

# How Digital Business Strategy Affects Profitability: Opening the ‘Black Box’ of Performance

*Completed Research*

**Matthias Murawski**

ESCP Europe Business School Berlin  
mmurawski@escpeurope.eu

**Julian Bühler**

ESCP Europe Business School Berlin  
jbuehler@escpeurope.eu

**Malte Martensen**

IUBH School of Business and Management  
m.martensen@iubh.de

**Christina Rademacher**

Promerit AG  
christina.rademacher@promerit.com

**Markus Bick**

ESCP Europe Business School Berlin  
mbick@escpeurope.eu

## Abstract

In the context of the digitalization, a growing number of both researchers and practitioners recommend developing a Digital Business Strategy (DBS). While drivers such as technological trends, organizational shifts, as well as key themes of the DBS are well understood, its impact on organizational performance lacks investigation. The objective of this paper is to contribute to a more detailed understanding of performance by focusing on the mechanisms that lead to a higher profitability as a result of the DBS. Based on a sample consisting of 123 large enterprises from Germany, Austria, and Switzerland, including 16 stock-listed enterprises (DAX), we calculated a mediated path model in AMOS. Results indicate that a) DBS is positively related to innovation and b) innovation has a strong positive impact on profitability, but that it is fully mediated by organizational agility. Corresponding theoretical as well as practical contributions are discussed.

## Keywords

Digital Business Strategy, Innovation, Organizational Agility, Performance, Profitability, Mediation.

## Introduction

Typical headlines in today’s business press are *Evolve Or Die: Why Digital Transformation Is More Important Than Ever* (Bainbridge 2017) or *Why digital transformation is now on the CEO’s shoulders* (Siebel 2017). Various consultants and experts in the field of digitalization emphasize the importance of becoming more *digital*. Digital technologies, such as SMAC (social, mobile, analytics, cloud) technologies, allow different approaches to reach the customer, to optimize own processes, or to build new networks and ecosystems (McAfee and Brynjolfsson 2017). These massive changes of the entire business landscape lead to the demand for strategic approaches taking the ‘digital world’ into account (Bharadwaj et al. 2013; Matt et al. 2015; Yoo et al. 2010). In this paper, we focus on one of these approaches: the Digital Business Strategy (DBS) of Bharadwaj et al. (2013).

The conceptual model of the DBS by Bharadwaj et al. (2013) focuses on the key themes of the DBS which are scope, scale, speed, and value creation. The DBS model also describes technological trends such as Artificial Intelligence (AI), Virtual Reality (VR), platforms and ecosystems, cloud computing, or the Internet of Things (Accenture 2017). Furthermore, organizational shifts such as new roles for coping with the

digitalization, for example the Chief Digital Officer (CDO) (Horlacher and Hess 2016), new business models (Veit et al. 2014), or the need for digitally competent employees (Murawski and Bick 2017) are part of the DBS model of Bharadwaj et al. (2013). These aspects, meaning key themes, technological trends, and organizational shifts, are current topics the IS community is engaged in.

However, it is also postulated that the DBS has an influence on the performance of a company (Bharadwaj et al. 2013). But what does performance mean in this regard? This question, although obviously very important, is neither discussed by Bharadwaj et al. (2013) in their paper, nor among IS scholars in general. Considering the performance of a firm, there is a great consensus that one of the overall goals is profitability (Sundaram and Inkpen 2004). However, a strategy itself, i.e., the DBS, does not have a direct link to profit. Instead, it has an influences on constructs such as innovation and organizational agility, which, consequently, lead to higher profitability (Balaji et al. 2015; Ravichandran 2017; Teece 2010).

We believe that leaving the performance part unexplored is a lack of the existing DBS model, as a sound understanding of a strategy's outcome would be a benefit for managers. It would, furthermore, increase the theoretical background of the DBS in terms of completeness. Therefore, the objective of this paper is to open the 'black box' of performance by answering the following research question:

*What are the mechanisms that lead to a higher profitability as a result of the Digital Business Strategy?*

The remainder of this paper is structured as follows. In the next section, we begin with the presentation of the conceptual DBS model of Bharadwaj et al. (2013). Furthermore, we develop a theoretical (sub-)model of performance of the DBS based on literature. In the following sections, we first outline our research method and then empirically test our model. This paper ends with a discussion and some concluding remarks.

## **Theoretical Foundation**

### ***Digital Business Strategy***

Following Legner et al. (2017, p. 301), we define digitalization very broad as the “manifold sociotechnical phenomena and processes of adopting and using [digital] technologies in broader individual, organisational, and societal contexts.” Focusing on the technology aspects, digitalization is related to converging SMAC (social, mobile, analytics, cloud) technologies and continuing miniaturization; and combined with increasing processing power, storage capacity, and communication bandwidth (McAfee and Brynjolfsson 2017). These digital technologies have the power to complement and enrich existing products and services and enable entirely new business models (Legner et al. 2017; Veit et al. 2014).

The increasingly dominant role of technology in business also impacted the view on IT strategy. In recent decades, the so-called alignment view (Henderson and Venkatraman 1993) was the prevailing approach. IT strategy was seen as a functional strategy that had to be aligned to business strategy. Furthermore, IT strategy was subordinate to business strategy. Given the fundamental role of IT for business nowadays, the alignment-view must be put into question.

In our paper, we refer to the approach of Bharadwaj et al. (2013) who suggest the concept of the Digital Business Strategy (DBS). According to their rather broad definition, the DBS is an “organizational strategy formulated and executed by leveraging digital resources to create differential value” (Bharadwaj et al. 2013, p. 472). More detailed, they identify four key themes that serve as the framework for the DBS. These four key themes are scope, scale, and speed of DBS, as well as the sources of value creation and capture (see Figure 1). Bharadwaj et al. (2013) also present potential drivers, meaning key external digital trends such as global supply chains, growth of cloud computing, and the emergence of big data; and key organizational shifts such as the limitations of traditional business models, and the trans-functional role of IT.

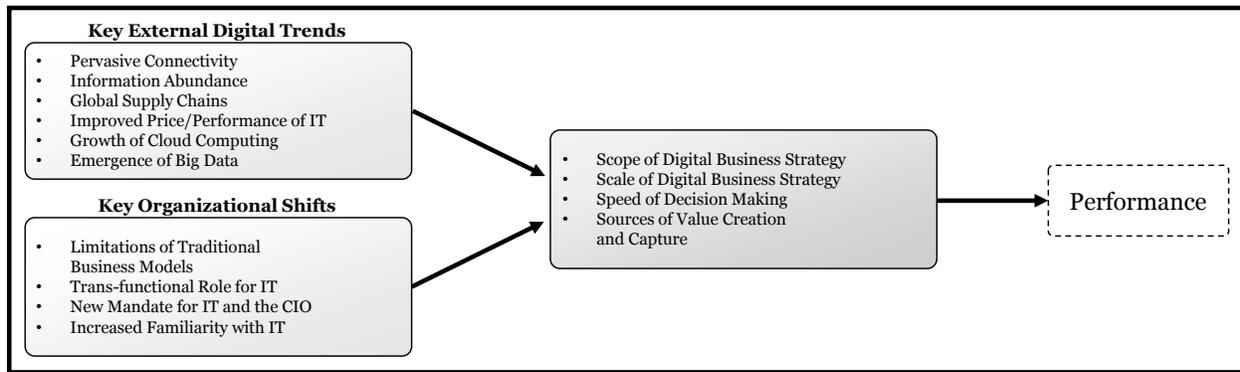
**Scope of DBS.** Generally, the scope of a company in a strategy context can be defined as the ‘portfolio of products and businesses as well as activities that are carried out within a company’s direct control and ownership’ (Bharadwaj et al. 2013, p. 473). Scope, e.g., in terms of diversification, has been proven to impact the performance of a company (Wade and Hulland 2004). This scope is affected by digital technologies in several ways, for example through the integration of internal and external platforms (Rai et al. 2012). DBS transcends traditional functional and process silos, thereby changes the scope of a company. This is in line with the above-mentioned rethinking of the strategic role of IT from a functional strategy to an overall

business strategy aspect. Furthermore, “the formulation of digital business strategy includes the design of products and services and their interoperability with other complementary platforms, and their deployment as products and services by taking advantage of digital resources” (Bharadwaj et al. 2013, p. 474). As in the definition of DBS in the previous paragraph, the concept of digital resources is mentioned. Digital resources are “more than just bits and bytes, the digital infrastructure consists of institutions, practices, and protocols that together organise and deliver the increasing power of digital technology to business and society” (Deloitte 2009, p. 2). Digital resources are, thus, a broad construct and find their theoretical roots in both the resource-based view (Barney 1991; Wernerfelt 1984) and the dynamic capability perspective (Teece et al. 1997; Teece 2007).

**Scale of DBS.** The second key theme in the model of Bharadwaj et al. (2013) is the scale of DBS. Generally, scale is related to benefits out of lower unit costs of products. Digital technologies enable numerous opportunities to increase the scale. Bharadwaj et al. (2013) suggest four ways to consider in this regard. First, the emergence and development of cloud technologies (e.g., everything-as-a-service) allows an on-demand access to a shared pool of powerful and up-to-date resources. Investments in digital infrastructure and applications become more flexible and fixed costs decrease. Second, the role of networks and therefore network effects get more important. A network effect means that the value of a product or service increases the more consumer use them. The classical examples are social media services (e.g., Facebook, Twitter), online shopping platforms (e.g., Amazon), and online games. Third, scaling in a digital environment is related to big data (Fosso Wamba et al. 2015). All the networks mentioned before produce massive amounts of data, but the increasing importance of cyber-physical systems with billions of sensors is going to boost this trend. Companies which are able to make use of big data analytics, for example, in terms of process optimization, could thereby positively influence their scale. Fourth, scale can be influenced by partnerships and alliances. Typical examples are the travel and hospitality sector in which, amongst others, reservation systems and loyalty programs are shared.

**Speed of DBS.** Time has always been considered as an essential driver of competitive advantage (Stalk 2014). However, digital technologies have led to a faster world. Bharadwaj et al. (2013) identify four dimensions of time which should be thought of. First, rapid developments and innovation regarding software and hardware urge companies to plan continuous product launches which are aligned to market developments. Otherwise, companies face the risk of not fulfilling customer demand. The speed of product launches is thus accelerated. Second, the speed of decision making accelerates as well. Innovative and ‘intelligent’ information systems combined with access to massive amounts of data force this trend (Accenture 2017). Customers demand immediate response, which, in turn, requires fast decision making and even real-time solutions. Third, the speed of supply chain orchestration has an impact. The best-in-class companies in this regard are typically not the traditional market players although they apply ERP systems combined with outsourcing of non-core activities. Instead, it can be observed that comparable ‘young’ companies such as Apple, thanks to its effective and efficient but also dynamic supply chain orchestration, reaches KPI’s (e.g., days of inventory in the supply chain) which are much better than the competitor’s values (Bharadwaj et al. 2013). This approach allows a faster adaption to market dynamics and innovation development. Fourth, and partly related to the previous point, the speed of network formation and adaption becomes more important. Bharadwaj et al. (2013) compare the digital business ecosystem mobile apps with more traditional supply chains in sectors like automotive and chemicals. While app developers “align and realign their affinity to the different platforms based on technical functionality and attractiveness” (Bharadwaj et al. 2013, p. 477), the incumbents are often less flexible.

**Sources of Value Creation and Capture.** In addition to traditional ways, digitalization enables new opportunities of value creation which are linked to the three key themes previously discussed. Again, four different aspects are outlined by Bharadwaj et al. (2013). First, companies have various options to reach an increased value from information. Examples are new subscription and advertising models, and personalized offerings. Second, value creation from multisided business models is one of the key features of many successful companies. Bharadwaj et al. (2013) discuss the case of Google, which even gives away its software (Android) free and monetizes it through its power and ability to influence and control advertising. Third, as the extension of the multisided business models, value capture could take place through coordinated business models in networks. This means that a number of different companies establish networks and share their pieces of value for creating a greater overall value. Fourth, Bharadwaj et al. (2013) explain that companies such as Apple benefit from value appropriation through control of digital industry architecture.



**Figure 1. Theoretical Foundation and Conceptualization based on Bharadwaj et al.(2013)**

### ***Research Model and Hypotheses***

What is missing in the paper of Bharadwaj et al. (2013) is a detailed explanation of what is meant by performance. Therefore, based on the DBS model of Bharadwaj et al. (2013), the objective of our paper is shedding light on the outcome of the DBS, or, in other words, opening the ‘black box’ of performance related to the DBS. To our best knowledge, scientific literature regarding the topic of performance in a DBS context is rare. There are some non-scientific publications dealing with the ‘return on digitalization’ (e.g., Moran 2017). However, they solely consider potential increase of sales as the indicator for performance. Our goal is, instead, to get a deeper understanding of the mechanisms that lead to the increase of sales and profitability.

Teece (2010) discusses the relation between business models, business strategy, and innovation: “Good business model design and implementation, coupled with careful strategic analysis, are necessary for technological innovation to succeed commercially: otherwise, even creative companies will flounder” (Teece 2010, p. 184). Based on this, we postulate that innovation seems to be one of the mechanisms leading from the DBS to higher profitability. Innovative firms are assumed to be more likely to engage in learning and experimenting, are able to cope with high uncertainty, and are more open to risk (Hurley and Hult 1998). Innovation can be considered from different perspectives. In their digital innovation framework, Nylén and Holmström (2015) suggest the following three dimensions: product (with areas like user experience and value proposition), environment (digital evolution scanning), and organization (skills, improvisation). Taking the DBS of Bharadwaj et al. (2013) into consideration, all these three dimensions are covered. Therefore, we first hypothesize:

**(H1)** *Digital Business Strategy will have a positive relationship with innovation.*

**(H2)** *Innovation will have a positive relationship with profitability.*

Another mechanism that potentially influences the relationship between DBS and the final outcome, that is profitability, is organizational agility (Balaji et al. 2015). Following Ravichandran (2017, "Organizational agility", para. 2), we conceptualize organizational agility as “a firm’s capacity to respond with speed to environmental changes and opportunities and define it in terms of three dimensions: customer responsiveness, operational flexibility and strategic flexibility.” This definition is based on an analysis of a set of different organizational agility definitions and similar to other recent work on this topic (e.g., Felipe et al. 2016). The term ‘speed’ in the definition of organizational agility provides a hint towards the link between agility and the DBS in which speed is one of the key themes.

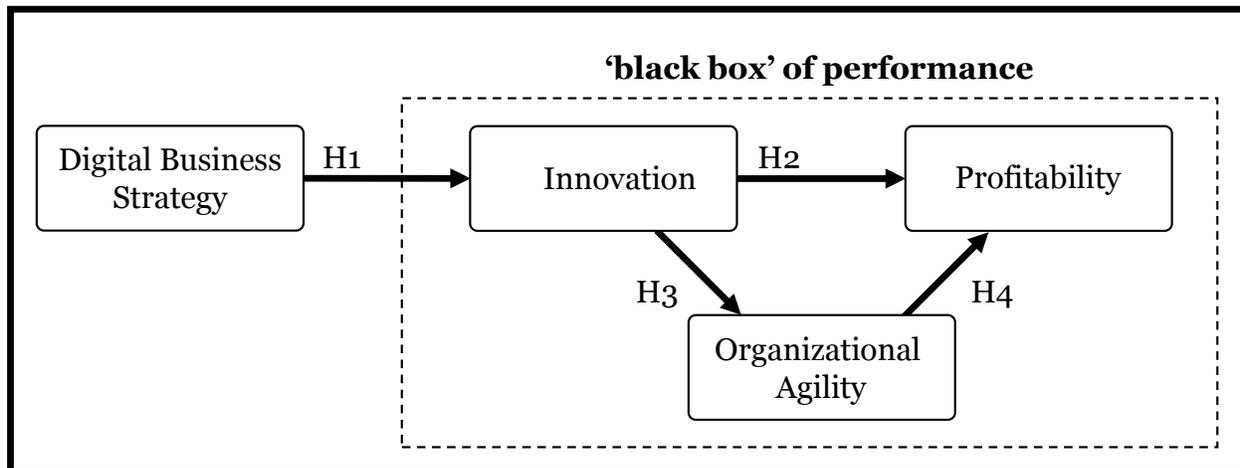
Ravichandran (2017) suggests a conceptual model that, besides organizational agility, also contains the construct of innovation. He emphasizes two aspects that underline the link between organizational agility and innovation. First, innovative firms, which are open to risk, benefit from a climate that allows experimentation. Experimentation and pursuing different courses of action “is necessary to identify appropriate rent yielding complementary interactions among firm resources” (Ravichandran 2017, "Innovation capacity and organizational agility", para. 6). Innovative firms tend to be more open to new ideas. They are able to respond quickly to new market conditions, for example, changing customer needs. They can, thus, be considered more agile (Rindova and Kotha 2001). Second, innovative firms tend to have

a tighter coupling of new business models with the rest of the organization. This makes it easier for these firms to assemble the resource bundles which are needed to market new products and services (Ravichandran 2017). Therefore, we hypothesize a mediating effect of organizational agility on the relationship between innovation and profitability:

**(H3)** *Innovation will have a positive relationship with organizational agility.*

**(H4)** *Organizational agility will have a positive relationship with profitability.*

Based on our hypotheses, we derive the following conceptual path model with the mediating effect of organizational agility inside the ‘black box’ of performance (Figure 2).



**Figure 2. Research Model**

## Research Design and Methodology

### Research Approach

A quantitative research approach was chosen to empirically test our previously postulated research model because it allows a full analysis of the mediated paths. The DBS serves as the independent exogenous variable that ultimately impacts the profitability of a company (dependent endogenous variable) through its level of innovation. This effect is expected to be mediated by organizational agility. To measure these mechanisms, we developed a questionnaire that addresses several key aspects of digitalization, such as digital transformation processes and digital strategy in the company. It was not explicitly divided into core sections, but certain question blocks exist of which the most relevant ones for this particular study will be explained in more detail.

In the first block that is of relevance for testing our research model, we ask the respondents questions referring to the digital strategy within the company, i.e., how the strategy is exemplified by the top management, how deep the strategy is tied within certain company departments (e.g., HR, IS), and if strategic initiatives are planned. But most importantly, the respondents had to state specifically to which extent a digital business strategy is implemented in their company as this is the basis for the DBS variable.

A second important question block addresses the performance of the company and it builds the basis for the variables that are covered in the ‘black box’ or our model. Participants are requested to state how they see their company in terms of key performances factors. We theoretically argued for the opening of the performance ‘black box’ and for the initial analysis of the interplay between innovation, organizational agility, and profitability. That is why we concentrated on these factors in the questionnaire design and asked participants how innovative their company is, how they perceive the willingness and readiness of the company to change during the process of digital transformation, and about the company’s overall profitability.

All items were measured consistently on 5-point Likert scales and we also asked for some basic demographics and core statistics such as the position of the respondent within the company.

## Data Collection

During the data collection stage, we worked together with a leading market research institute to address a diverse portfolio of organizations. Our study design did not aim at a specific target group in terms of the industry. We did, however, target larger companies with headcount ranging from 500 to over 50,000. Furthermore, we placed the focus on organizations headquartered in Germany, Austria, and Switzerland. In a first step, the questionnaire design was pretested with heads of human resources and/or organizational development of ten exemplary companies, and we used the initial feedback to rephrase some questions and change the order of questionnaire blocks to achieve a better understanding.

The questionnaire was then finalized and used to interview the sample of company representatives mainly by conducting standardized telephone interviews. On average, the participants needed around 20 minutes to respond to all questions. In addition, identical paper-based versions were handed out during a dedicated round table session to participants and filled in subsequently. For the purpose of this study, all questionnaires were anonymized and then used for the following analysis.

## Results

### Descriptive findings

At the end of the data collection stage, all responses were transferred to the statistics software IBM SPSS (version 24) for further analyses including reliability checks, the calculation of means and descriptive statistics, as well as initial analyses of variances. For the calculation of the path model, we used IBM AMOS (version 25).

Overall, n=126 questionnaires were gathered which we initially checked for missing data and reliability. Especially for self-reported and context-specific questions, we checked the consistency because such questions are more vulnerable to response biases (Hufnagel and Conca 1994). Consequently, three participants were excluded and, thus, we received a final sample size of n=123. Some of the important descriptive results are summarized in Table 1:

DAX company	Current position	“Digital strategy is exemplified by top management” <sup>1</sup>	“Digital strategy is tied within the HR & IS department” <sup>1</sup>
Yes: 16 (13%) No: 107 (87%)	C-level: 39 (48.8%) Leading position: 60 (31.7%) Other position: 24 (19.5%)	A: 17 (13.8%) B: 24 (28.5%) C: 38 (30.9%) D: 13 (10.6%) E: 7 (5.6%)	A: 46 (37.4%) B: 35 (28.5%) C: 25 (20.3%) D: 12 (9.8%) E: 4 (3.3%)
<sup>1</sup> Likert scale categories: A=Completely agree, B=Rather agree, C=Undecided, D=Rather disagree, E=completely disagree			

**Table 1. Summary of important descriptive survey results**

The descriptive results reveal that more than 80% of our respondents have at least a leading position within the company that gives them the power to make important decisions. As 16 companies are additionally stock-listed German enterprises (DAX), our sample can be considered as very suitable from a quality perspective in terms of answering questions that address digital transformation of a company.

In preparation for the path model analysis, we briefly address three descriptive results that classify the companies in the sample as to their general digital setting. On average, in 73 (59.4%) of the companies exists a high willingness to use new IS technologies whereas in only 10 (8.1%), the willingness to use these technologies is low (average willingness: 32.5%). More than half of the companies according to their respondents (n=63, 51.2%) have the digital competency to implement a digital transformation process and only 14 (11.4%) say that they lack such competency. Consequently, a majority of 53.3% (n=65) capitalizes from these opportunities and claims that they use their digital potential to rethink their product and services, in contrast to a minority of 13.0% (n=16) that do not capitalize. Overall, our sample of analyzed

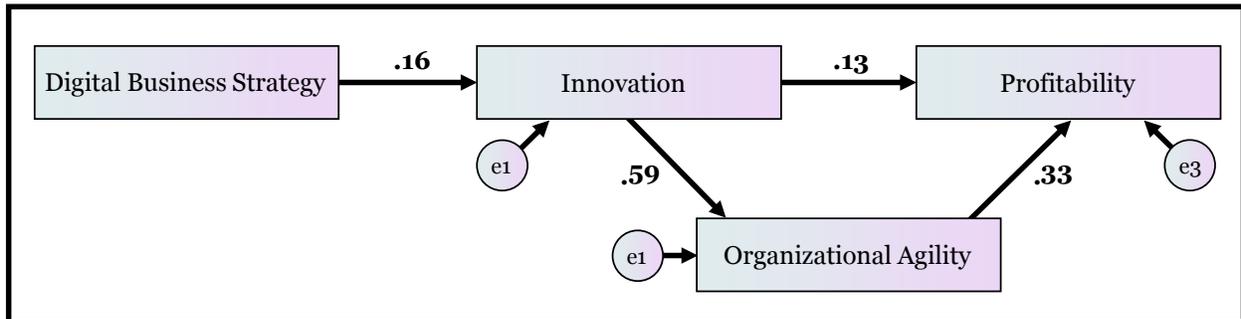
companies can be classified as rather open-minded about digital transformation and digitalization in general and, therefore, it is suitable for the intended path model analysis which follows.

**Path Model and Mediation Analysis**

For the creation of the research model as visualized in Figure 2, we followed a theory-driven approach that led to a *basic mediation* (Pieters 2017). In this model, the impact of innovation towards profitability mediated by organizational agility is measured. For the statistical procedure of testing the mediated effect, we followed the four steps summarized by Fritz and MacKinnon (2007) that we transferred to our model as follows:

1. Step: The total effect of innovation on profitability must be significant (hypothesized in H2)
2. Step: The effect of innovation on organizational agility must be significant (hypothesized in H3)
3. Step: The effect of organizational agility on profitability must be significant (hypothesized in H4)
4. Step: The direct effect of innovation on profitability must be non-significant

Accordingly, we designed our research model in AMOS to calculate the overall model. The software calculates the direct and indirect effect and, thus, allows to test for mediation and its significance. After we ran the model, we first tested for the overall model fit as discussed by Ruckstaetter et al. (2017), and our model indicates a very good overall fit in terms of RMSEA=.036 (<.05), GFI=.991 (>.95) and a nonsignificant Chi-square=2.308 (p=.315), which would otherwise suggest misspecifications. The path coefficients of the overall research model (Figure 3) reveals strong values >.3 for the paths to and from organizational agility that is hypothesized to mediate the model, whereas the values for DBS on innovation is slightly below the threshold of .2 for the standardized model and for the direct effect of innovation to profitability clearly below it (Chin 1998).



**Figure 3. Results of path model calculation with AMOS**

The effect of DBS on innovation in the AMOS model is rather low, but significant on the .9 confidence level (p=.073 < .1). Thus, we calculated a single analysis of variances (ANOVA) with SPSS in addition to cross-check the significance of this path. The results indicate a significant impact on the .95 confidence level (p=.02 < .05) of DBS on innovation if individually measured (Table 2).

	Sum of squares	df	Means	F	Significance
Between groups	22.685	4	5.671	3.041	.020**
Within groups	220.063	118	1.865		
Total	242.748	122			
** p<.05					

**Table 2. Single ANOVA result (DBS on innovation)**

The influence of DBS on innovation is positive according to the path values of AMOS and is significant according to AMOS and also—even stronger—significant if individually measured in SPSS. Consequently, H1 is supported and we could show that Digital Business Strategy (DBS) has a positive, significant relationship with innovation.

For the testing of the mediation and, thus, H2-H4, we analyzed the AMOS output regarding the previously mentioned steps. All key results discussed in the following paragraphs are summarized in Table 3. Step 1 requires the total effect of innovation on profitability to be statistically significant. For the standardized model, the two-tailed significance using the bias-corrected percentile method is  $p=.024$  and, hence, statistically significant on the .95 confidence level. Thus, H2 is supported.

Step 2 and step 3 address the paths from and to the suggested mediator organizational agility and both revealed strong path coefficients  $>0.3$  (.59 for innovation to organizational agility; .33 for organizational agility to profitability). The AMOS results indicate that these paths are highly significant as both have a p-value of .002 ( $p < 0.01$ ). As the requirements of step 2 and step 3 for mediation in our model are sufficiently met, with both direct effects being highly significant, H3 and H4 are consequently supported.

For the final evaluation of the overall mediation, we further must consider the direct effect of innovation to profitability compared to the indirect effect via the suggested mediator. This shows the significance of the mediation and its type. The AMOS bootstrapping output reveals in this regard that the direct effect of innovation towards profitability, which has already shown a low path coefficient, is not significant ( $p=.322$ ). However, the indirect effect from innovation via organizational agility to profitability is highly significant ( $p=.003$ ) on the .99 confidence level. Therefore, organizational agility fully mediates the impact of innovation on profitability in our model and this mediation is highly significant.

Total effect	P	Direct effects	Estimate	P
innovation → profitability	.024**	innovation → organ. agility	.592	.002***
Indirect effect	P	innovation → profitability	.126	.322 n.s.
innovation → organ. agility → profitability [full mediation]	.003***	organ. agility → profitability	.328	.002***
** $p < .05$ , *** $p < .01$ , n.s. = not significant				

**Table 3. Overview of AMOS results for the mediated model within the ‘black box’ of performance**

## Discussion

Our study contributes to both theory and practice. From a theoretical perspective, we contribute to a more complete picture of the DBS. Bharadwaj et al. (2013) suggest a conceptual model without explaining the effects of the DBS on the firm’s performance. We develop a potential addition that sheds light on performance and underlying mechanisms.

Specifically, our results clearly suggest that opening the ‘black box’ of performance was a meaningful decision. We could provide evidence for an interplay of three factors within the performance construct and, therefore, contributed to the scarce IS research that exists in this field. We revealed that a company’s innovation affects the profitability, but that there is no direct effect between these items. Instead, we demonstrated that this relationship is fully mediated by the company’s organizational agility, i.e., how flexible a company can react to environmental and organizational changes.

Based on these empirical findings, we can answer our initially raised research question—what mechanisms lead to a higher profitability as a result of a DBS—in the following way: a suitable DBS that is fully integrated within a company and exemplified by leading personnel can significantly impact the firm’s level of innovation. Innovation itself is considered as the first element within the ‘black box’ of performance, which was not subdivided in detailed parts by Bharadwaj et al. (2013). It ultimately effects, via the mediator organizational agility, the firm’s profitability. By adding the constructs of innovation and organizational agility, we provide new links to neighboring academic disciplines. The proposed sequence of these constructs could be a valuable input to related research.

From a practical perspective, our study supports managers in developing their own digital strategy and in getting a more complete picture of its requirements. For example, developing and implementing a DBS ‘top-down’ without enabling innovation and agility, would be useless in terms of profitability.

## Conclusion

We believe that the DBS model of Bharadwaj et al. (2013) and related research (e.g., Hess et al. 2016; Matt et al. 2015) is of great importance in today's digital world. However, the aspect of 'earning money' is probably one of the most important ones in the business world, but the underlying mechanisms are not explained in the initial DBS. In this paper, we focus on this shortcoming and open the 'black box' of performance. We are aware that our study is of explorative nature and, thus, only the beginning towards a comprehensive understanding of the broad and complex construct performance.

As in every research project, some limitations come along with this paper, which we will address and use to derive links to potential avenues of future research. From a methodological point of view, discussions exist whether or not mediated models are applied accurately by most researchers. Pieters (2017) recently discussed the misuse of mediation in the way that the underlying path model is not sufficiently driven by theoretical reasoning. Upcoming studies could investigate multiple mediated models or moderated mediations (cf. Pieters 2017), such as structural equation modelling, to identify causality in addition to organizational agility, or time-ordered path models (cf. Tate 2015, p. 236) to identify "specific time ordering of variables".

Another limitation lies in our sample which consists of respondents from Germany, Austria, and Switzerland. Although of high quality (i.e., mainly middle and top managers in large and sometimes even listed companies), this focus limits both the context of our study and the generalizability of our findings. Thus, a promising way to increase generalizability would be to replicate our study in different countries. A similar avenue for further research could be considering companies with different size, for example, start-ups. Especially start-ups are assumed to be more digital, innovative, and agile, which might lead to even stronger results than we could get for our sample. There is a variety of important unanswered questions, and by opening the 'black box' of performance, we have paved the way for fruitful upcoming research activities in the field of DBS.

## REFERENCES

- Accenture 2017. *Technology Vision 2017: Amplify You - Technology for People. The Era of the Intelligent Enterprise*. <https://www.accenture.com/us-en/insight-disruptive-technology-trends-2017>. Accessed 28 February 2018.
- Bainbridge, M. 2017. *Evolve Or Die: Why Digital Transformation Is More Important Than Ever*. <http://www.brandquarterly.com/evolve-die-digital-transformation-important-ever>. Accessed 23 February 2018.
- Balaji, M., Velmurugan, V., and Subashree, C. 2015. "TADS: An assessment methodology for agile supply chains," *Journal of Applied Research and Technology* (13:5), pp. 504–509.
- Barney, J. 1991. "Firm Resources and Sustained Competitive Advantage," *Journal of Management* (17:1), pp. 99–120.
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., and Venkatraman, N. 2013. "Digital Business strategy: toward a next generation of insights," *MIS Quarterly* (37:2), pp. 471–482.
- Chin, W. W. 1998. "Issues and Opinion on Structural Equation Modeling," *MIS Quarterly* (22:1), p. 1.
- Deloitte 2009. *Measuring the forces of long-term change - The 2009 Shift Index*. <http://www.johnseelybrown.com/shiftindex.pdf>. Accessed 24 January 2018.
- Felipe, C. M., Roldán, J. L., and Leal-Rodríguez, A. L. 2016. "An explanatory and predictive model for organizational agility," *Journal of Business Research* (69:10), pp. 4624–4631.
- Fosso Wamba, S., Akter, S., Edwards, A., Chopin, G., and Gnanzou, D. 2015. "How 'big data' can make big impact: Findings from a systematic review and a longitudinal case study," *International Journal of Production Economics* (165), pp. 234–246.
- Fritz, M. S., and MacKinnon, D. P. 2007. "Required Sample Size to Detect the Mediated Effect," *Psychological Science* (18:3), pp. 233–239.
- Henderson, J. C., and Venkatraman, N. 1993. "Strategic alignment: Leveraging information technology for transforming organizations," *IBM Systems Journal* (32:1), pp. 4–16.
- Hess, T., Matt, C., Benlian, A., and Wiesböck, F. 2016. "Options for Formulating a Digital Transformation Strategy," *MIS Quarterly Executive* (15:2), pp. 123–139.

- Horlacher, A., and Hess, T. 2016. "What Does a Chief Digital Officer Do? Managerial Tasks and Roles of a New C-Level Position in the Context of Digital Transformation," in *Proceedings of the 49th Annual Hawaii International Conference on System Sciences: 5-8 January 2016, Kauai, Hawaii*, T. X. Bui and R. H. Sprague (eds.), Koloa, HI, USA. 5/1/2016 - 8/1/2016, Piscataway, NJ, Piscataway, NJ: IEEE, pp. 5126–5135.
- Hufnagel, E. M., and Conca, C. 1994. "User Response Data: The Potential for Errors and Biases," *Information Systems Research* (5:1), pp. 48–73.
- Hurley, R. F., and Hult, G. T. M. 1998. "Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination," *Journal of Marketing* (62:3), p. 42.
- Legner, C., Eymann, T., Hess, T., Matt, C., Böhm, T., Drews, P., Mädche, A., Urbach, N., and Ahlemann, F. 2017. "Digitalization: Opportunity and Challenge for the Business and Information Systems Engineering Community," *Business & Information Systems Engineering* (59:4), pp. 301–308.
- Matt, C., Hess, T., and Benlian, A. 2015. "Digital Transformation Strategies," *Business & Information Systems Engineering* (57:5), pp. 339–343.
- McAfee, A., and Brynjolfsson, E. 2017. *Machine, platform, crowd: Harnessing our digital future*, New York: W.W. Norton & Company.
- Moran, R. 2017. *Return on Digitalisation Equation*. <https://www.linkedin.com/pulse/return-digitalisation-equation-ross-moran/>. Accessed 23 February 2018.
- Murawski, M., and Bick, M. 2017. "Digital competences of the workforce – a research topic?" *Business Process Management Journal* (23:3), pp. 721–734.
- Nylén, D., and Holmström, J. 2015. "Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation," *Business Horizons* (58:1), pp. 57–67.
- Pieters, R. 2017. "Meaningful Mediation Analysis: Plausible Causal Inference and Informative Communication," *Journal of Consumer Research* (44:3), pp. 692–716.
- Rai, A., Pavlou, P. A., Im, G., and Du, S. 2012. "Interfirm IT Capability Profiles and Communications for Cocreating Relational Value: Evidence from the Logistics Industry," *MIS Quarterly* (36:1), pp. 233–262.
- Ravichandran, T. 2017. "Exploring the relationships between IT competence, innovation capacity and organizational agility," *The Journal of Strategic Information Systems*.
- Rindova, V. P., and Kotha, S. 2001. "Continuous "Morphing": Competing Through Dynamic Capabilities, Form, and Function," *Academy of Management Journal* (44:6), pp. 1263–1280.
- Ruckstaetter, J., Sells, J., Newmeyer, M. D., and Zink, D. 2017. "Parental Apologies, Empathy, Shame, Guilt, and Attachment: A Path Analysis," *Journal of Counseling & Development* (95:4), pp. 389–400.
- Siebel, T. M. 2017. "Why digital transformation is now on the CEO's shoulders," *McKinsey Quarterly* (4).
- Stalk, G. 2014. *Competing against time: How time-based competition is reshaping global markets*, New York: Free Press.
- Sundaram, A. K., and Inkpen, A. C. 2004. "The Corporate Objective Revisited," *Organization Science* (15:3), pp. 350–363.
- Tate, C. U. 2015. "On the Overuse and Misuse of Mediation Analysis: It May Be a Matter of Timing," *Basic & Applied Social Psychology* (37:4), pp. 235–246.
- Teece, D. J. 2007. "Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance," *Strategic Management Journal* (28:13), pp. 1319–1350.
- Teece, D. J. 2010. "Business Models, Business Strategy and Innovation," *Long Range Planning* (43:2-3), pp. 172–194.
- Teece, D. J., Pisano, G., and Shuen, A. 1997. "Dynamic Capabilities and Strategic Management," *Strategic Management Journal* (18:7), pp. 509–533.
- Veit, D., Clemons, E., Benlian, A., Buxmann, P., Hess, T., Kundisch, D., Leimeister, J. M., Loos, P., and Spann, M. 2014. "Business Models," *Business & Information Systems Engineering* (6:1), pp. 45–53.
- Wade, M., and Hulland, J. 2004. "Review: The Resource-Based View and Information Systems Research: Review, Extension, and Suggestions for Future Research," *MIS Quarterly* (28:1), p. 107.
- Wernerfelt, B. 1984. "A Resource-Based View of the Firm," *Strategic Management Journal* (5:2), pp. 171–180.
- Yoo, Y., Henfridsson, O., and Lyytinen, K. 2010. "The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research," *Information Systems Research* (21:4), pp. 724–735.