How to Realize Business Value through a Big Data Analytics Capability -Results from an Action Design Research Approach

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How to Realize Business Value through a Big Data Analytics Capability – Results from an Action Design Research Approach

Completed Research Paper

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Abstract

Big data analytics (BDA) has been proven to be a source for business value in organizations. Though the notion of capabilities is often used to explain business value realization, the process from BDA-related organizational investments into business value is not yet fully understood. To address this gap in research, we draw on an action design research approach to delineate this process by drawing on a real-world setting as well as the prevalent body of knowledge. As a result, we propose a process model including two sub-processes: (1) the BDA conversion process, which explains the steps between BDA-related investments to resources, and (2) the BDA synergy process, which delineates the step from a BDA capability towards business value realization. Via taking this holistic perspective, we go first steps towards a nascent design theory in BDA business value realization, providing a basis for future IS research.

Keywords: big data analytics capability, big data analytics business value, action design research, general systems theory, synergistic resource interaction, enabling mechanisms

Introduction

Big data is one of the most discussed topics in IS research and labeled as "the next management revolution" (McAfee and Brynjolfsson 2012, p. 60). Big data demands organizations to create new techniques for analyzing it, summarized with the term big data analytics (BDA) (Baesens et al. 2016). As such, BDA refers to the technologies, techniques, and processes for processing big data (Mikalef et al. 2018). BDA provides exhaustive new value directions, for instance through decision-making support, going beyond traditional approaches such as business intelligence (BI) (Elia et al. 2020). BDA gains momentum both in academia and practice as it enforces technological advancements in organizations to increase productivity and revenue growth (Günther et al. 2017). Going further, BDA represents an exponential growing and dynamic research domain, as it is seen as one key enabler for the fourth industrial revolution (Günther et al. 2017). Thereby, research about the usage of big data or BDA is tremendous, as it provides various application areas like data-driven decision making and business process optimization (Elia et al. 2020). In practice, BDA is seen as the key leaver for facilitating a data-driven transformation (Berndtsson et al. 2018). Consequently, BDA may be viewed as a central concept for driving organizational value creation (Mikalef et al. 2018). However, many organizations struggle severely in successfully implementing BDA (Wiener et al. 2020).

The notion of the *BDA deployment gap* states that many organizations believe in its value realization potential, but are not able to realize value out of the BDA deployment (Chen et al. 2017; Wiener et al. 2020).

Within IS research, BDA business value realization is increasingly viewed through a capability-based perspective (Mikalef et al. 2018). The concept of a big data analytics capability (BDAC) may provide a viable solution to solve the BDA deployment gap, as it refers not only to establishing BDA-related technologies, but also on the creation and orchestration of management capabilities and human resources to effectively deploy BDA in organizations (Llave et al. 2018; Mikalef et al. 2017). However, the process of establishing a BDAC and how a BDAC is used for value realization is still in its nascent stages (Mikalef et al. 2020). To develop and sustain a BDAC over time, it its necessary to theorize the whole value realization process, which describes a serious lack in research (Grover et al. 2018; Mikalef et al. 2020). Several articles depict the constituents of a BDAC (Gupta and George 2016), consisting of several BDA-related resources. Nonetheless, the necessary activities and mechanisms to convert BDA-related investments into a BDAC is not sufficiently theorized and understood, which severely hampers our understanding about BDAC value realization (Grover et al. 2018). In addition, the orchestration and configuration between BDA-related resources constituting to a BDAC is an underrepresented area of research (Dremel et al. 2020; Mikalef et al. 2020). As such, the identification of synergistic mechanisms between BDA-related resources provides a fruitful research topic, as the establishment and development of a BDAC is seen as major driver of an appropriate deployment of BDA in organizations to overcome the deployment gap. Thus, we aim for answering the following research question: *How and through which processes can different resources be aligned into an orchestrated big data analytics capability in order to realize business value?*

To develop an empirical grounded model, we adopt the design science research (DSR) paradigm to establish a novel and validated artifact for conceptualizing BDAC value realization (Baskerville et al. 2018). We create such an artifact to identify mechanisms and organizational actions in an abstract manner, which are required to build and sustain a BDAC. In particular, we use action design research (ADR) to build and evaluate our artifact in a specific organizational setting to solve the deployment gap of BDA (Chen et al. 2017). This approach will help organizations to successfully establish a BDAC to realize business value out of it. In doing so, we aim for enriching the theoretical understanding about BDAC in IS research by presenting first a nascent design theory for value realization through a BDAC (Gregor and Hevner 2013).

We proceed as follows: In the next section, we describe the theoretical background and state-of-the-art in BDA research. Subsequently, we delineate our ADR approach and describe executed research activities at our selected case company *SupplyCo*. Based on the described methodology, we report on our results along the four phases of ADR and conclude our article with discussing theoretical and practical implications as well as limitations and future research opportunities.

Theoretical Background

Understanding of the Terms Big Data and Big Data Analytics in IS Research

The notion of big data is one of the most prominent buzzwords in IS research since more than 10 years and is adopted by a plethora of research areas beyond IS research (Constantiou and Kallinikos 2015). This trend can be explained via the enormous potential of big data for realizing transformational, transactional, informational, and strategic value (Elia et al. 2020). Researchers as well as practitioners are coincided to define big data via characteristics, the so-called V's. Originally, big data exhibits four V's, namely *volume*, *velocity*, *variety*, and *veracity* (Abbasi et al. 2016). Volume deals with the tremendous data quantities which are generated through a magnitude of data sources (Constantiou and Kallinikos 2015). Velocity takes a time-oriented stance and mentions the relevance of real-time data processing (Abbasi et al. 2016). Variety emphasizes the plurality of data sources like sensors, whereas veracity deepens the perspective of data credibility and reliability (Mikalef et al. 2018). From our viewpoint, *value* illustrates the fifth characteristic, as it accentuates the potential for realizing business value in organizations (Günther et al. 2017). As such, to achieve BDA business value, contingent resources and capabilities need to be orchestrated and aligned (Dremel et al. 2020; Mikalef and Krogstie 2020; Troilo et al. 2017), which is in line with the extant body of knowledge (Bhimani 2015; Constantiou and Kallinikos 2015; Sharma et al. 2014). This value creation process of big data analytics may be contingent on the surrounding technologies, structures and processes of decision makers (Troilo et al. 2017). BDA definitions vary widely in their scope and focus points. Sample definitions view BDA as "interpretation of information" (Loebbecke and Picot 2015, p. 150), as "process […]

[for] gaining actionable insights [and] creating business value" (Akter and Wamba 2016, p. 178), as well as "the application of [...] analytics techniques to big data for advancing business" (Grover et al. 2018, p. 390). We build on this knowledge base and understand BDA as the technologies, techniques, and processes for processing and analyzing big data to generate actionable insights in organizations.

Related Work on Big Data Analytics Business Value Realization

After clarifying central terms and concepts for our research endeavor, we aim to elicit the current state of research within the BDA domain. In the following, we summarize related work about BDA value creation and realization, focusing on central concepts and empirical results, as well as adapted theoretical lenses. A widely used approach to study value creation and realization mechanisms out of the implementation of BDA in organizations uses the theoretical concept of capabilities (Legner et al. 2020). The notion of capabilities calls for the orchestration of resources to create business value. Correspondingly, the capability-oriented stance builds upon renowned management theories and paradigms like the resource-based view (RBV) , or the concept of dynamic capabilities (Mikalef et al. 2018). Current work on the concept of BDAC follows mainly the classification system of Bharadwaj (2000), who categorizes elements of a BDAC along three distinct resource dimensions. In the IT resource dimension, the extant body of knowledge study in detail how a BDA infrastructure can be established, which technological characteristics it should fulfill, and how data management has to be managed (Mikalef et al. 2018, Gupta and George 2016). The human resource dimension delineates the required skill set for analytics-savvy employees. Exemplary skills are sensing about the effective use of data and their insights, communication skills, and skills about BDA and machine-learning-related technologies and its infrastructural elements (Mikalef et al. 2018, Dremel et al. 2020, Dremel et al. 2017). The intangible resource dimension incorporates aspects like data-driven culture, BDA governance, and organizational structures and emphasizes the need for aligning the more material aspects of BDA with management-related aspects (Gupta and George 2016, Mikalef et al. 2018, Mikalef et al. 2017). In sum, the concept of BDAC is well understood within the BDA research community. Correspondingly, we build upon the extant body of knowledge and adapt this notion for our research endeavor.

Another perspective for studying the formation of an organizational capability is the synergy perspective, which tries to complement the RBV and adds theoretical arguments in form of enabling conditions and mechanisms for orchestrating different resources, e.g., through structuring and governing mechanisms (Nevo and Wade 2010, Weibl and Hess 2020). The synergy dimension for BDA builds upon the concept of BDAC and aims to demystify how the different resources can be aligned (Nevo and Wade 2010). Thereby, theoretical concepts like synergy, alignment, and fit are used (Ghasemaghaei et al. 2017, Weibl and Hess 2020, Weingarth et al. 2020). As Weingarth et al. (2020) stated, the concept of business IT alignment pertains to the effective collaboration between business experts and analytics-related employees and is indispensable for creating value-adding use cases and solutions. Within the fit perspective, recent articles studied how a fit between analytics-related employees, an organizations environment, and its technological architecture can be established (Ghasemaghaei et al. 2017). The impact of BDA usage on output variables like organizational performance is studied extensively within the extant body of knowledge. Informational benefits are embodied through decision-making support, whereas transactional benefits are measured through return on invest (ROI) (Akter and Wamba 2016, Elia et al. 2020). Transformational benefits are mostly realized through a data-driven transformation program, which also addresses strategic benefits like competitive advantages (Elia et al. 2020, Llave et al. 2018).

The analysis of the current body of knowledge in BDA research indicates a clear focus on technical and financial resources (e.g., Grover et al. 2018, Wiener et al. 2020), neglecting complementary aspects like organizational structures and data-driven culture for realizing BDA business value. Resultingly, the understanding about how to convert BDA-related investments into business value is in its early stages within the IS community (Llave et al. 2018, Trieu 2017). Considering this gap in IS research, we initiate an ADR endeavor and develop a process model for explaining mechanisms for BDA business value realization (Sein et al. 2011). In addition, we propose distinct action clusters to leverage synergistic interaction between BDA-related resources, establishing a new theoretical lens for studying BDA business value realization.

Research Approach

To delineate the process behind value realization through BDAC, we employed ADR for addressing a practice-inspired research problem (Sein et al. 2011). We choose ADR for our research endeavor for two

reasons: (1) ADR supports the dual nature of our research problem, ensuring practical relevance while assuring scientific rigor (Baskerville et al. 2018, Hevner et al. 2004). (2) ADR aims to create prescriptive design knowledge addressing a class of problems (Sein et al. 2011). As research objective, we aim to propose a generalizable model in establishing value-generating BDA-related initiatives. We frame our process model with the objective of demystifying the business value realization potential through a BDAC. Therefore, we create an artifact that explains how organizations may leverage their BDA-related resources and how they may be orchestrated into a BDAC. We further aim for detailing mechanisms which delineate how a BDAC may be converted into business value. Resultingly, we provide practical insights through the identification of organizational actions that drive the value chain of BDA, pertaining to the effective use of BDA in organizations (Dremel et al. 2020). Besides practical intervention, we aspire to close the gap in IS research in explaining synergistic mechanisms bonding several BDA-related resources together into an organizational BDAC (Mikalef et al. 2020), aiming at going first steps towards a nascent design theory (Baskerville et al. 2018). In sum, we want to provide insights and new perspectives in how to solve the BDA deployment gap, which embodies our class of problems (Sein et al. 2011, Wiener et al. 2020).

ADR Project Setting

In line with the guidelines of ADR, we perform our artifact creation process within an organizational context (Sein et al. 2011). The research project was executed in a collaborative manner with *SupplyCo*, lasting from May to December 2020 (Mathiassen 2002). *SupplyCo* acts as a leading German automotive supplier with around 25.000 employees, producing mainly mechatronic systems for the automotive and mobility sector. As many other automotive companies in Europe, *SupplyCo* is nowadays confronted with a highly competitive pressure within its market, due to increasing debates about green mobility and innovative drive systems. *SupplyCo* tries to counter market challenges with the establishment of digitalization initiatives as part of their strategic renewal. Accordingly, various innovative pilot or lighthouse projects are initiated to strengthen the competitive position of *SupplyCo* and drive internal renewal. As such, digital transformation is increasingly seen as key leaver for its competitiveness. The ADR Team within *SupplyCo* was positioned within the central IT department. One of the key tasks of this unit nowadays is to develop data-driven (DD) products as well as the development of analytics-driven solutions for increasing operational excellence. To do so, an analytics-oriented center of excellence (CoE) was built up. Within this CoE, *SupplyCo* aims to leverage their data-driven capabilities fulfilling the objective of constantly evolving into a data-driven organization (DDO). We initiated our ADR project in May 2020, where the CoE was already initially built up. At this time, the CoE was in its factory phase and was confronted with diverse problem areas, ranging from analytical skills to governance topics. Correspondingly, our ADR endeavor addresses these problem areas and aims to support *SupplyCo* in its data-driven initiative.

ADR Activities

Our ADR project represents a collaborative research endeavor consisting of two researchers and several practitioners participating in the project (Mathiassen 2002). Throughout our whole research project, we constantly evaluated and refined our results through sparring between both researchers in form of weekly refinement and evaluation sessions (Sein et al. 2011). Thus, both researchers were involved in all four ADR stages (Sein et al. 2011, Thiess and Müller 2020). We gained practical insights through the collaboration with several units at the central IT department, as well as with the central development department. We are able to work together with data scientists, data engineers, agile and business coaches, BI experts and consulting managers, who all contributed to the project through giving the researchers practical insights into how BDA may provide business value to organizations. All ADR-related activities are summarized within Figure 1. In sum, we were able to execute two iterative design cycles and report in the next sections on how our artifact evolved and summarize the respective learnings. Within the stage of problem formulation, the research initiative is formulated through a practice-inspired perspective while ensuring scientific rigor through the usage of kernel theories (Sein et al. 2011). We started our research project by identifying the research gap and the corresponding determining of the research question. Therefore, two preconditions have to be fulfilled. First, to have an overview about the extant body of knowledge. For this purpose, we scanned current articles on BDA value realization. Second, to know about the current situation at *SupplyCo* and what challenges they face in the context of BI and analytics. Therefore, we analyzed several internal documents and presentations and talk to employees within the CoE about their understanding of the current situation. After planning our research endeavor, we conducted a systematic literature review on

BDA value realization based on renowned guidelines (e.g., vom Brocke et al. 2015), ensuring to build upon the state-of-the-art regarding BDA. We elaborated on key insights of our review in the related work section, while we are not able to explain in detail our approach and results of the review itself due to page limitations. One core result of the systematic literature review is the model of a BDAC based on the resource trifecta of IT, human, and intangible resources, as there remains consensus on that in BDA research (Gupta and George 2016). In addition, we conducted two focus group workshops with employees of the CoE at *SupplyCo* with the aim of analyzing the as-is situation as well as its activity approach for defining use cases and developing productive data-driven solutions. Both workshops revealed shortcomings in data-driven competencies as well as a lack of governing mechanisms for analytics-oriented topics. Based on the defined problems, we thought about potential kernel theories for informing our ADR project (Thiess and Müller 2020). Taking a system-oriented stance, the general systems theory (GST) serves as kernel theory for detailing the perspective of synergistic resource interaction (Someh et al. 2019). In addition, we choose the RBV as theoretical lens for delineating value creation and realization mechanisms (Wade and Hulland 2004). In sum, the problem formulation stage ensures a broad understanding about the research subject from both a theoretical and practical perspective (Sein et al. 2011).

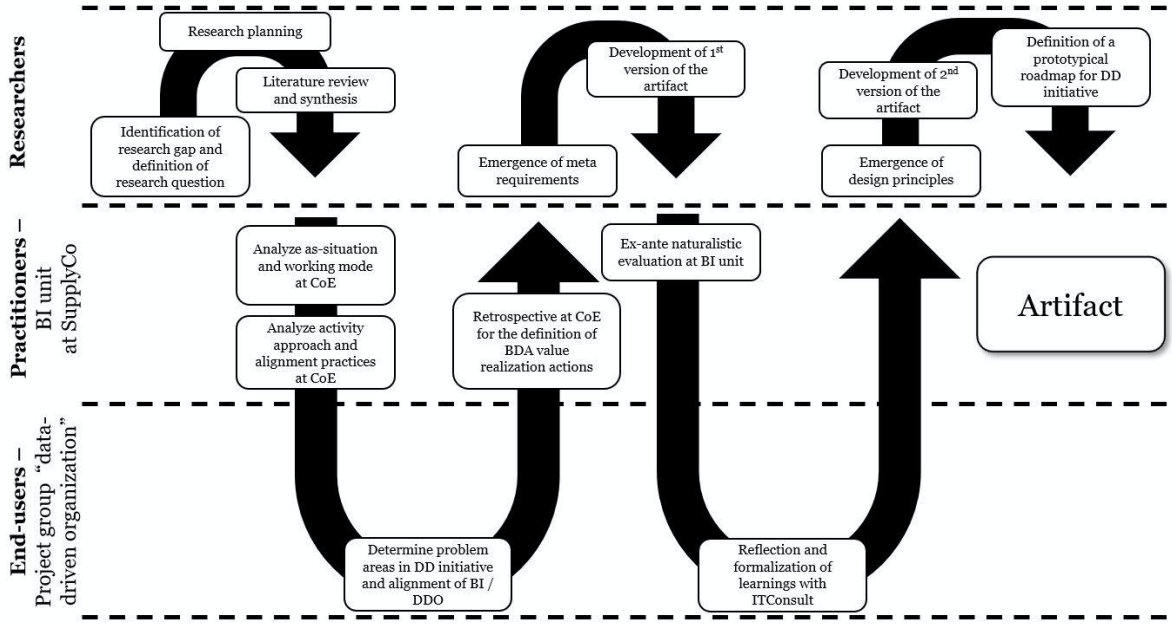

Figure 1. Overview about the activities in our ADR project (adapted from Sein et al. 2011)

The second stage – the building, intervention, and evaluation (BIE) phase of ADR – builds upon the results of the problem formulation phase. Within this stage, the artifact is created, evaluated against objective criteria, and applied into a specific organizational context. The process of artifact creation builds upon three main sources. First, the reliance on the GST and RBV as kernel theories ensures scientific rigor and informs artifact creation. The GST serves as mental model about systems in general, ensuring that a holistic perspective for establishing a data-driven organization is adopted. The RBV serves as basis within IS research in establishing IT business value models and delivers the cornerstones of our process model. Second, the results of our literature review about BDAC value realization informed artifact creation in the sense of building upon the state-of-the-art within the BDA community (vom Brocke et al. 2015). Third, practical insights through a focus group workshop at *SupplyCo* with participants of the data-driven initiative, who represent the end-users within our ADR project, informed artifact creation as well, ensuring its practical applicability. Resultingly, we identified distinct problem areas within the data-driven initiative as well as insights about the interworking and alignment of the initiative with the existing IT landscape. Out of these insights, we created an alpha version of the artifact. To evaluate our alpha version, we performed an ex-ante evaluation in form of a dedicated focus group workshop within the BI unit at *SupplyCo* (Venable et al. 2012). Within this workshop, both researchers presented the alpha version within the BI unit and discuss with the Head of the unit how practical insights can further shape artifact creation. As a consequence, we reduced complexity of our artifact and agree on the specification of concrete action items for realizing synergistic resource interactions. In addition, we agreed upon the derivation of a process

instance in form a prototypical roadmap for establishing a data-driven organization, which dedicates to the pre-identified problem areas at *SupplyCo*. This prototypical roadmap serves as intervention within the organization. Unfortunately, due to page limitations and confidentiality issues, we are not able to give details about this prototypical roadmap.

The third stage, called reflection and learning, parallels the two previous stages and aims to continuously reflect on the process of artifact creation (Sein et al. 2011). Going along with the principle of guided emergence, the continuous reflection leads to the formulation of a consolidated set of meta-requirements on BDA value realization (Dremel et al. 2020). Within this stage, we build upon (1) insights from our case organization *SupplyCo,* and (2) our selected kernel theories. Therefore, we executed an agile retrospective with participants of the CoE to discuss on their journey. Pertaining to their experiences, we gained firsthand insights about their impediments in establishing value-adding activities and framed our meta requirements along them. In addition, we connect our theoretical lenses with the set of meta requirements and our artifact. Thus, we infer the two process steps (conversion and synergy process) and its basic input and output elements (BDAC and benefits) from our theoretical lenses and formulate one meta requirement for each element. Out of our theoretical lenses and the corresponding meta requirements, we structure our artifact as process model with these four elements and add details from our insights at *SupplyCo*.

The fourth stage aims to generalize the generated contextualized learnings via setting the solution instance into a broader class of solutions (Sein et al. 2011). We decide to formalize our learnings in form of design principles, which represent a prevalent mode for generating prescriptive design knowledge (Herterich 2017). Going along with the principle of the ADR method, we conducted a focus group workshop with two senior consulting managers of *ITConsult*, which acts as an external consulting firm for digital services, supporting *SupplyCo* in its digitization initiatives. As *ITConsult* supports *SupplyCo* since 2019 in its digitization initiatives, both consulting managers generated a whole amplitude of learnings in developing an organizational BDAC. Together, we reflect on the learnings at *SupplyCo* and other firms in the automotive industry and discuss what general necessities are required in organizations to become data-driven. Resultingly, we are able to formalize three distinct design principles in establishing a data-driven organization. In the subsequent sections, we report on the content-related results out of each stage and further discuss them in the implications section.

Phase 1: Problem formulation

As-is Situation at SupplyCo

As described in the previous section, we analyzed the as-is situation at *SupplyCo* through the execution of two specially designed workshops at the CoE, which are dedicated for the delivery of sophisticated analytics solutions, as well as through the analysis of several internal project documents and presentations. The CoE was initiated in the end of 2019, aiming at creating valuable analytics and data-driven solutions. With the start of our ADR project in May 2020, the CoE has finished its seed phase and moves forward into the factory stage, which is mostly dedicated to the establishment of a BDA infrastructure as well as with the extension of its organizational setup and corporate alignment. Through the analysis of the as-is situation at the CoE, the researchers were able to extract key pain points, which have to be tackled through the ADR project. First, the enterprise data of *SupplyCo* are not managed on a corporate level, lacking a clear data strategy. Even if the relevance of BDA for *SupplyCo* is already realized, a holistic strategy and roadmap for establishing relevant capabilities remained not adequately addressed. Second, an overall BDA technology stack is not in place to enable BDA-related use cases. The BI unit works with a traditional data warehouse and several BI tools, lacking competencies in cloud-related technologies and more advanced technologies. Third, governance and structures are not managed on a corporate level. In detail, clear roles and responsibilities for managing data all along its lifecycle were not implemented. This pain point goes along with the lack of skilled employees. Even if the CoE bundles BDA- related experts, *SupplyCo* does not yet have the competencies to realize the full potential out of BDA.

To tackle those various pain points, *SupplyCo* initiates its data-driven initiative in April 2020 and formulates four overall fields of actions. Within the data strategy stream, *SupplyCo* tries to define a vision and mission statement for acting data-driven as well as to formulate an overall data-driven strategy. Within the technology stream, *SupplyCo* aims to define the required technological capabilities for producing data-driven products. These capabilities serve as input for a technological blueprint and followed evaluation

process for establishing a BDA technology stack. Within the operating model stream, data management processes have to be defined and aligned with the organizational setup of the CoE. The partnerships stream complements this with the identification of industry partners and universities for knowledge sharing.

Selection of Kernel Theories

A Capability-Based Perspective on Big Data Analytics Business Value Realization

In our research, both concepts "resources" and "capabilities" play a crucial role. Both of which can be related back to the RBV of the firm (Barney 1991). The RBV of the firm views organizations as a bundle of resources, which incorporates a potential competitive advantage (Wade and Hulland 2004). Table 1 illustrates and defines these central concepts.

Assets	Resources	Capabilities
"anything tangible or intangible [a] firm can use in its processes for creating, producing and/or offering its products [...] to a market" (Wade and Hulland 2004, p. 109)	Resources are firm-specific assets (Teece et al. 1997)	Capabilities are constructed via the orchestration of different resources (Amit and Schoemaker 1993)

Table 1. Relevant concepts for the definition of the capability creation process

The theoretical underpinning of the RBV is widely adopted in IS research, in particular in IT business value research (e.g., Bhatt and Grover 2005; Melville et al. 2004). As such it builds a solid and well-established theoretical base for our research endeavor. In line with this body of knowledge, the major source of IT business value lies in the formation of an IT capability. An IT capability represents the deployment and configuration of several IT resources (Bharadwaj 2000). An IT resource, in turn, is established through IT assets out of IT investments (Soh and Markus 1995; Wade and Hulland 2004). The step from IT assets to IT resources may be called a conversion process and is delineated through management activities to create a firm-specific asset, called an IT resource (Soh and Markus 1995). An IT capability builds on these "converted" IT resource, which may be further broken down into IT resources, human IT resources, and intangible IT-enabled resources (Bharadwaj 2000; Melville et al. 2004). Following the line of thought of an IT capability by Bharadwaj (2000), Gupta and George (2016) present a BDAC model encompassing tangible resources, human resources, and intangible resources. We build on this model by stating that a BDAC consists of the above-mentioned resource trifecta with one notable exception. Within the technical domain, we call this resources "IT resources", which are dedicated to the technical aspects in establishing a BDAC like a BDA infrastructure and data management. Thereby, we follow the definitions of Bharadwaj (2000) and Melville et al. (2004). Gupta and George (2016) called this resource domain "tangible resources", encompassing not only technical aspects, but also financial aspects. As we focus within this domain on purely technical aspects, we decided to call this block IT resources. These superordinate elements of a BDAC serve as state-of-the-art in BDA research and are therefore adapted for this study (Mikalef et al. 2020). Following the definition of an organizational capability by Amit and Schoemaker 1993 (see Table 1), we aim to extend the concept of a BDAC by explaining how the configuration of different BDA-related resources lead to the creation of a BDAC (Mikalef et al. 2020). In order to this, we supplement our capability-based perspective on BDA with a systems-theoretic perspective, which is further detailed below. As such we theorize a BDAC as organizational capability for deploying BDA resources (Gupta and George 2016; Mikalef et al. 2020), while at the same time as organizational capability to realize business value, e.g., by data-driven decision-making (Dubey et al. 2019).

A Systems-Theoretic Perspective on Big Data Analytics Business Value Realization

We follow the guidelines of the DSR paradigm and rely on a system-oriented perspective, namely the GST, as kernel theory (Baskerville et al. 2018). The GST defines a system as "a set of interrelated elements, [which serves as] an entity, [where] each of a system's element is connected to every other element" (Ackoff 1971, p. 662). The characteristic all systems have in common is that the whole system is more than the sum of its parts (Kast and Rosenzweig 1972). A central assumption of the systems-oriented perspective is that the system's elements need to be aligned to realize synergistic effects. We argue that similarly the value realization of BDA relies on synergies between BDA-related resources and capabilities (Weibl and Hess 2020). Organizational systems per se deal with the interaction between its employees and an organizations

IT, demanding for determining a valuable fit between both subsystems. Markus and Rowe (2018) summarize this position with the notion of relational synergy, stating that the outcomes of an organizational system stem from the synergistic interaction between its social actors and the organizations IT. This relational and synergetic ontology is ingrained in the line of thought of system-oriented theories such as the GST and socio-technical systems theory, as they deal with synergistic interactions and relations between the systems elements (Gharajedaghi 2011). Based on this ontology, we propose that several BDA-related resources should be aligned to each other for enabling a synergistic interaction and building up a BDAC. In doing so, we may close the gap in explaining mechanisms and activities for establishing a BDAC out of BDA-related resources. Additionally, the objective of the synergistic interaction between a system's elements is to realize organizational benefits in form of so-called *synergistic effects*. Synergistic effects can be related back to the economic theory of complementarities (Milgrom and Roberts 1995), stating that synergistic interactions between system elements lead to the realization of *super-additive business value*, a surplus of realized business value (Tanriverdi 2006). This theoretical concept supports our objective to explain value realization mechanisms through the synergistic interaction between BDA-related resources. The lens of synergy builds the backdrop of this step as synergy deals with the interaction of at least two system elements, in our case several BDA-related resources (Someh and Shanks 2013). As such, the concept of synergy informs our endeavor to identify synergistic interactions between BDA-related resources (Weibl and Hess 2020). Those synergistic interactions between BDA-related resources form a BDAC, representing the core driver of business value realization. The identification of these synergistic interactions between BDA-related resources responds to the call of Mikalef et al. (2018), who propose to identify orchestration mechanisms for achieving the creation of a BDAC. In addition, such orchestration mechanisms follow the approaches of Gupta et al. (2018) and Wade and Hulland (2004), who already proposed that resources should not be viewed isolated, but rather in combination with each other. Consequently, the systems-theoretic perspective complements our capability-based perspective on BDA in the form of viewing BDA-related resources in combination to each other (Nevo and Wade 2010). Such a combination of both theoretical paradigms potentially depicts several steps in realizing business value out of the usage of a technical artifact. A preliminary step, also called potential synergy, proposes that an interaction between different resources provides potential for synergistic interaction (Weibl and Hess 2020). Subsequently, synergy enablement tries to leverage synergistic interactions, whereas the step of realized synergy describes the output in form of super-additive business value, realized out of synergistic resource interactions (Nevo and Wade 2010, Tanriverdi 2006). Within our research endeavor, we focus mainly on the step of synergy enablement and enabling mechanisms (Nevo and Wade 2010), aiming at delineating organizational actions for fostering synergistic resource interactions and BDA business value realization (Dremel et al. 2020).

Phase 2: Building, Intervention, and Evaluation (BIE)

Artifact for Value Realization through a Big Data Analytics Capability

The created artifact is represented through a process model and is illustrated in Figure 2. The process model consists of two processes, i.e., the conversion process and the synergy process. The conversion process describes the step of establishing BDA-related resources out of BDA-related investments (Trieu 2017). This step includes certain management and conversion (Trieu 2017). Thereby, we adapt this process step from the literature and renowned process models of Soh and Markus (1995) and Trieu (2017), who acknowledge the analogy of viewing IT business value processes as input/output system, where the input is embodied through IT-related investments, and, in our context, BDA-related investments (Schryen 2013). The synergy process details the step of value realization out of a BDAC through synergistic interactions between BDA-related resources (Nevo and Wade 2010). This step is adapted from our systems-theoretic lens stating that an organizational capability is established through a synergistic interaction between several resources. Resultingly, a surplus of business value is realized when synergistic resource interaction is leveraged through enabling mechanisms. As such, we focused on the aspect of corresponding action clusters, which we tried to identify within our case at *SupplyCo*. The output of the process model discusses value realization mechanisms through BDAC on four benefit levels.

The Big Data Analytics Conversion Process

Before business value is perceivable and in consequence potentially realized, investments have to be taken in establishing BDA (Llave et al. 2018; Trieu 2017). This refers mostly to BDA investments regarding BDA-

related technologies (i.e., cloud technologies for a BDA technology stack), and skilled employees like data scientists (Gupta and George 2016). Today, most organizations have invested deeply in BDA, especially in applications for a BDA infrastructure (Mikalef et al. 2017; Dremel et al. 2020). However, not every organization is able to transform these tremendous investments into its existing organizational context, aiming to convert them into firm-specific resources (Chen et al. 2017; Trieu 2017). The BDA deployment gap states that establishing a BDAC affords organizations to create a clear configuration between the existing organizational context and acquired BDA-related investments (Mikalef et al. 2020). Taken together, a process is required, which converts BDA-related investments into the organizational context, summarized with the notion of a conversion process (Soh and Markus 1995). From a socio-technical perspective, this process may require the conversion of BDA-related investments into BDA-related resources through organizational actions at the technical-, structure-, and actor-level (Dremel et al. 2020).

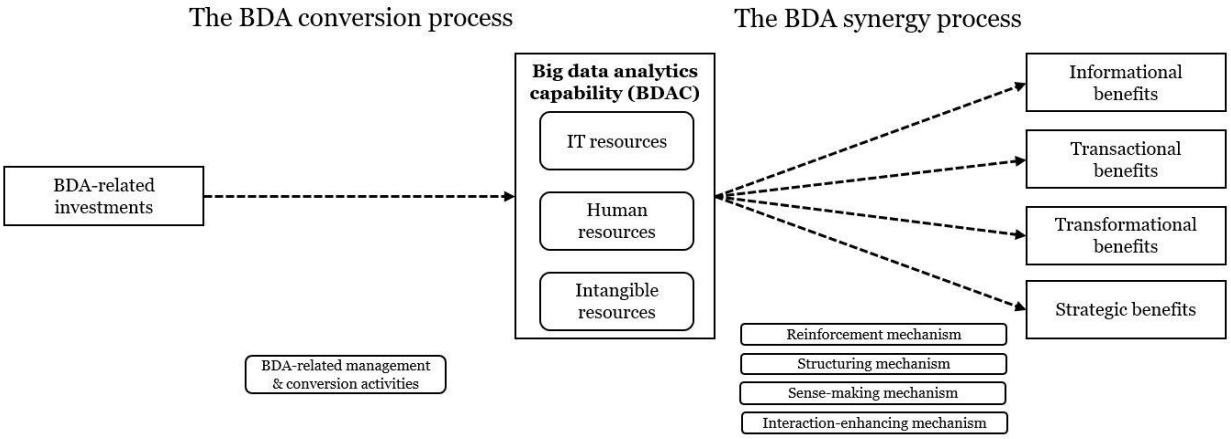

Figure 2. Artifact for value creation and realization through BDA

Relating to the technical-level, technology-related investments include investments in software, hardware, and the overall technical infrastructure (Trieu 2017). The aim at this level is the creation of a seamlessly working BDA technology stack and architecture. Thus, investments should be focused on the gradual establishment of it to allow for a generative organizational use. The foremost issue nowadays in organizations is how to store and analyze the tremendous generated data volumes. Consequently, a technology architecture has to be designed before massive investments are taken. Yet, the challenges in establishing a BDA architecture with abilities in data storing, processing, and analysis are manifold. The market on applications and tools of BDA is exponentially grown the last years (Turck 2020), affording organizations to define clear decision criteria for determining a good fit with the organizational context. Thus, the definition of a conceptual target architecture is recommended to ensure the seamless working of different architectural components. To integrate and gradually build up such a target architecture, a technology evaluation and integration process is required. After such a decision, a predefined process of integration into the existing technology stack has to be established. These steps ensure a gradual establishment of a BDA technology stack, for instance through relying on data lake solutions in the cloud, e.g., with Azure Data Lake Store from Microsoft Azure or S3 storage from Amazon Web Services.

Establishing BDA in organizations potentially affords a strategic renewal, requiring substantial changes in structuring and organizing. Accordingly, organizational actions at the structure-level are crucial for establishing BDA. To increase the value realization potential, new forms of organizing employees are recommended. Especially the organizational structure of the CoE gains momentum in boosting strategic renewal in organizations (Dremel et al. 2017; Schüritz et al. 2017). An analytics-oriented CoE tries to support several business units and functions to scale and successful execute analytics-related projects and initiatives. Taken together with an organization-wide BDA strategy, these actions build the backdrop for establishing a BDA initiative within an organization. In addition, the build-up of an analytics oriented CoE can be leveraged through the usage of agile management and methods like SCRUM.

Regarding the actor-level, the notion of business IT alignment emphasizes the need of a close collaboration between data scientists and functional experts (Weingarth et al. 2020). Especially the employees within the CoE should exhibit business acumen in order to create an argumentation line for obtaining funding (Dremel

et al. 2020). These aspects are potentially leveraged through the establishment of a learning culture and the personal ability to be open minded, driving the BDA-driven transformation.

The Big Data Analytics Synergy Process

The output of the BDA conversion process is illustrated through the establishment of different BDA-related resources out of BDA-related investments and corresponding management activities (Soh and Markus 1995; Trieu 2017). In the next step of our process model, the created BDA-related resources have to be orchestrated and aligned with each other in order to build up a BDAC and ultimately realize value. To delineate the BDA synergy process, the required resources as well as orchestration mechanisms have to be determined. The first aspect is adapted from literature through our executed systematic literature review. Accordingly, we use the notion of Gupta and George (2016) and state that the necessary resources for establishing a BDAC are IT resources, human resources, and intangible resources. The orchestration aspect is expressed through the identification of synergistic mechanisms and interactions of the different BDA-related resources, which are based on our systems-theoretic perspective out of the GST (Kast and Rosenzweig 1972; Weibl and Hess 2020). Further, we state that a second process for BDA business value realization is required and call it BDA synergy process. This process deals with the establishment of a BDAC, identifying explanations for the transmission of a BDAC into business value (Akter et al. 2016). The conceptualization of this step is done via the identification of enabling mechanisms that support the synergistic interaction between BDA-related resources (Nevo and Wade 2010). Accordingly, we are able to identify four mechanisms and two corresponding action clusters per mechanism (see Table 2).

Reinforcement mechanism	Interaction-enhancing mechanism	Sense-making mechanism	Structuring mechanism
(1) Analytics controlling and coordinating (2) Agile project and program management	(3) Business-IT alignment (4) Partnerships and analytics ecosystem	(5) Change management (6) Funding and top-management support	(7) BDA governance (8) BDA strategy and management processes

Table 2. Synergistic mechanisms and action clusters for realizing value out of a BDAC

The first identified mechanism is called reinforcement mechanism, which aims to support and reinforce the interworking of the elements of a system (Kast and Rosenzweig 1972). Applied to BDA, this mechanism exemplifies organizational actions, which enable and increase the seamless interworking of several BDA-related resources within a BDAC (Dremel et al. 2020; Weibl and Hess 2020). The reinforcement mechanism is positioned at the corporate strategic level of an organization, addressing corporate goals of an organization and methodological means to achieve them (Mikalef et al. 2018). We call our first identified action cluster for reinforcement analytics controlling and coordinating, stating that an organization should plan and coordinate all analytics-related activities within an organization (Akter et al. 2016). Such a coordination at the organizational level ensures that all analytics-related projects and endeavors follow a routinized approach, allowing for bundling and allocating BDA-related resources to newly created projects when needed (Schüritz et al. 2017). Thus, this action cluster intends to create an analytics delivery pipeline, providing process continuity (Legner et al. 2020). For instance, such a delivery can be established within an autonomous analytics working unit like a CoE, where all relevant expertise, infrastructure, and leadership is bundled (Schüritz et al. 2017). In addition, a suitable working mode within this autonomous unit is required for establishing proof of concepts (PoC) and productive BDA-related solutions. Enabling such a working mode may be ensured through the introduction of agile methods and a supporting program management, that supports analytics planning and coordination (Weingarth et al. 2020).

The second identified mechanism aims to leverage the collaboration between employees within an organization, independently from their functional affiliation, and is called interaction-enhancing mechanism (Weingarth et al. 2020). The notion of business-IT alignment is of special concern within data-driven endeavors, stating that data scientists and engineers as well as functional and business experts have to collaborate effectively for producing use cases and PoC's for creating business value (Schüritz et al. 2017). Going beyond organizational boarders, the collaboration with academic and industry partners provides a viable source for creating synergistic effects, aiming at creating an analytics ecosystem (Mikalef et al. 2017).

The third identified mechanism is inherently interwoven with the interaction-enhancing mechanism. The sense-making mechanism tries to convey meaning and purpose for BDA-driven initiatives, leading to an understanding at the employee-level (Lycett 2013). Change management is one action cluster within this mechanism, summarizing all activities that drive the digital transformation within an organization. Organizational actions within this cluster try to establish an open mindset and a willingness-to-change at the employee-level (Chen and Nath 2018). To understand the need for a digital transformation and strategic renewal of an organization, top management support and funding is needed. Thus, a clear communication strategy with the C-level at an organization is recommended to be established in advance.

Our fourth identified mechanism is called structuring mechanism and aims to reach an overview about all BDA-related initiatives and resources to avoid organizational risks and identify value realization opportunities. The creation of a BDA governance framework is classified within this mechanism. BDA governance relates to structural governance (for instance roles like a data steward), procedural governance (for instance BDA-related policies), and relational governance for managing different BDA-related domains (Abraham et al. 2019). In addition, BDA-related management processes have to be established for ensuring a standardized and proper handling with the enterprise data.

As a synopsis, the above presented action clusters all detail how a synergistic interaction between BDA-related resources may be leveraged. Hence, the BDA synergy process deals with the creation of an organizational BDAC in a first step, serving as precursor for thinking about how to realize business value out of this BDAC. To discuss value realization mechanisms, we have to describe and theorize the object through which value is realized, as well as the target of value realization (Kohli and Grover 2008). In our case, we have to describe the BDAC as object as well as their benefits, to which a BDAC is targeted in order to realize business value (Mikalef et al. 2020). Organizational benefits can be structured along the taxonomy of Gregor et al. (2006), who classified benefits along the informational, transactional, transformational, and strategic dimension. Informational benefits may be realized through the deployment of a data-driven decision-making process, whereas transactional benefits are related to big data-related business models (Abbasi et al. 2016, Wiener et al. 2020). Transformational benefits accentuates the need for operational excellence through business process efficiency (Grover et al. 2018), followed by a more external perspective through customer centricity for realizing strategic benefits (Elia et al. 2020).

Phase 3: Reflection and Learning

Following the principle of guided emergence of ADR, we elicit meta requirements (MR) out of the constant reflection on the designed artifact and its practical shaping in the context of *SupplyCo* (Sein et al. 2011). MRs embody one cornerstone for formulating design theories via addressing a class of goals through the application of kernel theories for the research endeavor (Walls et al. 1992). Within our ADR project, we aim to establish a process model, which explains how to realize business value from BDA through dedicated investments (Wiener et al. 2020). Hence, our class of goals is embodied through our aim of closing the BDA deployment gap (Hevner et al. 2004). Thereby, we structure our MRs along our theoretical lenses, especially with regard to the different process steps and formulate per step one MR. Following Walls et al. (1992), we categorize the MRs in line with the selected kernel theories.

To formulate our first MR, we analyzed the state-of-the-art in BDA business value research. In line with other articles, research about BDA business value creation and realization is an underexplored topic lacking in theoretical and holistic perspectives on the whole value realization process (Günther et al. 2017; Constantiou and Kallinikos 2015). As the results of our literature review indicate, most articles about BDA business value take an ex-post perspective while consequently lacking an ex-ante value assessment of BDA-related assets. As IT business value realization is a complex task itself, the outcome of investments in IT has to be determined ex-ante (Kohli and Grover 2008; Schryen 2013). In line with our systems-theoretic perspective, the ex-ante business value assessment of BDA-related assets and resources is complementary to the potential synergy between assets and resources (Weibl and Hess 2020). As resources are firm-specific, BDA-related assets have to be adapted in a specific organizational context (Bharadwaj 2000). However, organizational actions that yield to the conversion of BDA-related assets into firm-specific resources, are scarce (Grover et al. 2018). Following our theoretical perspectives of the RBV and GST, we formulate MR1 around the conversion of assets into resources. MR1: *The artifact should identify activities at both the social and technical level to provide an ex-ante business value assessment of BDA-related assets and its conversion to BDA-related resources.*

As the central concept of the proposed artifact is the development of a BDAC, the term needs to be demystified and clearly defined out of a business value perspective. In research, several definitions about BDAC exist (e.g., Gupta and George 2016; Wamba et al. 2015), lacking in taking a holistic perspective framing a BDAC as an organizational capability. To establish our own understanding out of the resource orchestration lens, we formulate MR2: *The artifact should delineate the term big data analytics capability containing its constituent elements and framing it as a major source of business value realization*.

As a BDAC builds on several BDA-related resources, a synergy perspective is proposed to complement the business value perspective on BDA. According to this theoretical perspective, synergistic interactions result in synergistic effects, so-called super-additive business value (Milgrom and Roberts 1995). The probability for realizing synergistic effects can be increased via enabling mechanisms (Nevo and Wade 2010). Enabling mechanisms are described via organizational actions that implement predefined potential synergies (Someh and Shanks 2013). Previous literature is very limited in detailing synergies regarding BDA-related resources (Dremel et al. 2020). Thus, we formulated MR3: *The artifact should allow for insights about exemplary enabling mechanisms, delineating synergistic interactions between BDA-related resources.*

The concept of super-additive business value emphasizes the relevance of realizing synergistic effects out of the synergistic interaction between BDA-related resources. Yet, most research articles that detail BDA define as output organizational performance (Mikalef et al. 2018). Therefore, we aim to distinguish between different value forms like transformational and strategic value (Gregor et al. 2006). In addition, we intend to give clear explanations how business value might be created and realized, extending the lens of solely focusing on business value perceptions. Therefore, we illustrate value realization through enabling mechanisms and dedicated benefits, which delineate the object through which value is created (Grover et al. 2018). Out of that reason, we structure our output concept along four different benefit dimensions, as we refer to the targets where business value is created and realized. To close this gap and describe the whole process of value realization, we formulate MR4: *The artifact should contain exemplary benefits for detailing value realization mechanisms out of the synergistic interaction between the elements of a BDAC.*

Phase 4: Formalization of Learning

To generalize our findings from the problem instance at *SupplyCo* and generate solutions for the class of problems which are dedicated to the BDA deployment gap, we aim in the fourth stage of ADR to formulate design principles (DP) to contribute to the existing body of knowledge (Sein et al. 2011, Wiener et al. 2020). We follow the guidelines of Gregor et al. (2020) and adapt their schema for formulating DPs. In particular, we formulate DPs along the elements "aim A-mechanisms M-enactors E-rationale R" (Gregor et al. 2020, p. 1633). Pertaining to the aim A, we used our insights about the data-driven strategy and vision for the data-driven initiative at *SupplyCo* as well as explanations in the extant body of knowledge to extract common goals for BDA-related initiatives. Pertaining to the mechanisms M, we generalized our insights at *SupplyCo* and *ITConsult* in their approaches to become more data-driven. As enactors E, we used our identified action clusters out of the artifact to generalize on activities for realizing those mechanisms. The rationale R is embodied in form of our theoretical lenses. Out of our ADR project, we are able to identify three distinct DP addressing our proposed MRs. The identified DPs are illustrated in Table 3.

Our first identified DP argues that business value realization through BDA usage in organizations takes a considerable amount of time, also summarized with the notion of lag effects (Schryen 2013). As we reported already in the section of the BDA conversion process, top management support is indispensable in early stages of such innovative initiatives. To reach top management support, it is crucial to make value-adding activities early visible and transparent. Such an approach ensures early funding and support at the C-suite. Thus, we recommend that an organization should implement BDA stepwise, which can be possibly understood as evolutionary process for implementing BDA. For instance, the development of initial use cases and PoC's describe a viable first step for implementing BDA, which could be followed by the creation of productive solutions. Analytics controlling and coordinating activities as well as governance mechanisms support the structuring of such processes, while securing that value-adding activities are realized.

Supplementing this process-oriented perspective, our second DP emphasizes the need of focusing on BDA-related experts for realizing business value. The focus point here is not only on the empowerment of those employees, but also on how to structure and organize them (Grover et al. 2018). To structure BDA-related experts within an organization, several types of organizational designs exist (Hagen and Hess 2020).

Regarding BDA-related activities, centralized approaches have gained momentum in IS research, for instance through the design of CoE's (Schüritz et al. 2017). To implement BDA in organizations, we recommend to follow initially a centralized orientation in structuring BDA-related resources, as it allows for structuring and coordinating all analytics-related activities, leading to the bundling of BDA-related knowledge within an organization (Hagen and Hess 2020). Such a bundling should be complemented with an appropriate strategy and working mode, which is ensured by the application of agile project management and the formation of an overall BDA strategy (Dremel et al. 2020).

#	Design principle	Definition of design principle	Addressed MR
DP1	Planning and Structuring	To achieve a stepwise establishment of a data-driven initiative within an organization, employ pilot and lighthouse projects involving analytics controlling and coordinating, top-management support, and BDA governance because early visibility of value-adding activities conveys meaning to top-management and BDA-related employees.	MR1
DP2	Enablement	To achieve the creation of productive BDA-related solutions, employ an initial centralized approach to bundle competences and resources involving agile project and program management, change management activities, and the development of a BDA strategy because resource orchestration serves as theoretical basis for business value realization.	MR2, MR3
DP3	Connecting and Alignment	To develop innovative BDA-related concepts, employ mechanisms for emphasizing collaboration and communication of analytics-savvy employees involving business-IT alignment and the development of an analytics ecosystem because cross-functional collaboration leverages data-driven competencies.	MR4

Table 3. Design principles for establishing a BDA-driven organization

Our third identified DP deals with the question of how business value is created and realized. As emphasized through our identified interaction-enhancing mechanism, effective communication and collaboration between BDA-related employees serves as basis for value-adding activities and products. This mechanism is embodied through the enactors of business-IT alignment and the development of an analytics ecosystem. Thereby, a sense-making mechanism at the employee-level is employed (Lycett 2013). This mechanism fulfills two purposes. First, to ensure that each analytical activity provides the potential to realize business value (Weibl and Hess 2020). Second, to establish a common ground for effective cross-functional collaboration, especially in the context of the interworking of business and IT (Weingarth et al. 2020).

Discussion and Implications

Theoretical Implications

The execution of our ADR project has several implications for academia, extending the body of knowledge and providing fruitful avenues for future research. Through our research endeavor, we are able to propose a process model for explaining actions and mechanisms for BDA business value realization. Thereby, we build on the state-of-the-art in BDA research through reliance on existing models of a BDAC (Akter et al. 2016; Grover et al. 2018; Gupta and George 2016; Mikalef et al. 2018), and establish a holistic lens for illustrating the process behind BDA business value realization, following several calls within IS research (Grover et al. 2018; Mikalef et al. 2018; Someh et al. 2019; Weibl and Hess 2020; Wiener et al. 2020).

Referring to the DSR paradigm, we argue to contribute to the extend body of knowledge through the aspects of (1) a proposal of our novel artifact and (2) first steps towards a nascent design theory. First, according to Gregor and Hevner (2013), models in general represent the second level of DSR contributions, also called nascent design theories. Correspondingly, we categorize our process model within their knowledge contribution framework in the quadrant of improvement (Gregor and Hevner 2013, p. 345), symbolizing that our model builds upon existing BDA value realization models (e.g., Akter et al. 2016, Grover et al. 2018), while establishing a new theoretical perspective on BDA resources and capabilities. Therefore, we

combined the RBV and the GST as kernel theories. The lens of synergy provides various possibilities for studying BDA business value realization, since it enables the derivation of action-oriented items out of the theoretical mechanisms of synergy enablement and realization (Nevo and Wade 2010). Hence, we think that the theoretical lens of synergy is fruitful for studying IT business value in general, as it allows for the identification of organizational actions to realize business value, while maintaining a theoretical solid ground. Thereby, we respond to the calls of Mikalef et al. (2018, 2020), who call for new perspectives on how to orchestrate resources into an organizational capability. Second, following the components of a design theory according to Gregor and Jones (2007), we implement several components within our ADR project. The "causa finalis" is ensured through the theory-informed building of our process model, demystifying the concepts BDAC and BDA business value. The clear definition of BDA-related resources, capabilities, and business value serve as "causa materialis". The "causa formalis" is embodied through our proposed DPs, addressing several MRs (Gregor and Jones 2007; Herterich 2017).

Practical Implications

Even though BDA techniques and processes represent a highly relevant area for research, many organizations are not successfully implementing and anchoring BDA within their organization. Within IS research, the notion of a BDAC is considered as core driver for business value realization. However, the concept of a BDAC has to be converted into concrete organizational necessities and actions to establish it within an organization. Our proposed process model including its two sub-processes provides guidance for practitioners in establishing a BDAC. In both processes (i.e., the conversion and synergy process), we identified distinct action clusters. Each identified action cluster serves as a concept at the meta-level, aiming for contributing to a framework of fields of actions to practitioners. For instance, the structuring mechanism calls for establishing a BDA governance framework at the structural, procedural, and relational level, leading to the identification of several possible organizational actions to structure and bundle BDA-related resources. This bundling is potentially realized by a coordinated corporate strategy and roadmap. In addition, our process model offers guidance in how to initiate a BDA-driven initiative and what actions an organization can take to scale it. The identified mechanisms and actions embody a benchmark against which an organization can assess their organizational ability to establish a BDAC to realize business value. By doing so, we provide implications for practitioners for enhancing their BDA maturity (Halper 2020).

Conclusion and Limitations

There exist several limitations in the light of our executed ADR project. First and foremost, we based our results on the collaboration with a single organization called *SupplyCo*. Thus, our results possible lack in its generalizability, affording future research that are based on multiple case studies. Second, we based our insights on in-depth focus group workshops as well as our observations at *SupplyCo*. Despite our theoretical anchoring in the body of knowledge, this may lead to a possible subjective bias of the researchers. Future research should provide more detailed qualitative data sources like personal interviews to ensure a broader empirical data structure. Third, we only executed two design cycles and cannot promise that our results are stable yet. In the future, we plan to execute additional design cycles in collaboration with other organizations to consolidate our learnings. Nonetheless, our results in form of the proposed process model as artifact provides first steps towards a nascent design theory on BDA business value realization (Baskerville et al. 2018; Gregor and Hevner 2013). Our process model provides a new and fruitful theoretical lens for studying IT business value mechanisms in general and complements existing IT business value models (e.g., Bhatt and Grover 2005, Kohli and Grover 2008) through proposing synergistic mechanisms and actions as key enabler for creating IT business value. Besides BDA, other technical artifacts could be studied in their potential for synergistically create and realize business value. Such research projects potentially provide fruitful insights for organizations and the IS research community on how to anchor a newly acquired technical artifact for realizing business value. Accordingly, we hope for advancing the understanding of BDA business value realization in IS research through the delineation of a process model (Constantiou and Kallinikos 2015; Grover et al. 2018; Günther et al. 2017; Mikalef et al. 2018, 2020).

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