services, which cannot be readily virtualized.

About half of the participants (49%) stated that virtualization as a business model is currently hardly of any importance for their own company. Virtualization is presently used here in a supportive way. Technology is deployed by these consultants to ensure the efficiency as well as location-independent communication and cooperation. Innovative virtual consulting services are barely offered by these companies.

Virtualization has a medium-sized relevance for 33% of the questioned consulting businesses. Initial concrete approaches and business ideas of virtualization are used to meaningfully extend the traditional delivery-model of the specific company. Eleven percent of the participants stated that virtualization plays an important role in their consulting. In this case, it can be assumed that relatively extensive offers of virtual consulting services are already available.

The actual significance of virtualization in their own business model is the largest for consulting providers with an annual turnover of more than ten million Euros. Here, virtualization is also most advanced in the implementation. Thus, the starting situation is especially advantageous to exploit the whole spectrum of virtualization. The great significance assigned by these consulting firms can also be attributed to an in-depth analysis of the topic virtualization that has already taken place in these companies.

The statistical evaluation shows that the assessment of the current significance of virtualization on behalf of IT- and HR-consulting is similar, and by tendency higher than the evaluation of strategy and organizational/process consulting. The fact that the consultants of IT-consulting rate the significance of virtualization higher, was to be expected, as IT-consulting is already strongly driven by technology and is subjected to an extremely high competitive pressure. Virtualization is here an essential means to ensure competitiveness. Moreover, the service portfolio of

IT-consulting shows a high virtualization potential. A virtual consulting service, which is already offered by these businesses, is for example a remote application management, thus the care and support of IT-applications via so-called helpdesks. Additionally, diverse virtual consulting services are already used for the selection and implementation of software in projects. Thus "customizing", which means the individualization of standard software, the testing of new software solutions and user trainings, are already performed in a virtual and technology-based way. The distinct technology orientation of IT-consulting service systems facilitates extensive virtualization.

Participants working in HR-consulting also give a high assessment to the significance of virtualization. One can conclude here, that particularly in the field of talent management, virtualization plays a big role. Virtualization makes it possible to evaluate a large pool of talents, independent of the location and time of each candidate. A virtual service, which is also provided by HR-consulting, is online-coaching. This makes a continuous support service for managers possible in the field of management diagnostics and development.

Consultants from strategy consulting state, by tendency, that virtualization is less significant for their business model. Consulting services for the development of e.g. marketing or sales strategies or in the field of business development and innovation are described as too complex and individual for virtualization to apply. According to these consultants, the creative processes necessary to solve a problem are not suited for virtualization, but rather require personal contact.

This resembles the significance of virtualization for consulting services of organizational and process consulting. Here participants assume that consulting services from the area of change management as well as reorganization and post-merger integration need the experience and the personal attendance of individual consultants. Using virtual consulting services for highly individual and partly sensible problems is regarded as unsuitable. Even though, this consulting field does offer significant potential for virtualization. Virtualization could bring forth new approaches to process optimization and performance management, which use the existing data from the clients' information systems to automatically model processes and generate performance data. Projects in the fields of customer relationship management and sales issues could result, via data- and technology based solutions, in the creation of new clients' accesses and integration opportunities.

In summary, it can be said, that virtualization nowadays is rather important to large IT-consulting firms as well as to large HR-consulting firms. Consulting companies, which have projects particularly in the areas of organizational and process consulting as well as strategy consulting, regard virtualization as less significant. The assessment of consulting firms with a turnover of less than ten million Euros are similarly moderate.

A look at the future (Fig. 5)—only 6% of the participants were of the opinion that the significance of virtualization for consulting services will not increase. This small number of participants gives traditional consulting approaches a higher ranking, even for the future. These participants might also have exhausted their

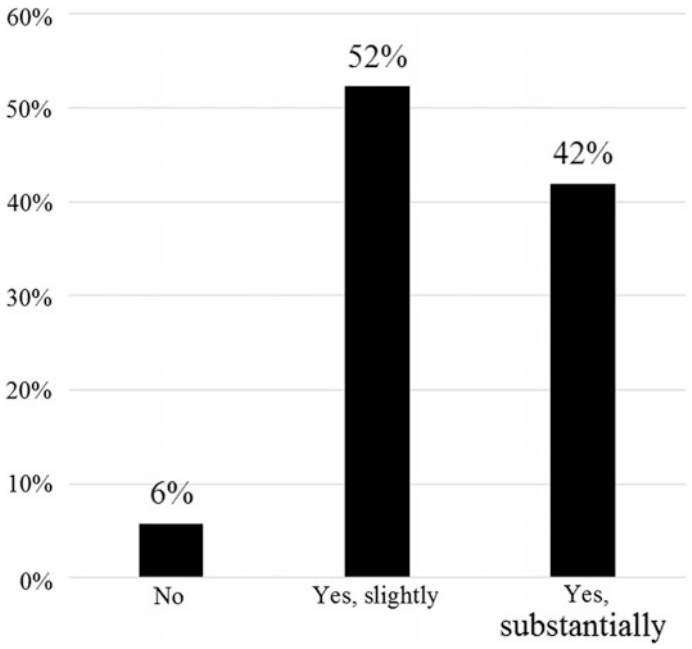

Fig. 5 Assessment of the *future* increase in significance for virtual consulting

capabilities of virtualization. On the other hand, 94% of the participants believe that the significance will increase, at least slightly (52%), whereas 42% believe that it will increase substantially. This result is also due to the extensive penetration of digitalization in all living- and business areas. Digitalization and consequently virtualization is omnipresent, and it changes products and services sustainably. The changes do not fail to leave their mark on consulting businesses. The general increasing acceptance of digitalization presents chances, which will redesign the service systems of consulting businesses and their own value chains in an innovative way. Consultants who are expecting an increase in the significance of virtualization have realized that this is not only an important impulse for their clients, but also for their consulting business.

The lowest increase in significance was predicted amongst businesses with a turnover of between one and ten million Euros. Consulting firms with a turnover of less than one million Euros and more than ten million Euros cannot really be significantly distinguished by their assessment. Thus, small and large consulting businesses expect a stronger increase of virtualization. Virtualization is currently of a rather minor significance for small consulting firms. In the future, it can offer the chance to exploit new client segments by innovative technology-based consulting services. These consulting businesses could operate in niches, which are currently still unexplored. The digital transformation of client-specific business processes

leads to new problems, which need innovative consulting solutions. Here lies the potential to develop new consulting products, which will differentiate the business from the competition.

Employees of large consulting firms see an increase in the significance of virtualization, because the complexity of their own organizations, as well as that of the clients' organizations does increase. To keep up with the clients, and to be able to still work efficiently, it is useful to extend virtual service concepts in a meaningful way.

There is an insignificant difference amongst the various consulting fields regarding the expected significance increase of virtualization. This was a surprise, as it seemed plausible to believe that virtualization was more important to IT-consulting, than for the firms in other consulting fields. The reason therefore is that IT-consulting operates in an especially technology-oriented field and the daily rates for standard services decrease continuously. Virtualization and thus consulting concepts putting emphasis on automatization could offer valuable potential to lower the costs against this background. Hence, the margin for standard services would increase again. Respectively, lower prices could exploit new groups of buyers.

HR-consulting does not estimate the future significance increase of virtualization any higher than the other consulting fields. It is though important to note that HR- as well as IT-consulting do already use virtualization more often today than the other consulting fields. Organization- and process consulting, as well as strategy consulting have likewise realized that virtualization will become more important to them in future.

2.3 Virtualization of Different Project Phases

It is not feasible to equally virtualize every phase during the consulting process. The following factors have an influence on the acceptance of digital consulting services, and thus of the virtualization potential (Nissen and Seifert 2016b):

- High complexity has a negative influence.
- High interactivity has a negative influence.
- Great urgency affects the virtualization potential positively.
- Great trust of clients in the consultants has a positive effect.
- A high maturity level concerning virtualization has a positive effect.
- Availability of suitable consultants has a positive effect.

It can be assumed that the phases, which are particularly suited for virtualization are, by tendency first digitally transformed. To verify this assumption, the participants were asked to estimate to which degree each of their consulting phases are being virtualized. As mentioned before, virtual consulting can be assigned to a spectrum, which reaches from simple, supportive usage on the one side, to full

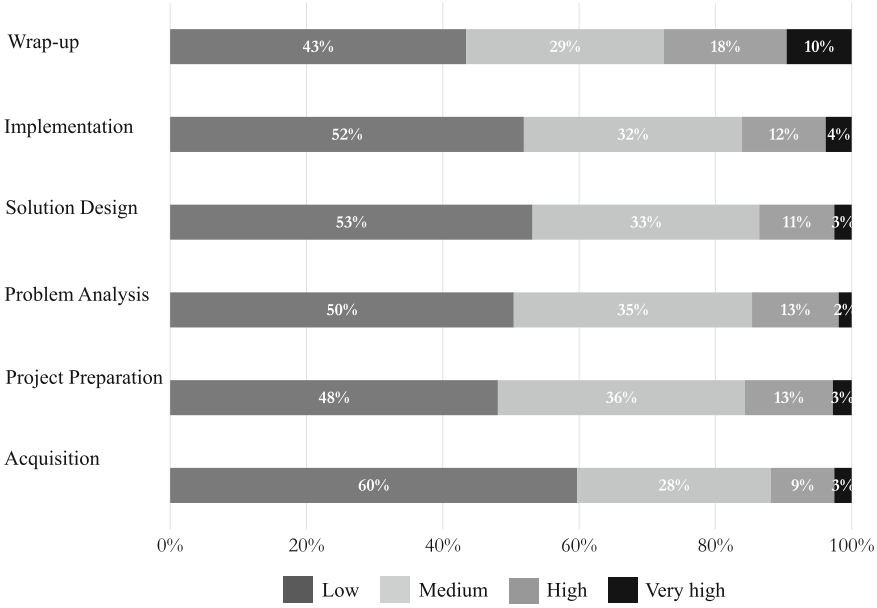

Fig. 6 Degree of virtualization of the individual project phases (n = 472). Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

automatization on the other side. Using this spectrum, the participants were now able to indicate to which degree each individual project phase is being virtualized in their own consulting business. Concerning this question 472 responses could be evaluated (Fig. 6).

The customer acquisition, by tendency, shows the lowest degree of virtualization. However, concepts and approaches already exist to sell consulting services online in a type of consulting shop (Werth et al. 2016). There are also corresponding digital options for marketing purposes in the consulting business. Additional activities, which can directly be assigned to the acquisition phase, such as a demand analysis or the presentation of an offer are still conducted by personal contact with the client. Thus, the participants indicated that the individual starting situation and the individual consulting demand could only be adequately determined in a personal conversation on site. There are only isolated approaches to allow clients to configure their own consulting service in some form of a product configurator. The consulting fields do not differ significantly in this phase.

The project preparation phase is overall a bit more virtualized than most other phases are. This phase includes activities such as preparing a detailed project plan, setting up the project organization structure, determining standards, the establishment of a mutual communication level for the project members, the distribution of

work packages for consultants and client employees and the project-kick-off. Virtualization is used here in the form of project platforms, audio- and video-conferences as well as knowledge management systems. Approaches for the simulation of project progress are still the exception. As the availability of data and new technologies to analyze these data increases steadily, many extensive opportunities will appear in the future to arrange the preparation in a more efficient and qualitative better way. In this phase, the consulting fields do not show significant differences. Problem analysis includes activities such as the diagnosis of present problems as well as accomplishing a deeper understanding of these problems, to be able to form a basis for the development of solution alternatives. During this phase, slightly less virtualization is currently used than during project preparation. In problem analysis, creative and analytical processes do already take place, which often require direct contact between the consultant and the client. Personal commitment of the consultants as analysts is here still customary. However, there are concepts to automate the analysis of very large quantities of data, such as data mining, analytics applications, and process mining. Virtualization concepts are particularly suited for standardized surveys and analyses. Questionnaires can be put on the Internet to conduct online-assessments for choosing a software product or to determine the maturity of an organization. Furthermore, the analysis phase provides potential to gather avatar-based and fully automated the current situation of the clients. In the scope of a self-service, the clients can be led through an individualized assessment, whilst e.g. technologies of artificial intelligence are being used to analyze individual responses of the clients, regarding the actual situation in the project. Similar virtualization during this phase is shown by all consulting fields in our survey.

The solution design phase, during which problems are solved, includes activities such as the preparation of one or more alternative solutions and presenting them to the decision makers, as well as the selection of the solution to be implemented. This phase has, by tendency, only a moderate virtualization level, and according to the participants, it has a low virtualization potential. The consultants stated that the preparation of a specific solution for the client is often only possible via personal exchange with the customer on site. Using full virtualization was regarded as unrealistic. Personal contact and creative consulting services are inevitable for having success. In this phase of solving problems, the virtualization level for IT-consulting is the highest. This is followed by HR-consulting. IT- and strategy consulting differ significantly. Strategy consulting is distinctly less virtualized than IT-consulting in this phase that may be attributed to the on average higher complexity of strategy consulting tasks.

Implementation includes the implementation of recommendations in the individual analysis areas. This phase is currently just as moderately virtualized as the two former phases. There are significant differences between IT- and strategy consulting during the implementation phase. Whereas IT-consulting already

virtualizes its implementation, the activities of strategy consulting are mainly conducted in a traditional way.

The wrap-up work of a project includes activities such as the processing of rendered results for the purpose of re-use and knowledge storage. During this phase the evaluation of project members' individual performance and compiling references are also carried out. The virtualization level of this phase is comparatively high. This means that many activities are already carried out virtually. In most cases, a full virtualization is impossible, because the selection of information and documentation of knowledge needs to be done by a human consultant. In IT-consulting this phase is, in comparison to the other consulting fields, significantly higher virtualized. The other consulting fields do not differ much amongst each other.

Viewing the virtualization level of each phase, it can be determined, that similar to the assessment of the virtualization progress, larger consulting companies have developed their virtualization much further.

2.4 The Use of Different Virtualization Levels

Virtualization makes the formation of a broad spectrum of heterogeneous, innovative consulting services possible. The level of virtualization serves the differentiation of typical forms of virtual consulting offers within this spectrum. A consulting service with a particular low level of virtualization is featured by a low technology input and mainly by direct contact of the actors. The technologies used here, typically are e-mails, and also conference- and chat applications. A consulting service with a particularly high level of virtualization is not feasible without technology and contains concepts such as self-service consulting. These virtual consulting applications are complex individual software developments, which amongst others may contain the newest data analytics procedures.

The analysis of the participants' feedback shows that the frequency of usage decreases, whilst the level of virtualization increases (Fig. 7). Most frequently very low level forms of virtualization are employed. This encompasses the use of e-mails and conference tools for regionally separated and timely synchronized or asynchronized consulting.

Approaches to which a low level of virtualization can be assigned are still used regularly, but definitely less frequently. An example for this type of virtualization is regular virtual collaboration on collaboration platforms, also called "project places". Consulting with a medium level of virtualization is, by tendency, rarely used or not at all. These include approaches such as online coaching on professional topics, or concepts where the actors hardly have direct or personal contact with each other. Some approaches of automatization can also be found here. Of the participants, 63% state that they do not use a high level of virtualization at all. This level includes, for example, a remote-diagnostic-tool, which could be linked to the central ERP-system of the client.

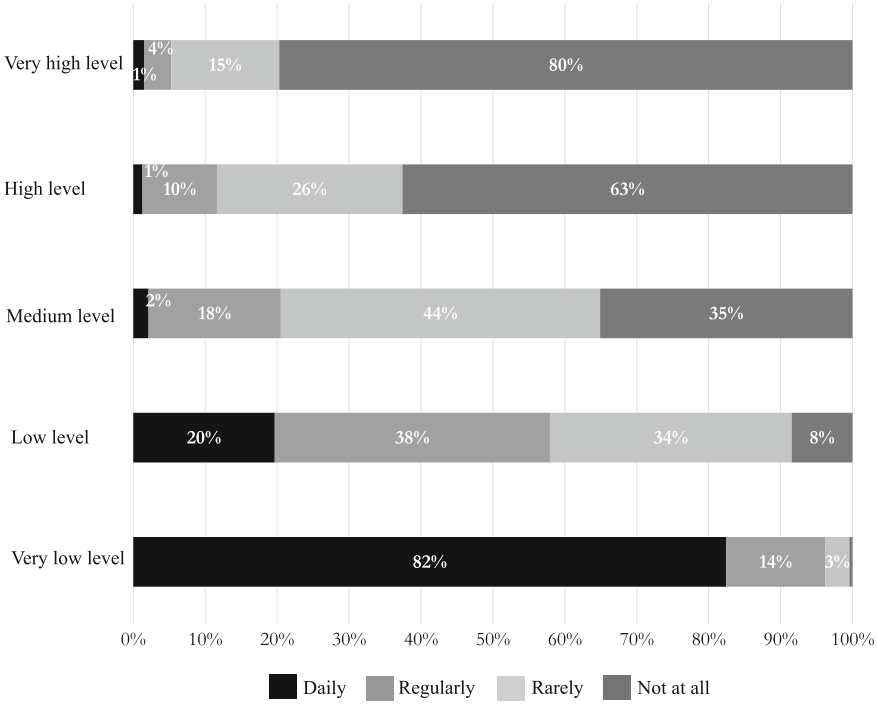

Fig. 7 The use of various levels of virtualization (n = 473). Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

Consulting services and approaches with a very high level of virtualization, which are largely automated are not used at all, as stated by 80% of the participants. Only one percent of the consultants replied that they use this type of virtualization daily. This includes e.g. self-service consulting, such as a rule-based fully automatic online-assessment, which based on the data entered by the client creates an expert report.

The impression that virtualization in business consulting is still at the beginning, for the majority of the consulting providers, is strengthened by the analysis of the results received on consulting services with various levels of virtualization. The participants, who were questioned, use approaches with a middle to very high level of virtualization only very rarely. Here a lot of unused potential is concealed (because it is not fully understood). More in depth examination of the tasks, contents and procedures within a consulting phase could lead to valid starting points for a stronger virtualization. This also entails the examination of the data, technologies and actors, which may be needed to fulfil the tasks.

Full virtualization describes the extremum of virtualization where the human performance and the personal contact disappears almost completely. Avatars take over from business consultants and offer a comprehensive spectrum of automated solutions. Results are produced promptly, automated and personalized without requiring any contribution of an employee of the consulting business. Full virtualization basically offers the opportunity to be able to conduct routine consulting tasks most efficiently. Automated consulting services make a simple scaling possible and thus the short-term covering of similar customer requests. Another advantage of automatization is a quality standard, which guarantees a uniform service delivery and can thus be marketed accordingly. However, an automated consulting service has limits regarding the required individuality. Thus, full virtualization only enables the solution for a specific class of problems.

Clients with a very individual consulting requirement and a complex starting situation would hardly be advised to use automated approaches. Another aspect, which can be considered as a hindrance for full virtualization, is the client's skill to use this kind of self-service correctly. To be able to analyze what significance full virtualization will have in the future, the participants were asked to estimate the significance of automated consulting services for the next five years. There were 506 responses, which could be evaluated (Fig. 8).

16% of the participants stated that full virtualization will be irrelevant also in the future. The prior described disadvantages and particularly the apprehension that the provided service might not satisfy the clients' quality demands, contributes to this tendency. Just more than half of the participants (51%) refer to a minor significance of full virtualization in the future. The tendency can also be noted here, that human contribution to knowledge intensive services, like consulting, can hardly be replaced by virtualization. Full virtualization is seen as a niche solution by these participants. A group of 24% of the participants, however, allocate a medium

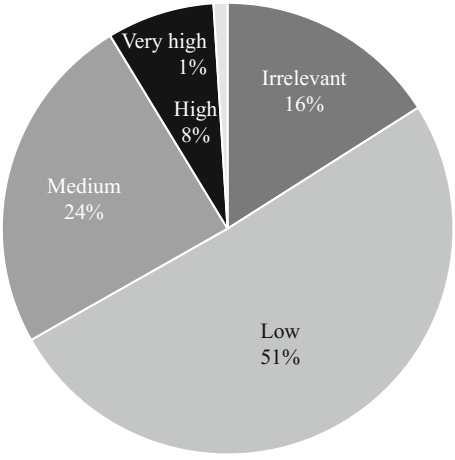

Fig. 8 Future significance of full virtualization in consulting (n = 506). Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

significance to full virtualization and note that there will be a potential for the use of "self-service" and automated consulting solutions.

For the remaining 9% of the participants total virtualization has a high to very high significance. The consulting businesses of these participants have service portfolios and clients available, who enable them to render automated services at any time and in any place. Complex technical solutions will form the basis of these services. As the circumstances require, clients have to be supported and/or qualified while using these services, so that afterwards they will be able to use them effectively. Business consultants, who see a chance to use full virtualization, should incorporate potential clients in the conception of the new services at an early stage. The role of the clients during the development of virtual consulting services will be discussed again later. Basically, the point is to draw up present, possibly only low virtualized project references and to integrate virtual products into the right places so that their strength can be highlighted.

Small and large consulting firms assess the significance of full virtualization significantly higher than medium-sized consulting firms. Here the general tendency continues in the outcome of our survey, that small and large consulting firms see more potential in virtualization. Medium-sized consulting firms are, by tendency, still indifferent concerning the chances and risks of technology-based solutions. HR- and IT-consulting firms evaluate the future significance of total virtualization as the highest. In the case of HR-consulting full virtualization could help to conduct assessments faster, or to identify suitable candidates for an open vacancy in an automated way, analysing, for instance, social media data.

2.5 Possible Applications of Virtualization in Consulting

In the scope of this survey, the participants were asked to specify three possible applications of virtualization in their consulting business from their individual perspective (Table 2). Here the participants particularly often mentioned the application during geographically distributed cooperation. The motivation to use virtualization thus originates primarily from the need to work together independently from where the project members are. Thereby the participants explain the importance of one of the most fundamental surplus values of virtualization—temporal and local flexibility. Virtualization can also contribute to the improvement of work-life-balance during consulting (Termer and Nissen 2011, 2012; Nissen and Termer 2014), which makes the consulting businesses, as an employer, more appealing.

Even when simple forms of virtualization are used such as video conferences, it can provide a significant benefit for the client as well as for the consultant. The analysis done on the usage of various virtualization levels, furthermore, shows that this form of virtualization and virtual cooperation is already used extensively. Hence daily consulting cannot be imagined without virtualization.

Table 2 The 10 most frequently mentioned application priorities of virtualization in consulting, according to the consultants questioned

1. Online collaboration	6. Data mining and big data
2. Remote analysis	7. Virtual project management
3. Online coaching	8. Virtual assessment
4. Information distribution via internet	9. Online knowledge management
5. E-learning	10. Test of IT solutions

Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

Another frequently mentioned application refers to the analysis of information and the opportunity to do this independently from a specific place, such as the client's office. Here is a particularly large potential in the problem analysis phase of the consulting process. In doing so, it has to be differentiated whether the virtualized analysis should be done manually, which means remote by a consultant, or technically based, which means extensively automated by an IT-tool. In both cases, there is no need to analyze the information at the client on-site. The process of gathering information can also be partly virtualized, whilst for example the required documents are automatically loaded onto a consulting portal or an analysis tool. The more steps of this analysis are technically based and automated, the higher would be the level of virtualization. According to these findings, there is still considerable potential to virtualize sub-tasks and to optimize the problem analysis as compared to the status quo.

The opportunity to conduct a professional coaching anytime and independently from the client's site was also mentioned as a good application area for virtualization. Such an online coaching, moreover, offers the opportunity to look after various participants at the same time, or to save conducted sessions so that they can be used again. Online coaching is currently often a component of blended learning —or e-learning programs. Moreover, nowadays online coaching is already offered on the Internet when specific demand exists. In the context of business consulting online coaching could specifically be used to support clients to solve their business problems, as well as supporting them with the usage of complex virtual consulting products.

The opportunity to prepare information and to pass it on to clients and partners were repeatedly mentioned by the participants as a possible application of virtualization. Information, which is digitally available can be managed, secured, distributed and specifically used in a better way. These are processes with a rather low to medium level of virtualization. During the analysis of the progress of virtualization and discussing the level of virtualization, it was already determined that virtualization should both take place internally (internal processes), as well as externally (sales and consulting processes). In the case of both variants, consulting companies are still at the beginning of the development. The distribution of

information via the Internet rather refers to external communication by the use of webinars or podcasts. Testimony of competencies and client references can be distributed rapidly and efficiently via blogs and forums. During the acquisition, implementation and also the follow-up phases of a project, webinars can be used to distribute information to the clients.

The success of a consulting business is determined largely by the qualification of their own employees. Today virtualization, in the form of e-learning, already contributes to the advanced training of consultants. Thereby the local dispersion of consultants is considered. E-learning offers can be used for every phase in a consulting project, in order to provide the consultant with project-relevant knowledge.

A basis for the successful and profound usage of virtualization will be the ability to gather, structure and analyze large amounts of data rapidly and possibly automated. Data produced by the consulting business, data generated by the client and data generated by the partners or public institutions have to be consolidated and analyzed. In this way, new insights can be gathered very quickly and consulting results of a high standard are produced. This assumes that the exchange and the storage of data, as well as their application is legally protected. From the point of view of the survey participants, the topic of data protection does not really present an impediment. It should though be considered in a conclusive master plan. Furthermore, the participants stated that the necessary technologies do exist and can be obtained, if needed. For successfully virtualized consulting concepts, on the basis of big data and analytics (e.g. data mining solutions), a close cooperation with key clients is recommended. A sound analysis of realistic applications against the background of different virtualization potentials for individual tasks is recommended as well.

Nowadays the completion of projects is already supported by project platforms. These are mainly tools, which record the work progress and organize the cooperation. However, the actual consulting service is personally rendered by the consultants. It is conceivable that the larger part of communication among the project actors is processed via such platforms and also certain consulting services are available through this channel. As early as the times of virtual platforms like "second life", there were concepts to offer and conduct consulting services in a fully virtualized space.

The option, to conduct surveys, studies and assessments online, to investigate a variety of clients and companies in a standardized form and independently from time and location, presents a further, often mentioned approach for the usage of virtualization.

The opportunity to use and expand online knowledge management was also often mentioned by the study participants. Know-how is a critical resource of consulting businesses. Therefore, it has to be used effectively and efficiently during the service delivery, which means that it needs to be managed actively. At the same time virtualization offers new chances to continue developing the knowledge management of a consulting organization. On the one hand, elaborate knowledge management presents the basis for the design of virtual consulting services, since knowledge has to be analyzed and explicated in order to apply it in the form of

innovative virtual consulting products. On the other hand, virtual consulting services and the correlated digitalization of information offer the basis for an efficient knowledge backup and distribution. Furthermore, knowledge management, which is closely integrated with operative consulting processes, is simplified where knowledge management systems are smoothly linked to digital consulting products. In this way, the results of a virtualized consulting project can simply be adapted and re-used in other consulting services. An example here could be a process mining-tool, which automatically designs processes based on the analysis of actual ERP-data of the client. These models are then abstracted from the specific situation of the client and are saved in a process database for later re-use in other contexts.

Another opportunity for virtual consulting, already known from experience, is the remote-testing of software. Without being directly on-site with the customer, the consultant can test the implemented software and document the results.

A trend of the participants was to use only a low to medium level of virtualization for the mentioned possible applications. High to fully virtualized consulting services were only mentioned in the field of online assessments. This result agrees with the other results of the study, where an actual focus on low to medium levels of virtualization was noticed. The presented examples refer to all phases of the consulting process. So far there are, however, only a few concrete ideas, of what highly virtualized consulting services could look like.

2.6 Relevant Technologies of Virtualization

The participants were asked to assess the relevance of possible technologies for the virtualization of consulting services (Fig. 9).

Digitalization in the business world and society is substantially characterized by the use of mobile technologies. Today mobile devices already have an important role in consulting and may gain further significance in the future. Mobile communication by means of tablets, smartphones or smartwatches allows the speedy and location-independent interaction with clients, partners and consultants in the context of virtualization. Internal business applications and client-specific apps could support consulting services or even serve as stand-alone consulting products. By constantly being available on corresponding devices, expert systems used for the fully automated, and location-independent analysis of bulk data, could be considerably useful to assess the client's situation, or to support decision making. However, even in the case of mobile technologies the initial situation of the client's company as well as the skills of individual clients need to be considered. The use of mobile technologies will be a clue for extensive virtualization in consulting. But these technologies demand the qualification and support of the internal employees as well as of the clients, which requires additional resources, in particular at the beginning of the product life-cycle.

In this study the significance of cloud technologies is, by tendency, rated at a high level. Cloud computing is a model, which allows accessing readily, at any time

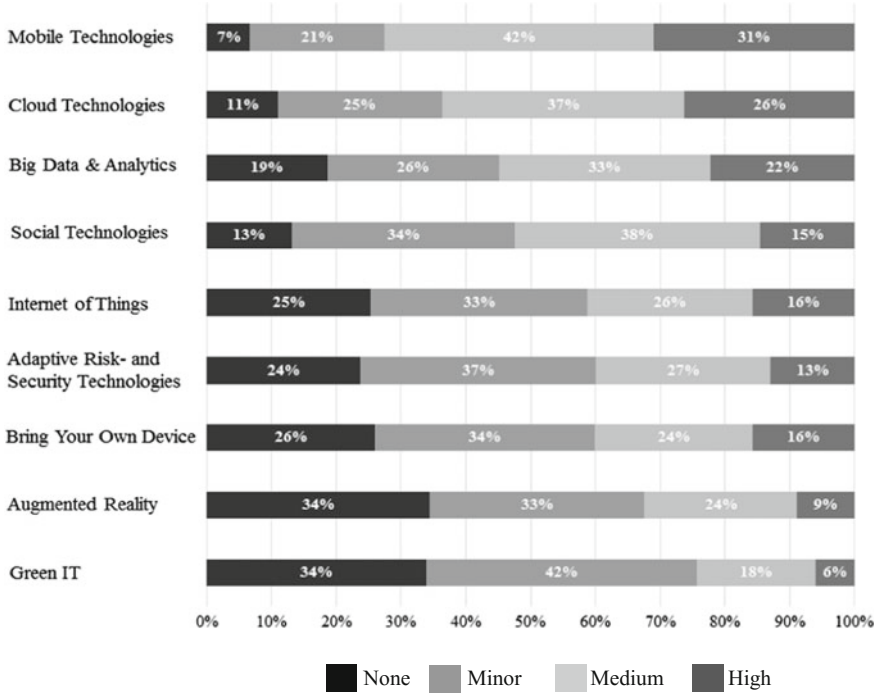

Fig. 9 The importance of technologies for the virtualization of consulting services (n = 419)

and everywhere a network of shared and configurable computer resources (e.g. networks, server, storage systems, application and services). In this way, virtualized consulting services can be readily developed, offered and flexibly scaled with minimum effort. Cloud-based software tools can be the basis for more efficient consulting processes and the modular combination of various tools opens up new possibilities. Cloud-based service networks, which integrate service portfolios of various consulting providers with different professional focus in a highly flexible and scalable manner, could sustainably change the added value of the consulting branch.

A similar high significance was assigned to technologies in the context of Big Data and Analytics. Big Data does not only provide concepts, but also concrete methods, technologies, IT-architectures, as well as analysis tools for the virtualization of consulting services. These are necessary in order to convert the exponentially increasing volumes, and continuously changing information into better consolidated and prompt decisions. The rate and quality of consulting services are supposed to be improved by analytics solutions. This was assessed as medium to highly significant by the participants.

Social technologies, such as forums, blogs, microblogs, social networking and instant messages can be platforms for the communication, cooperation and coordination of the actors during a consulting process. In the scope of virtualization,

they serve the problem oriented exchange of ideas, questions and opinions among client, partners and consultants. The participants of this study assessed the significance of these technologies on average as medium important.

A similar rating was given for the Internet of Things (IoT). The IoT describes the communication of objects via corresponding networks, to gather and exchange data. In the case of business consulting, the IoT can make the development of consulting services possible, which, for example, are based on real-time information of linked-up production resources. By doing so, production processes of the client could be continuously monitored and analyzed, which again makes it possible to offer customized solutions for the optimization of processes. If e.g. logistic processes need to be optimized, then diagnostic- and modelling tools could give insights into the running logistic procedures in real-time on the basis of data mining approaches. The participants assessed such technologies on average as medium important. In particular consulting businesses, which do industrial projects, should in detail consider the chances, which virtual consulting services can offer. The *Smart Factory*, *Smart Product* or *Smart Services concepts* offer digital links to deploy accurately fitting virtual consulting services. On a more general level, the IoT offers great potential for client integration.

According to the assessment of the participants, adaptive risk and security technologies have a similar significance for virtualization. Therewith technologies are meant, which ensure a minimum of data security within virtual consulting services. Safety measures which autonomously recognize and evaluate risks, may be vital for the approval of the clients. Such concepts could, for example, be based on techniques of data and text mining as well as semantic technologies.

Not only social media can blur the line between private and professional lives, but technologies employed in virtual consulting services may also partly come from the private sphere. Consultants can use their own smartphones and laptops. This technology trend, which is referred to as "Bring Your Own Device" was assessed by the participants as medium relevant. It is assumed that security demands, which are posed for user devices, would prevent the use of private hardware.

The evaluation of the responses shows that augmented reality technology is considered only barely significant for virtualization. It includes, for example, the use of products such as data glasses, which can display additional information on processes, systems or products. There are concepts in other industries, such as engineering, where data glasses are used for the maintenance and analysis of machinery. Virtual data could be linked to real information like the optical condition of a machine. Even in the case of knowledge-intensive service industries, such as business consulting, technologies of the augmented reality could make new consulting approaches feasible. That way data about the client's company, the client market, benchmarks, and much more, could be accurately called at the right moment. New quality standards for decision making and working results seem to be attainable is this way. In order that these technologies are leveraged, the consultants should be qualified and supported by technology experts. The connection between the business and technological know-how is the key for realizing the technical surplus values of new technologies.

The technology trend Green IT seems not very relevant to the participants. Therewith ambitions are described to design information- and communication technology, so that they are environmentally- and resource-friendly during their whole life cycle. This would involve the process from designing the virtual consulting solution to the implementation and use.

Virtualization can only be successful when various technologies are meaningfully combined with each other. This requires the analysis of own processes as well as the client's procedures. Consultants need to learn how to use the technologies themselves, before implementing them for their clients. Consulting firms, which rather offer services without much technology, should look for partners to acquire this know-how. On the methodological side it is, however, essential to employ a method, which supports the process of determining whether consulting services can be virtualized meaningfully at all.

2.7 Barriers to Digital Transformation in Consulting

The participants were also asked to evaluate pre-defined barriers to virtualization, which will impede investments in virtualization in their consulting businesses. Moreover, they were given the chance to comment every barrier, and to mention additional barriers (Table 3) if desired.

The analysis shows that the client's lack of demand is the primary barrier (62% of the participants answered this way). One participant responded that, as no demand had been established so far, no knowledge had been accumulated. At this point, the German consulting branch seems to be in a standby situation. Virtual consulting services are thus only developed when the client directly asks for them. The question can though be asked, how clients are supposed to request innovative consulting services, when the consulting businesses cannot show any innovative product portfolios. The questioned consulting businesses state that financial means can be made available, if a demand is noticeable. They are, however, hesitating to invest in consulting products, which may only later arouse a certain demand.

Without a concrete demand from the client, and without a possible prospect of an order, an investment in virtualization will only be difficult to realize. The client, his acceptance and demand, as well as the resulting business case are the greatest barriers that need to be overcome. When these basic questions are positively resolved, the consulting business can attend to the acquisition of resources and the establishing of know-how that is initially needed. Technological and data protection-based aspects, which are associated with virtualization, were not assessed as a real barrier by most participants.

If consulting businesses want to attain (or keep up) a leading position on the consulting market, they should evaluate the creation of complex virtual products in depth. Only those consulting companies, which establish competencies in this field and which can demonstrate innovative virtual services, will be able to arouse a corresponding demand from the client. Whoever can show innovative reference

Table 3 Barriers to virtualization of consulting services (n = 493)

Barrier	Share of consultants, whom consider this factor a barrier (%)
Missing demand for virtual consulting services by our clients	62
Missing acceptance of virtual consulting services by our clients	43
Vague business value	38
The lack of a strategic fit to existing consulting services	34
Missing experts for the virtualization of our consulting services	32
Missing capacities of our consultants for the implementation of virtualization	31
Missing know-how of methods and tools used for virtualization	28
Missing know-how of which consulting services are suitable for virtualization	27
Missing know-how of technologies for virtualization	25
A low maturity level of the required technologies	25
Unresolved questions on the data security	24
Limited funding	23
Missing know-how on the application of methods and tools	20
Missing standards and norms	20
Problems associated with the general legal framework	16
Inadequate infrastructure (e.g. broadband communication)	14
Inadequate stability of the infrastructure	9
No interest from our management	9
Problems associated with the political framework	6

Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

projects at an early stage has got good chances of a lasting competitive advantage. It is important not to wait too long with own initiatives. Otherwise there is substantial risk to become a victim of the "innovators dilemma", described by Christensen (1997) that might ultimately drive even big service providers out of the market when faced with disruptive innovations.

The missing acceptance of virtual consulting services by the clients is seen as another major barrier for the implementation of virtualization (43% of the participants). The acceptance for technology-based products or services are being

influenced by factors such as the expected usage effort of the client, the expected performance of the service, the social influences on the client, the supportive framework conditions (e.g. availability of the infra-structure) or the client's age (Venkatesh et al. 2003). To attain maximum acceptance, the heterogeneous expectations of the clients and the relevant factors describing the initial situation, need to be considered. Thus, one participant states: "The opposite party does not have the know-how" and another participant reckons "The client is not prepared for this".

To receive as much acceptance as possible, it is required, from an organizational perspective, to establish a feeling of solidarity between the clients and consultants across the barriers of virtualization. If required, clients should still be able to make use of a personal contact to a consultant despite virtualization. Beginning with the negotiations for the contract, via the design of a speedy, individual solution to approval of the consulting results, it is important to have continuous support by the personal consulting counterpart (Nissen et al. 2015). The acceptance will increase when a client-oriented mixture of virtual and classical consulting services is offered. It can be presumed that a certain insecurity on the part of the client prevails, as virtual consulting is nowadays still the exception. This means that clients hardly have any experience with it.

More than a third of the participants (38%) find that a vague business value hinders the implementation of virtualization. One participant responded: "If we saw a surplus value for our clients or for ourselves, we would use it". On the other side, 62% of the questioned participants did not express any barrier caused by the business case. However, the added value for clients in the context of existing consulting services (strategy and organization) is not yet unambiguous. The low distribution of virtual, and, in particular, complex virtual consulting products indicates that the vague business value constitutes in fact a bigger barrier than stated by the participants.

Economic advantages of virtualization include scalability of virtual consulting products, the reduction of costs by reduced travelling activities and automatization, as well as the opening-up of new client segments that would rather not place an order for (expensive) classical consulting. Contrary to that are the investment and maintenance costs as well as the non-chargeable time used for the development of virtual services. The business case of a virtual consulting product should therefore integrate initial and ongoing efforts, quick wins and particularly long-term income potential, so that an investment in virtualization should be seen as an investment in the future of the consulting business.

Thirty-four percent of the participants are of the opinion that the strategic fit of consulting services is not suitable for their service portfolio, so that virtualization cannot be successfully implemented. Therefore, knowledgeable analysis is necessary to find out which services and products can be admitted into the service portfolio. Starting with the company strategy, consulting firms should be able to derive a strategy for virtualization (Wurdack 2001). Based on this general approach, a consulting portfolio can be defined, which combines traditional and virtual consulting services. To evaluate the strategic fit, the previous portfolio is confronted

by strategic goals. The role of virtualization for achieving these goals is then elaborated. In this process, information about the actual and the expected development status of the markets, as well as information on industrial clients, are very important. Subsequently it has to be tested whether virtualization is suitable to sustainably cover future demands and the expected development of markets.

Only 32% see the shortage of experts as a barrier for virtualization. The majority of the participants disagrees with this. The participants indicate that the questioning on suitable resources should be treated as of secondary importance, and the questioning on the demand of the clients as a matter of priority. The application of virtualization in a customer project will be successful when consultants are capable of analyzing their own processes on a meta-level. Besides the professional know-how, which a consultant needs to apply to a client's project, he also needs methods and tools for the analysis of knowledge-intensive processes, and for the development of technology-based virtual services. Depending on the consulting field, specific qualification, particularly on the side of the consultant, is needed to implement virtualization successfully.

Less than a third of the participants (31%) state that inadequate capacities of their own consultants are the reason why virtualization cannot be implemented. The majority though states that resources are made available, when required and a directive of impact has been set. The participants also state that not enough try out time to experiment is a barrier on the way to more virtualization. One participant noted that the required training needed for the conversion of classical delivery-models of consulting, during the course of virtualization, is very time-consuming and therefore, a capacity related impediment.

Of the participants, 28% assessed that insufficient know-how of methods and tools is a barrier of virtualization. The virtualization of knowledge-intensive services demands a profound know-how on e.g. the areas: service engineering and management, software engineering, knowledge management, virtual organization, computer supported cooperative work, as well as business management. In order to be able to implement virtualization successfully, a consultant has to apply this knowledge in his own consulting processes. The analysis of own processes, tasks, information, actors and results requires corresponding methods for modelling and analyzing knowledge intensive services. After assessing the status quo, it should be possible to show the virtualization potentials. Subsequently client-oriented service concepts can be designed, which consist of sub-services with various levels of virtualization. For this purpose, engineering tools and methods are required. The following decision between the purchase of standard tools, and of the development of an individual solution, requires profound know-how of software engineering. If these concepts have been implemented in corresponding virtual products, they should be marketed. For this, know-how of service management is required. Overall, an engagement with the required knowledge to develop complex virtual consulting products on the one side, and the critical evaluation and advancement of own skills on the other side, are decisive for the success of the consultant.

Twenty-seven percent of the participants stated that they did not know which consulting services can be virtualized. Here the participants also pointed out that without any concrete customer demand and without a corresponding strategic goal, virtualization know-how is not required. At this point the consulting businesses under-estimate how complex the evaluation of virtualization can be. Various factors determine whether consulting processes or tasks can be virtualized. These factors should be accurately analyzed before virtual consulting products are developed.

A quarter of the participants feel that insufficient knowledge of technologies is a barrier. In this case, it would be necessary to examine precisely whether all possibilities of current technologies had already been researched, analyzed and evaluated sufficiently accurately. Non-technology consultants are here confronted by particular challenges concerning the virtualization of consulting services.

The maturity of the relevant technologies is considered as a barrier by 25% of the participants questioned. ICT is the vital virtualization mechanism. As has already been shown, various technologies have a different rating for digital transformation in consulting. Consulting providers have to succeed in assessing the application capabilities of various technology trends, and to choose the suitable technology for a consulting service.

Just less than a quarter of the participants (24%) consider that unresolved issues regarding data security are a barrier for virtualization. The responsible dealing with data is a fundamental basis for the success of digitalization, and consequently for the success of virtual consulting services. Consulting businesses need to deal firmly with the legal data security perspective of virtualization, to develop solutions which are legally valid on the one hand, and allow the client's trust on the other hand. At the end, it is all about consulting services, which are not only interesting and effective, but also secure. The client's trust is just as important during traditional consulting as during virtual consulting. Thus, it should be the goal of a consulting business to design digital consulting products, which establish trust and strengthen the relationship to the clients. Consequently, a high significance should be attributed to relevant security technologies and concepts.

Only 23% of the participants see the lack of financial means as a barrier for the implementation of virtualization, whereas 77% do not see it like that. They point out that financial means are provided, and investments taken as soon as the strategic usage and demand of virtual consulting services become clear. One participant responded: "Means are provided when it makes sense". The business case for the development and the implementation of a virtual consulting service should be given and the return-on-investment calculable. A missing business case is often the reason why complex (and by tendency expensive) forms of virtualization are not pursued.

Twenty percent of the participants see inadequate know-how on the applications of virtualization as a barrier. The parties state that they do not have the necessary "vision and imagination". Furthermore, they also respond that "no concrete approaches or business ideas exist", and "there is a lack of ideas for suitable digital implementation of consulting services", which delays the progress of virtualization. The maturity level of virtualization in the German consulting branch shows that virtual consulting services and in particular complex virtual products take up only a

niche role at present. So far only a few consulting providers were successfully able to use the existing technologies to design innovative service systems.

A further 20% of the participants see the limited availability of standards and norms as a barrier. International as well as national standards and norms are crucial for virtualization, as corresponding standardized and normalized consulting products facilitate their distribution, and reduce their complexity. The standardization of technique-based consulting products forms a fundamental basis for the wide-ranging integration of various digital and traditional consulting processes and providers. When a consulting business considers valid standards and norms of virtualization, consulting services can be developed, which are more compatible with existing services, and can therefore be used more readily.

A group of 16% of the participants felt that legal conditions could be a hindrance to the implementation of virtualization. Regulatory requirements can promote or restrict virtualization. Compliance with legislation on the regulation of employee assignment is, for example, definitely necessary for both the client and the consulting business, as in the case of non-compliance substantial penalties may be imposed. This legal structure forces in particular clients to separate the consultant and the client's employees clearly from each other, to avoid the accusation of concealed employee assignment. Here e.g. standardized communication and organization of projects via a project platform can contribute to the establishing of consulting processes according to legal requirements.

Legislation can set bounds for the virtualization of consulting services, in particular in the case of data security. Especially complex virtual consulting products are based on large amounts of data from various resources. That way a specific consulting firm, on behalf of the client, could extract information about consumers (e.g. the buyers of a specific product) from market data, and process this information in the course of analytical applications. For virtualization to be successful, a legal approval has to be obtained for this data processing.

Only 14% of the participants find that the non-availability of suitable infrastructure hinders the implementation of virtualization. Increasing virtualization of technical resources by cloud-services favours virtualization, because new virtual consulting products can be made available sooner, and with a greater operating reach. Cloud architectures and software-as-a-service products provide the technical basis for flexible and scalable virtual consulting products. In order that the infrastructure does not present a barrier, consulting businesses ought to strive for a high extent of technical flexibility and compatibility. They should also be informed which infrastructure related requirements the clients have.

Not more than 9% of the participants feel that the stability of the infrastructure is inadequate and obstructive in the given context. It now applies that the existing technical base should be successfully utilized, and by implementing suitable virtual consulting products the available technologies should be beneficially installed.

Nine percent of the participants have the opinion that virtualization is hindered by absent interest of the consulting management. The commitment of the management is needed to define a vision and to derive strategies, processes and an organization in the context of virtualization. Even though the necessary attention of

the management does predominantly exist, the consequent implementation of virtual consulting products does not take place among the consulting businesses questioned. It is inhibited by the distinctive factors—lack of client demand and low client acceptance. In this context, a key role is assigned to the management, namely to launch virtualization even if there is initially no obvious demand. The management has the responsibility to develop, and put onto the market a consulting service portfolio, in such a way, that it attracts clients.

Merely 6% of the participants questioned find that political circumstances cause a barrier. Currently a high significance, which also applies to the political side, is attributed to the digitalization of economy and society, as well as the concomitant challenges. Consulting businesses can make use of this trend by means of targeted cooperation with research institutes, clients and other actors from industry and science, to develop new, innovative consulting offers.

2.8 Organization of the Digital Transformation

In the context of virtualization of consulting services, the question arises, how the transformation of a traditional consulting service is typically organized. Here simple and complex virtual consulting services should be differentiated. The development of simple virtual consulting services requires comparatively little effort. For example, a virtual workshop about process mapping can be carried out without the development of special tools, merely by using a standard software.

Complex virtual consulting services, such as a consulting-app for the self-service of clients, first need to be designed and developed. Such a development project can be carried out in various ways. The participants were asked to name the typical organization form used for their transformation processes. The analysis of the data shows that, in most cases, virtualization is carried out during the preparation or execution of a client project (Fig. 10). In less than a third of all cases, virtualization takes place as an internal project without direct contact to a particular customer. Least often virtualization is implemented in the course of the wrap-up of a client project.

These results were to be expected in view of the revealed obstacles of virtualization, because these had shown that virtualization can barely be carried out without a concrete demand from clients. About two-thirds of the participants stated that virtualization is carried out before or during a client's project. In these cases, there is thus a customer and a concrete demand. If consulting businesses want to address new clients or client segments, and they want to use virtual consulting services to do this, then the design and development without a specific customer project might be necessary.

No significant correlation between the size of the consulting provider and the question, how the digital transformation is organized could be discovered in our study. Likewise, the organization of the transformation process seems to be independent from the consulting field. Should consulting firms intend to use

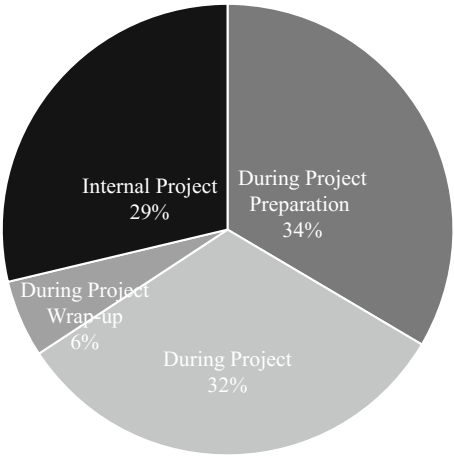

Fig. 10 Project context of virtualization (n = 397). Nissen and Seifert (2016a) in source: Deelmann T, Ockel DM, in collaboration with BDU e.V. (eds) Handbuch der Unternehmensberatung, loose-leaf book, state 2017, KZ. 7312, courtesy of Erich Schmidt Verlag GmbH & Co. KG, Berlin 2017, more about the loose-leaf book at http://www.esv.info/978-3-503-07846-2

virtualization outside the context of a customer project, they can try to involve innovative clients to determine, at an early stage, whether their own ideas relate to the client's demand. This way, acceptance and chances of success of virtual consulting services can be improved, right from the beginning.

The development of virtual consulting services detached from a particular consulting project and unencumbered from daily business makes it easier to continuously and purposefully deploy resources. Should, however, virtualization concepts be developed alongside a proceeding client's project, the danger increases that the conceptual work done for the digital transformation comes short due to daily business.

The virtualization of consulting services can, therefore, be organized in different ways. The implementation certainly also depends on which application should be developed.

3 Maturity Model of Digital Transformation in Consulting

3.1 Four Maturity Levels

The virtualization of consulting services depicts a transformation process, where, in the simplest case, individual consulting services, and at the highest level of maturity, the complete business model of a consulting business are digitally transformed.

Digitalization as the decisive mechanism for virtualization makes the extensive networking among the actors of consulting processes possible. Hence the consultants, clients and partners are part of a transformation process. To be able to characterize this conversion, and for orientation in this challenging transformation process, we defined four maturity levels for consulting providers (see Fig. 11).

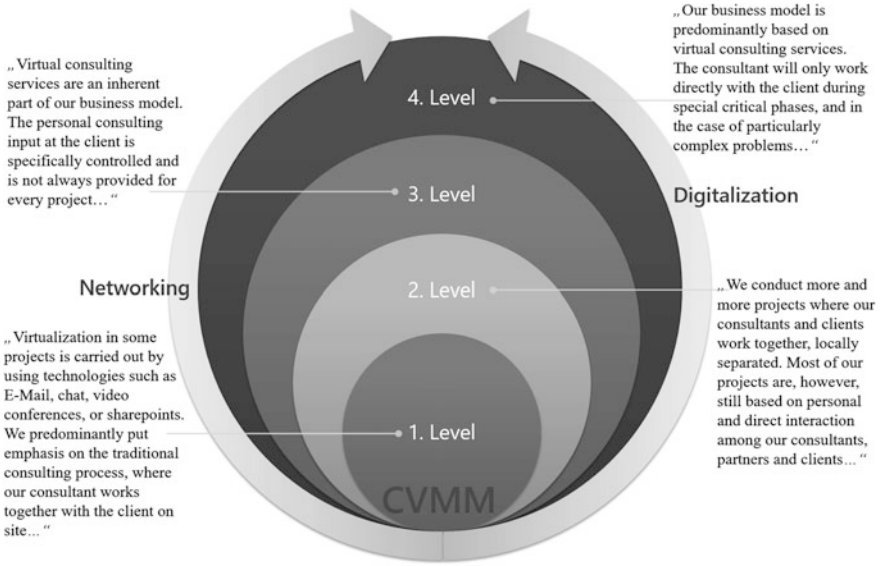

Fig. 11 Consulting virtualization maturity model (Nissen and Seifert 2016b)

These four maturity levels are briefly characterized in the following. Later the classification of the participants from our empirical study in this maturity model will also be presented.

First Level—Basic The first level of the model describes a state in which virtualization is used by consulting companies in some projects through the use of technologies such as e-mail, chat, video conferences or sharepoints. The consulting provider predominantly puts emphasis on the traditional consulting process where the consultant personally works together with the client on-site. The consulting organization and the internal processes as well as the added value processes are based on the direct contact among consultants, internal employees, clients and partners. The issue of virtualization could possibly be further taken into account in the future, but at the moment it is only of minor importance.

Second Level—Upward Climber In the second level of virtualization, we assume that more and more projects are conducted where the consultant and client work together, although they are geographically separated. Most of the projects are, however, still based on personal and direct interaction among consultants, partners and clients.

The development of new consulting services with a stronger emphasis on technology is one of the strategic targets of a consulting business at this level. The company is already actively involved in the process of virtualizing internal processes and improves the network among employees of individual business areas through the targeted use of technology. The topic virtualization could possibly be considered more in future, and is currently, however, only of secondary significance.

Third Level—Established Virtual consulting services are an inherent part of the business model of consulting businesses on the third level. Personal consulting input at the client is specifically controlled and is not always provided for every project. The clients, internal employees, partners and consultants of a consulting business are already digitally well connected. Occasionally consulting services are offered, which can be performed fully automated. Virtualization is one of the strategic pillars, and will be inwardly (internal processes) and externally (added value) pushed ahead in the future.

Fourth Level—Master The business model of a consulting business on level four is predominantly based on virtual consulting services. The consultant will only work directly with the client during special critical phases and in the case of particularly complex problems. Many of the offered consulting services are carried out automatically and possibly with remote support by specialists. The consulting company is so well networked with its partners, clients and employees that future problems can be recognized at an early stage and appropriate consulting services can be developed and offered promptly and precisely. The subject of virtualization is of very high importance and is characteristic of this service provider.

As with every maturity model, it should to be noted, that one would be able to differentiate more levels and characteristics, than the four levels mentioned by us. Virtualization, as a digital transformation process, is fundamentally a continuum of changes. However, in order to be able to compare the current state of virtualization in the consulting market and to compare the situation of the different consulting firms, the four levels described above were helpful.

3.2 Maturity of the Consulting Providers in the German Market

We wanted to find out which of the four introduced virtualization maturity levels most likely reflects the situation in the businesses of our participants. Altogether 470 responses could be evaluated (Fig. 12).

Forty-five percent of the participants stated that the progress of virtualization in their company corresponds with level one, whereas 47% identified themselves most closely with level two of our model. Only 7% classified themselves at level three of the transformation process, and merely 1% of the participants stated that they had reached the top level of our model. Consulting businesses with a turnover of more than ten million Euros do, by tendency, have a higher maturity level of virtualization, than businesses with a lower turnover. Large consulting businesses do not only assign a higher significance to virtualization, their transformation process is also further advanced.

By tendency IT-consulting providers show the largest maturity, followed by HR-companies. The consulting providers, who assign a high significance to virtualization, are also more advanced in the transformation of their service systems

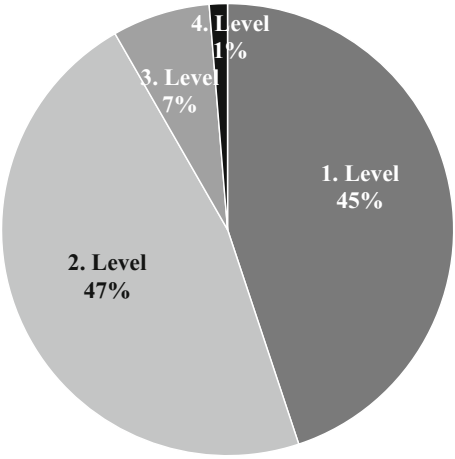

Fig. 12 Virtualization maturity level of the consulting providers questioned (n = 470)

and business models. The actual progress of virtualization is though still inferior to the stated significance. Consulting businesses do not only have to define a strategy for virtualization, they consequently also have to implement this strategy. Other fields of consulting, namely strategy, organization and process consulting, still stand at the beginning of their respective transformation processes.

4 Summary and Outlook

Subsequently the central results of the survey will be summarized in the form of ten theses on virtualization in the consulting business.

I. The significance of virtualization as an innovation driver that paves the way for new business models and consulting services, will increase in the consulting industry.

The study has shown that virtualization in consulting will become more important. Like other industries, the consulting industry also needs to follow the trend of digitalization and networking, and consequently the virtualization of their consulting services and internal processes. To stay competitive, the virtualization potential of one's own business needs to be investigated accurately, so that, at suitable parts of the service spectrum, process steps and even entire services can be virtualized. Moreover, completely new, digitalized services are to be developed and business models critically reflected and altered. The digital transformation calls for a self-critical and creative strategic perspective on one's own business model.

A service portfolio with complementary classical and virtual consulting products is aimed for. Virtualization can be varyingly useful, depending on the consulting issue and the phase of the project. This needs to be evaluated in a sophisticated manner.

In the simplest case, virtualization can be understood as a measure for securing efficiency and flexibility. At the highest evolution level, virtualization offers the opportunity to completely change the delivery model of the company. The consequence would be that the complete service system of the consulting business is changed, and the value chain is optimized. A majority of the consultants questioned in our study recognized this opportunity, and assigned a corresponding high significance to virtualization in the future.

II. Virtualization is particularly advanced in large consulting businesses.

Looking at the status quo of virtualization, it can be determined that simple variants of virtualization are already applied by most of the consulting providers. However, virtualization is more advanced in large businesses, even if the virtualization concepts are at first rather simple.

The starting situation for big consulting companies is good, and an important basis for the future development of more complex virtual services. In the case of small and medium consulting firms, virtualization will first be an important measure to secure efficiency. Moreover, virtual consulting services could exploit new client segments, to whom classical consulting is too expensive. For medium consulting businesses, virtualization may provide further chances for growth. A necessary basis is that digital transformation is solidly rooted in the business strategy, which requires a profound analysis as well as associated knowledge of the topic. Here partnerships with technology vendors or universities can be advantageous.

III. IT- and HR-consulting firms are more advanced in the digital transformation of their own services than is the case in strategy consulting as well as in organizational and process consulting.

Providers of IT- and HR-consulting services assess themselves as comparatively advanced in their digital transformation. It is not surprising that IT-consulting is leading here as it represents the most technology oriented consulting field. IT-consulting has direct access to the technologies, which could also change the service systems of the consulting businesses. HR-consulting services, in the fields of personnel recruitment, selection, and employee development are nowadays already simplified by virtualization. For example, recruiting measures in social media are implemented, or training programs are almost completely deployed

online. The challenge for HR-consulting would rather be to successfully virtualize strategic consulting activities next to the operational ones.

IV. Fully virtualized and automatic consulting services have a subordinated significance to the consulting business according to the participants.

Full virtualization stands for the complete substitution of human work performance by suitable technologies. The majority of the participants in our study assessed the significance of full virtualization as slight, even in the future. Both the application and also the benefits of high- to fully virtualized-consulting services are more dependent on the willingness and skill of the client to use these, as is the case with lesser virtualized consulting offers. Through the automation of service delivery, parts of the human consulting service are substituted and other parts are shifted from the consultant's side to the client. Full virtualization, therefore, requires a substantial contribution from the client, who uses the consulting service independently. Here it is necessary that the client is equipped with the corresponding infrastructure, that he is prepared and has the ability to operate such a consulting application correctly, and that he is able to understand the results of the consulting, and wants to apply them. Full virtualization is, therefore, not suitable for every consulting task and is only implemented by those with know-how to bring key technologies, like big data, and suitable client segments together. At the same time, high requirements on the conception of such consulting products arise.

Our own opinion is that the participants though, underestimate the long-term potential of full virtualization for (selected) consulting services.

V. In the course of a typical consulting process, the preparation phase, problem analysis phase and the wrap-up phase of a project are more rapidly, and by tendency, stronger virtualized than other phases such as the acquisition and solution design.

The virtualization of consulting services necessitates the analysis of the phases of a typical consulting project and the differentiation of these phases according to the degree, to which they can be virtualized. The following typical phases, which are ideal during the consulting process, could be differentiated: the acquisition, project preparation, problem analysis, solution design, implementation and wrap-up work. When considering virtualization, it is necessary to analyze these individual phases, the assigned tasks and the actors in a differentiated way. Depending on the outcome, virtualization will be more or less advantageous. Currently, in particular the phases project preparation and wrap-up are stronger virtualized, as they are marked by a less complex interaction pattern. Fundamentally, technology for

virtualization is nowadays potentially used in every project phase. The level of virtualization decreases, though, in the phases design and implementation of a solution. Here it is possible, that especially in the case of highly standardized services, changes will come in the future. These offer great potential for virtualization, up to automated self-service applications for the client, in the extreme case. The future significance of extensive automated, analytical applications, in the scope of the analysis phase, should also not be underestimated.

The development of web-based consulting portals, which may in the future be used for the virtual marketing, sales, initiation as well as the handling of consulting projects, should take place under the stipulation, that classical and virtual consulting services (with different levels of virtualization) should be depicted in a client-oriented way within a single "consulting environment". In this way, a platform for the continuous interaction between the client and the consultant is offered, which will intensify the consultant-client relation.

VI. Currently mainly supporting technologies for slightly virtualized consulting services are implemented. Automation, Virtual Reality and Artificial Intelligence are still in the early stages.

If one looks at the actual distribution of consulting services or internal processes with varying levels of virtualization, it becomes clear that only the slightly virtualized services are daily or regularly used. The higher the level of virtualization, the more rarely it is nowadays used in consulting practice. In order for stronger virtualized consulting processes to find their way into the company, and to make use of higher virtualization in internal processes, visions and substantial innovative power are needed. Here it is necessary to integrate the strategic, procedural and technological aspects meaningfully. This imposes high technical requirements on the consulting businesses, not only during the design and implementation of virtualized consulting concepts, but also in terms of the internal change management as well as the sales-related interface toward the clients. When, for example, technology oriented consultants think about meaningfully using their technological potential for virtualization, the competencies of other consulting fields, for example process consulting, are also in demand.

VII. The integration of clients into the design and development process of virtual consulting services will be crucial to their success.

Within this survey, we could show that the clients' attitude, their acceptance and trust is crucial to the success of virtual consulting services. To be able to develop

and offer long-term, successful consulting services, close cooperation and coordination with key clients are needed, which does not necessarily have to be within a concrete client's project. From the first idea of an innovative consulting service, to its design, implementation and usage, the focus should be on the integration of particularly innovative, technology-affine key clients.

VIII. The so far low demand for (highly) virtualized consulting services is the largest obstacle on the way to the in-depth penetration of virtualization in the consulting practice.

The question, why consulting businesses do not invest in the development of innovative virtual consulting services, is predominantly answered by the low demand of the clients. Barriers, such as the lack of know-how, the availability of resources, financial obstacles or technologies are considered less critical. Our results show that the demand and acceptance of the clients, as well as a missing strategic fit within the consulting service portfolio, were the three determining impediments. According to the participants, know-how, technology and resources are either there, or they are acquired as soon as a business case is given. This attitude is reflected in the actual progress of virtualization in the consulting branch, and in the distribution of related tools and services. The client's demand for innovative and highly virtualized consulting services are absent in most of the consulting businesses. Consulting providers should, therefore, ask the question how the demand for virtual consulting services can be increased. Here the cooperation with key clients, and the active marketing of these pilot projects will be of vital significance. Concerning the topic of digitalization of their own processes and services, consulting businesses should not repeat the mistake other industries have already made, namely to adopt a strong waiting attitude. That way a chance would be wasted. The contrary is true. At an early stage, with a strategic foresight and creativity, consulting firms should occupy themselves with the chances and risks of virtualization, in view of their own service portfolio. They should also accumulate competitive know-how. Here it is also meaningful to experiment. We are convinced that parts of consulting businesses will in future proceed quite differently than it is the case today. Those who are conceptually involved at an early stage, have a long-term chance of a sustainable competitive advantage.

IX. Virtualization will enable new forms of clients' integration, where a common data base forms the foundation for innovative consulting services.

Previous models for the cooperation within consulting are partly revolutionized by virtualization, as new modes of cooperation, as well as communication- and

cooperation-platforms develop. The adolescent generation is used to interact virtually and to exchange information online. In future this next workforce generation will have completely different expectations concerning the work and forms of cooperation with each other. This will increase the acceptance for virtual cooperation, and eventually also of virtual consulting services.

X. Consulting providers with no technology background should seek for cooperations with technology providers and universities, to secure their future competitive capability.

The starting situation of technology oriented consulting firms is better than that of other companies. The others should form strategic alliances with companies offering technologies relevant to virtualization in order to compensate their weaknesses, and nonetheless, have the chance of using virtualization.

For the consulting industry, virtualization promises innovative opportunities to optimize their own performance and to differentiate in competitiveness. A detailed analysis of their own service portfolio, in terms of the potential, which virtualization offers within the phases of consulting projects, within the internal consulting organization, and in cooperation with clients and partners, is necessary. For this purpose, knowledge should be accumulated at an early stage, and a consistent strategic vision should be developed, which meaningfully combines virtualization and the traditional consulting approach. The early involvement of technology-affine clients in the complete process, from the development to the implementation of virtual consulting products, will be the key to success.

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