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RESEARCH ARTICLE

# Co-creating Service-Dominant Business Artifacts with Action Design Research: Towards Ambidextrous Business Process Management

## Co-criação de Artefatos Empresariais de Serviços-Dominantes com Action Design Research

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**Abstract:** Due to the rise of digital innovations, business process management research requires not only to focus on internal organizational improvement aspects. It should also adopt an explorative focus to include completely new business processes driven by digital innovations. Our research project began as an innovation initiative of an international Dutch conglomerate in the financial services sector for exploring new business models. This effort took the form of collaboration among academics in business informatics and practitioners. We formalized this collaboration by adopting action design research (ADR) for reaching impact within the company while contributing new knowledge. The use of ADR resulted in the artifacts' co-creation that led to shared benefits, resulting in a win-win situation for the academics and practitioners.On the one hand, academics built a framework and its underlying artifacts for service-dominant business design and engineering. On the other hand, the framework supported the organizational transformation driven by digital innovation. This framework helps explore new strategic approaches that influence the design of new business models enabled by new business processes due to combining new and current capabilities known as business services.

**Keywords:** Digital Transformation — Service-Dominant Logic — Action Design Research — Ambidextrous BPM

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## 1. Introduction

A former chief executive officer (CEO) of the Dutch conglomerate initiated a project named CoProFind (contract-based process outsourcing in the Financial Services industry) for facing future challenges driven by the rapid market changes. The goal of the project was to trigger the digital transformation of the company driven by new paradigms in connection with the field of business process management. For achieving this goal, we established a collaboration between academic and practitioners. This kind of collaboration is growing in importance because it can generate reciprocal benefits for all parties involved [1]. Practitioners from industry secure access to scientific capability, and scientists, in exchange, learn about the industry's demands and concerns [2].

In this paper, the Author explores the collaboration challenges, experience, and gains between academia and industry. The Author was the former PhD candidate of the project that acted as a link between the between academia and industry.

In particular, the Author discusses the shift from researcher-driven design research towards a collaborative action design research approach. With this research approach, our collaboration was able to produce a framework that achieved organizational change while generating academic knowledge. This work is an extension of a presented research paper [3] at the first workshop on academy meets industry in information systems engineering (AMISE) co-located at CAISE [1], [2]. This research paper extends the AMISE research paper by including new illustrations (Figures: 1, 2, 3, 4 and 10) and new tables (Table 1 and Table 2). There is also the extension challenges and lessons as two sections. The inclusion of the following new sections: State-of-the-art as Section 2 and Section 12 for establishing a clear connection between this work

[1] http://caise20.imag.fr/workshops.html
[2] https://www.inf.ufrgs.br/amise/2020

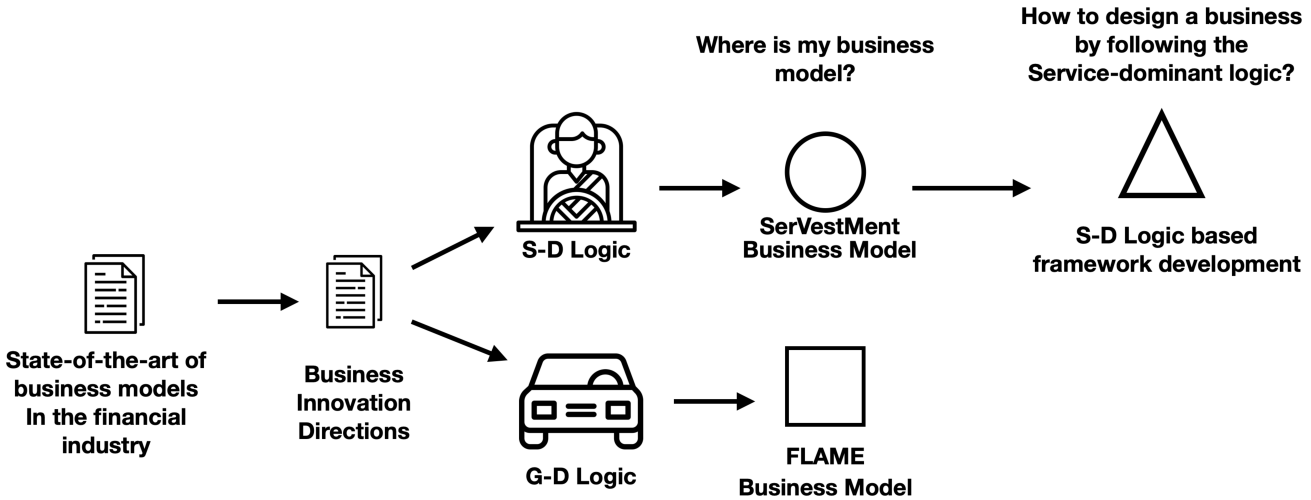


**Figure 1.** Problem identification journey.

and the BPM lifecycle.

This paper is structured as follows: In Section 2, we discuss the state-of-the art regarding digital transformation frameworks related to business process management. In Section 3, we discuss the research problem identification from practice. In Section 4, we discuss the challenges faced during our project. In Section 5, we describe the criteria for selecting the research method. In Section 6, we describe good practices of the selected collaborative research method: Action Design Research (ADR). In Section 7, we discuss the result of applying the collaborative research approach in the Dutch conglomerate for the overall framework design. In Section 8, we discuss the ADR use on developing the strategic layer. In Section 9, we discuss the ADR development on the business model layer. In Section 10, we describe the collaboration regarding the co-creation of the business service compositions and the business services layer. In Section 11, we discuss on how we solve our challenges and the lessons learned. In Section 12, we discuss the relationship between the resulting framework and the business process management lifecycle. Finally, we end this paper with conclusions.

## 2. State of the Art

The contemporary business process management (BPM) body of knowledge was developed for a specific type of business context, focusing mainly on clear-cut, structured processes that require improvement, standardization, or automation enabled by workflow management and enterprise systems in order to improve time, costs, and quality [4]. The BPM body of knowledge offers multiple research agendas for various topics such as the process mining agenda [5]. However, the link between BPM and DI has not received enough attention from researchers and is under-investigated [6].

Traditional BPM research on focuses on inward-looking improvement to improve operations, reduce waste and increase efficiency. However, digital innovation is challenging shifting the focus towards exploration outside the boundaries of the organization [7]. Moreover, leading researchers form the BPM community are calling for a convergence between BPM and digital innovation (DI)[8]. BPM tends to be inward-looking and attempts to incrementally improve business processes. However, this incremental improvement is not focusing on decisively innovate the business processes. In recent BPM literature, this difference has been identified as exploitation vs. exploration. For exploitation, BPM methods such as process analysis, re-design, and the development of a standardized data structure. For instance, ERP solutions support many of the process activities and thus helps to harmonize the process on a global scale and increase its efficiency and effectiveness. However, because the focus on exploration lies in innovation and more creative methods should be applied for process design and re-design phase, such as design thinking methods, instead of extensively measuring and analyzing the process performance [9]. As a researcher in business information systems the following question arise: How to extend business process management towards explorative research? Pervious works link the business processes with strategy and business models [10], [11], [12]. Hence, there is a research opportunity for developing a framework that links an explorative perspective to business process management. Previous works, provide a foundation of the framework presented in this research paper by connecting business processes with business artifacts: Al-Debai identified three connected layers: Strategy, Business Models and Business Process [10], [11]. The author states that the business model acts as the foundation from which the detailed operational business process model should be derived. De Castro et al., identified the business model, service compositions as processes, and business services [12]. However, these works do not provide management tools for connecting such layers. These management tools are essential part of explorative BPM for identifying new busi-

ness processes based the creativity of business practitioners. In this paper, the Author presents the research process of a framework that adds and explorative perspective to business processes by including business aspects such as strategy and business models.

## 3. Problem identification

In this section, we describe the presented visualization of the problem identification process presented in Figure 1. Through the first year, the Author examined the solution space: Business model innovations within financial services [13]. In this first step, the Author recognized the importance of business model innovation and brought into the company the use of visual representations for describing business models as shown in Figure 2.


**Figure 2.** Vendor Business Model from the Dutch Conglomerate by using post-it notes and the business model canvas.

As the following step, we developed a framework for establishing business innovation directions (BID). As presented in [14], the BID framework has four dimensions: Logic, openness, competitiveness, and newness. From these four dimensions, we focus our attention in this article on the logic dimension. This dimension has two possible values: Goods-dominant or service-dominant.

On one side, the goods-dominant logic indicates a traditional focus on products and value chains with a manufacturer mindset. In this goods-dominant logic [15], each link of the value chain adds value for manufacturing products and offering adding value services for such products. This logic has a focus on value-in-ownership, and the consumer plays a passive role by being a receptor of a product produced by the firm. On the other side, the service-dominant logic focuses on solutions: The value-in-use instead of value-in-ownership. This value-in-use is co-created within a value network, also known as an ecosystem. In this logic, all the business actors engage actively in the co-creation process [15].

Within the information systems (IS) group from the Dutch University, we designed business models by following a goods-dominant perspective that is heavily asset oriented like FLAME: An asset leasing network that aimed to extend the current leasing scope from big machines to a more diversified range of goods. We also developed business models by following a service-dominant mindset, like Servestment. The Author led the development of the Servestment business concept, a crowd-funding finance platform for service providers by selling tokens for service delivery [16]. The practitioners from the company decided that business concepts that followed the service-logic perspective were the most innovative. Furthermore, they showed interest in designing a business by following this form of thinking. Therefore, we discovered our practice inspired problem: How to design businesses by following the service-dominant logic? How can we integrate current foundation on linking business processes and business artifacts in a framework that guides the business design and engineering process?

## 4. Challenges

During our project, we faced co-operation challenges in the between academics and practitioners. We conceptualize them as follows:

### 4.1 Challenge 1 (CH1): Consultant trap

There is a conflict between fast results and methodological research rigors expected for academic contributions. Practitioners want speedy results like a consultancy, resulting in a challenging environment.

The consultancy provides the academic with expertise that can provide a valuable source of research material. Nevertheless, in practice, efforts to combine consultancy and research can be frustrating. In general, consultants and academics vary in their motives, vision, and behavior [17]. In particular, during our problem identification journey described in Section 3, we behave more like consultants. Then shifted towards a researcher-driven collaboration for combining research and practice relevance for solving the identified problem.

### 4.2 Challenge 2 (CH2): High revenue trap

As a result of increasing financial performance, the financial success of a high-income earner conglomerate can slow down the research progress due to the lack of urgency to develop new concepts.

The financial success and increasing financial performance of traditional companies (incumbents), blinds them from seeing the danger of a new entrant into the market: A high revenue trap.

The revenue trap can be explained by using the S-curve. The S-curve can be applied for explaining the business performance over time. In Figure 3, we use the X-axis for representing business maturity and the Y-axis for representing

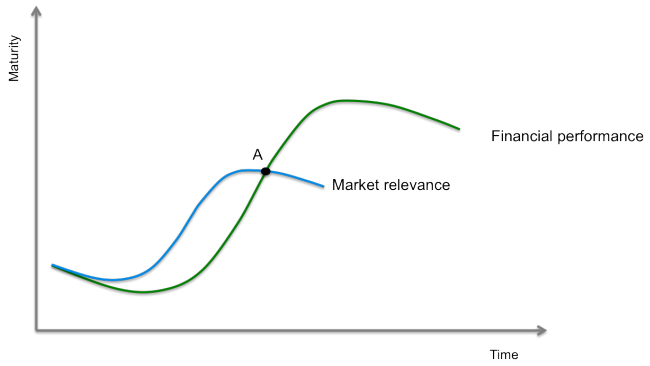


**Figure 3.** S-curves of financial and market relevance [14].

time. The S-cure shape is explained by the slow business performance at the time when the business is launched. In the beginning the curves goes down because the company is experimenting with the right business formula. Then the business maturity, that represents the performance, accelerates as the offering's popularity increases. At the end, the curve goes down because the offering's popularity decreases and reach obsolescence. This can be easily observed by the green s-curve, at the right-side of Figure 3, that represents the financial performance of a business based in their offering.

There is also what is called a hidden S-curve, represented the right left-side of Figure 3 with the color blue. This curve represents the inevitable changes in consumer needs and disruptive innovations by new market entrants. This curve is known as the market relevance (MR) S-curve. In the MR S-curve the market relevance start to slowly adapt to a new competing offerings from start-ups and new companies. However, incumbents are still ascending on the the green S-curve while a new offering rapidly is adopted on the marketplace. We illustrate, the high revenue trap phenomenon in Figure 3: The intersection point "A" where the ascending on the financial performance S-curve intersects with the diminishing market relevance S-curve. This phenomenon is explained by the financial performance confidence influences the top management of a company to avoid identifying new business models. This financial success, combined with the size of a company act as a trap by increasing the difficulty of creating new business models.

In a nutshell, the incumbents are too focused on optimizing their current business by improving operations and squeezing out their margins driven by a focus of exploitation instead exploration. Hence, there is a need on achieving a transformation towards exploration because does not receive much attention in traditional companies.

### 4.3 Challenge 3 (CH3): Artifact acceptance

Balancing usable and understandable artifacts driven by novel theory, new jargon, and new ways of doing things. The Author identified the service-dominant (S-D) logic as the novel foundational theory for developing a new framework. The

**Table 1.** S-D Logic's foundational premises [18].

| Premise | Brief explanation |
|---|---|
| FP1: Service is the fundamental basis of exchange. | The application of operant resources (knowledge and skills), "service," is the basis for all exchange. Service is exchanged for service. |
| FP2: Indirect exchange masks the fundamental basis of exchange. | Goods, money, and institutions mask the service-for-service nature of exchange. |
| FP3: Goods are distribution mechanisms for service provision. | Goods (both durable and non-durable) derive their value through use - the service they provide. |
| FP4: Operant resources are the fundamental source of competitive advantage. | The comparative ability to cause desired change drives competition. |
| FP5: All economies are service economies. | Service (singular) is only now becoming more apparent with increased specialization and outsourcing. |
| FP6: The customer is always a co-creator of value. | Implies value creation is interactional. |
| FP7: The enterprise cannot deliver value, but only offer value propositions. | The firm can offer its applied resources and collaboratively (interactively) create value following acceptance, but can not create/deliver value alone |
| FP8: A service-centered view is inherently customer oriented and relational. | Service is customer-determined and co-created; thus, it is inherently customer oriented and relational. |
| FP9: All economic and social actors are resource integrators. | Implies the context of value creation is networks of networks (resource-integrators). |
| FP10: Value is always uniquely and phenomenological determined by the beneficiary. | Value is idiosyncratic, experiential, contextual and meaning laden. |

S-D logic is based on a set of principles called foundational premises (FPs). These premises are shown in Table 1. However, these principles lack a practical application in real settings.

The choice towards the S-D logic was made because this theory offers a service-centered alternative to the traditional goods-dominant (G-D) paradigm for understanding economic exchange and value creation. The G-D logic sees economic exchange in terms of the production and distribution of units of output, which acquire value during the design and manufacturing process. Ideally, in G-D logic, this output is tangible,

produced away (separate) from the interference of customers, standardizable, and capable of being inventoried until sold, all to enable maximum efficiency in operations. Hence, the S-D logic theoretical foundation fits perfectly for researching about exploration instead the traditional exploitation research on BPM.

However, these principles are very theoretical, with a challenging jargon that is difficult to follow for non-experts in the matter. At the beginning, the Author struggled to communicate these principles to the research team due to its high theoretical nature. One of the key challenges was to find the right way to communicate the service-dominant logic in a useful and understandable manner. As a solution for this problem, the former Author constructed a service-dominant strategy to translate this concepts into a friendly manner. The result of this translation was implemented in the service-dominant strategy canvas [19].

## 5. Research Methods Experimentation and Identification

As presented in Section 4, the artifact acceptance is identified as one of the challenges of the project. Hence, the purpose our finding the right research method is to balance the theory and artifact developments from researchers with the usability required by business practitioners. Hence, we acknowledge the need to include our industry partners in the fine tuning process of the artifacts for engaging end-users and achieve a desired digital transformation within the Dutch conglomerate.

In our project, we began with design science research (DSR): A renowned research method for developing artifacts grounded in academic theory. Nevertheless, in DSR, the involvement of end-users happens only during the evaluation stage: Once the artifact is fully developed [20].

We experienced that by using DSR exclusively, our artifacts were not well received. Due the low engagement from practitioners towards our artifacts. Most of our meetings were on showing progress and results to our industry partners. Hence, there was a need to engage our industry partner into the development process for acquiring the right requirements regarding the usability, acceptability and applicability of the tools in a real setting scenario.

Then, the Author looked at Action Research (AR)[21] for reaching an impact within the company [22]. AR [23] is a research method aimed to intervene in the real world for solving practitioners' problems and gain scientific knowledge [24]. This research method is usually performed as an iterative process and combines theory generation with researcher intervention for solving an immediate organization problem [25]. However, it lacks the artifact development process from DSR.

The collaboration between academics and researchers required the adoption of a new research approach within the IS group. Consequently, we ask ourselves the following question: How can we construct artifacts with organizational impact and academic quality? Our collaboration shifted from researcher only driven artifact development towards a collaborative approach between academics and practitioners. Our research aimed to achieve the dual goal of creating academic knowledge and solving practitioners' problems. AR was a method taught in the Netherlands research school for information and knowledge systems (SIKS) and the beta research school of operation logistics and management (Beta), where the Author attended. However, the Author found in the IS literature a new kind of research method, neither taught at SIKS nor Beta: Action design research (ADR), specifically conceived as an intersection (illustrated in Figure 4) between action research (AR) and design science research (DSR) [25]. ADR [25] has emerged as a new design research method that combines DSR with AR to focus clearly on artifact development while considering user participation and feedback during the experimentation.

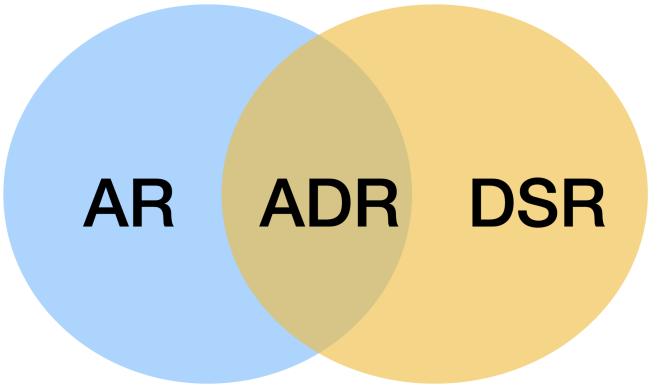


**Figure 4.** ADR as the intersection between AR and DSR.

We applied ADR successfully in our research project because it combines design research with action research to achieve organizational impact and knowledge generation: Mutual benefits for practitioners and researchers. This co-creative approach to conducting research balanced the development of new artifacts with an organizational impact: A shift from a goods-dominant business towards a service-dominant one.

## 6. Action Design Research Best Practices for Co-creating Artifacts between Academia and Industry

In this section, we present good practices for conducting an action design research (ADR) process. We describe good practices of the ADR process as the following stages [25]:

**ADR Stage 1: Problem formulation.** In this stage, we identify and conceptualize a research opportunity based on existing theories. Two principles drive this stage: Principle 1, practice-inspired research; and, principle 2, Theory-ingrained artifact. The former emphasizes viewing problems as knowledge-creation opportunities. The later, emphasize that theories inform artifacts that are created and evaluated within ADR.

**ADR Stage 2: Building, intervention, and evaluation (BIE).** In this stage, we use the problem and theoretical foundation for artifact development. Three principles drive this stage: Principle 3, reciprocal shaping, states that an ADR team formed by academics and practitioners engage in the artifact iterative process. Principle 4, mutually influential roles, stress the importance of mutual learning from the participants within the ADR process. Finally, principle 5, authentic and concurrent evaluation, emphasizes that evaluation is not a separate stage of the research process that follows building. In ADR, the artifact development process is iterative: First, we present a researcher-driven version to the practitioners: The alpha version. This one or more alpha versions are formative for refining the artifact. Then, the practitioners contribute to feedback. The captured feedback is processed by academics, resulting in one or more beta versions of the artifact. We use the beta versions with end-users in workshop settings. In this beta version, we asses the value and utility of the outcomes.

**ADR Stage 3: Reflection and learning.** In this stage, we reflect on the development process from building a particular solution to a broader class of problems. The resulting artifact, also known as the ensemble, will reflect not only the original design but also the practitioner's perspectives within the organizational use. This stage works in parallel with Stage 1 and Stage 2.

**ADR Stage 4: Formalization of learning.** In this stage, we formalize the outcome as a tool for solving a class of problems. This stage is driven by the principle 7: Generalized outcomes. This principle states that the resulting artifact or ensemble is, by definition, a solution to address a problem that can be generalized.

In the next section, we describe how we applied ADR for developing the framework artifact and two underlying artifacts: The service-dominant strategy canvas and service-dominant business model radar (In a few words, the business model radar or BMR).

## 7. Service-dominant Business Framework as the Overall View Artifact

By following ADR stage 1, we started the development of the service-dominant business framework for solving a practical problem: How to design businesses by following a service-dominant mindset. By following the ADR stage 1, the Author identified the theory behind: The link between strategy, business models, and business processes [27] [10].

The Author proposed the development of a service-logic driven framework as a foundation for his PhD thesis. However, the practitioners required confirmation of the service trend for going in this direction. The PhD candidate proposed to attend a service design and innovation workshop at the Institute for Manufacturing (IfM) at the University of Cambridge. The company showed interest in the research direction by sending an innovation manager to join the workshop with the PhD candidate. The innovation manager confirmed in practice the research direction on the service-dominant logic established by the Author, and the executives were eager to continue in this direction. As a result, the innovation manager supported the Author for developing a framework following a service-logic: The innovation manager and the Author sent a memo to the upper management for applying this framework in the company [26]. Then, due to the interest of the company in this direction, the IS group allowed the development of the framework as PhD thesis [28].

In Figure 5, we present the evolution of the iterative construction process that shaped the artifact. By following ADR stage 2, the framework evolved from an alpha version proposed by the Author[22] to a beta version (first presented in [29]) that included the feedback from academics and practitioners [30], [28].

The Service Business Logic Framework, the alpha artifact framework shown in Figure 6, includes from top to bottom: Service-dominant strategy model, service-dominant business model, business process model, and IS architecture and technology model. The Author defined the last layer at that time concerning the company's desire to implement business models. The service-dominant strategy model focused on a high level definition of a strategy driven by the service-dominant logic. The service-dominant business model as the result of confronting the business model concept with a strategic view of the service-dominant logic, the business process model for enacting business models as business processes. This vision was aligned to the ongoing research on service compositions with executable business processes with BPEL and SOA that was taking place within the cross-organizational information systems (XIS) research cluster within IS group. The Author was a XIS cluster research member. Therefore, the research challenge was mainly focused on the strategy and business models layers of the framework.

As shown in Figure 7, the artifact evolved into a business-only framework because our users were business executives: The beta version. This version was a result of ADR stage 3 by reflecting on the evolving practitioners' business needs. Hence, this updated the design principles and resulted in the service-dominant business framework with strategy formulation, business model design, and business process compositions with business services. In Figure 5, in the end, we show how business-oriented practitioners interacted with the framework during one of our workshops within the Dutch conglomerate.

As suggested by ADR stage 4, the framework can solve a class of problems in designing service-dominant business models. For instance, for modeling business adopting Industry 4.0 [31]. Furthermore, the framework guided the development of the underlying artifacts. In the service-dominant strategy layer, we have the service-dominant strategy canvas. In the service-dominant business model layer, we have the business model radar. At the bottom two layers, the service composition and business services, we used concepts with less novelty. At the business services layer, we used the concept of a business service catalog inspired in the service-oriented

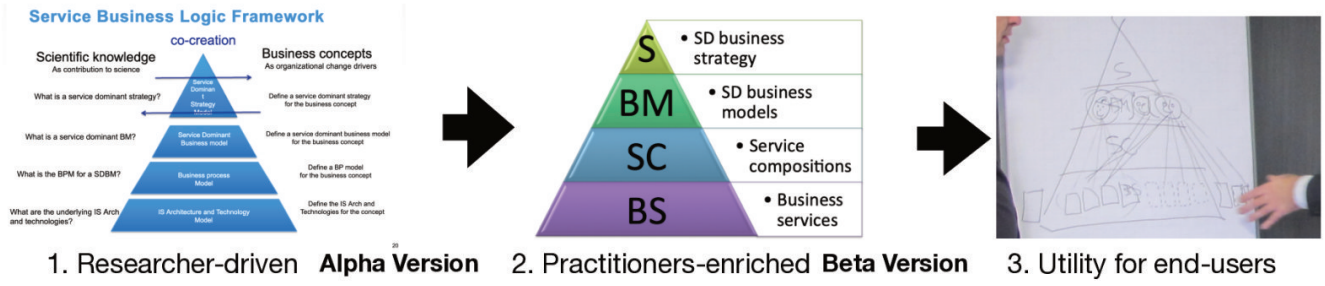


**Figure 5.** Service-dominant business framework development with action design research [3].

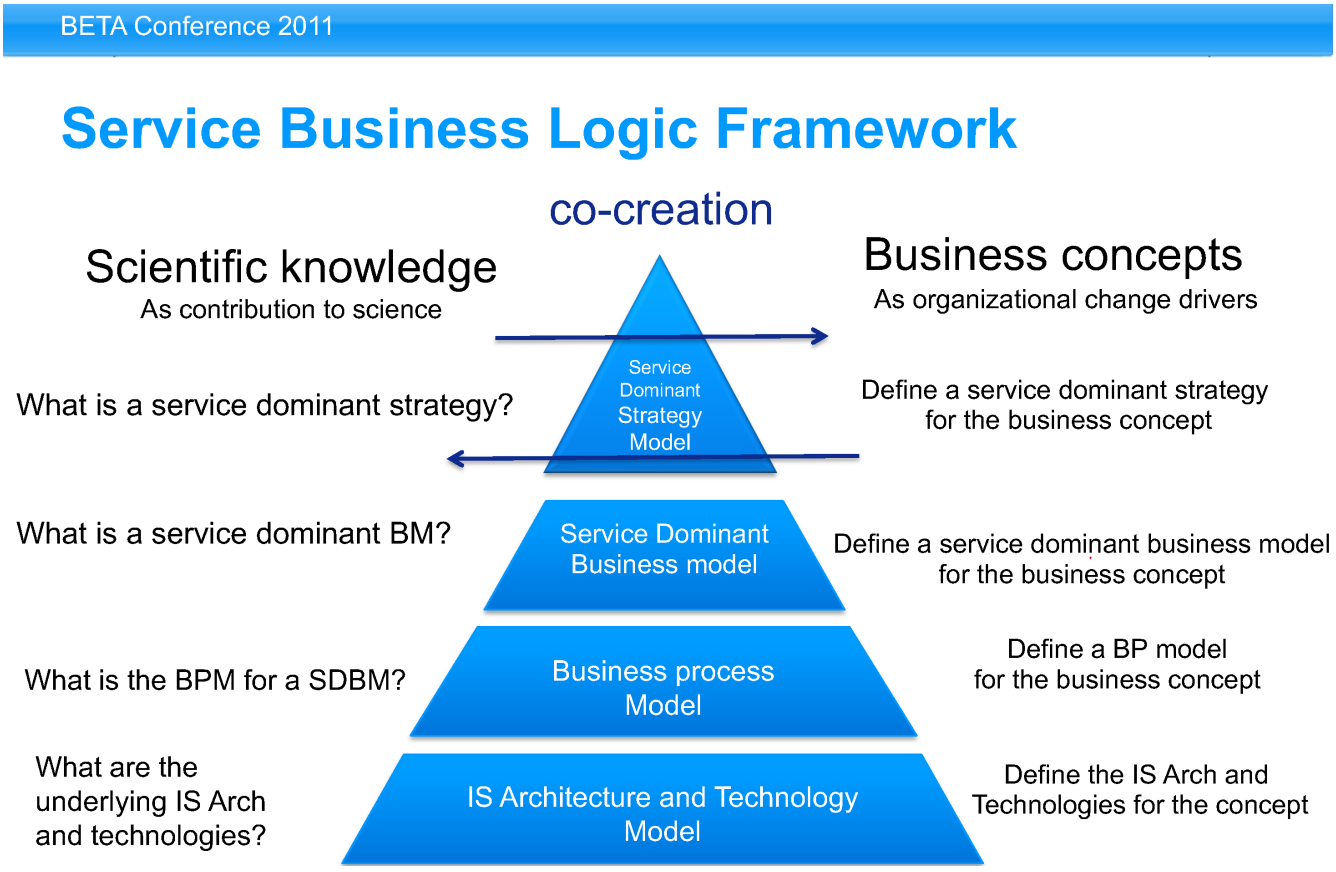


**Figure 6.** The service business Logic framework [22]: The alpha service-dominant business. Proposed to the Dutch conglomerate in [26].

architecture and applied at the business level. At the business service composition layer, we use the concepts of service blueprints and business processes for illustrating the idea of using a business service catalog.

## 8. Service-dominant Strategy Artifact

The first practical problem was how to formulate a service-dominant strategy. The Author reviewed the literature regarding the service-dominant logic theory and its strategic development [32]. This theory ingrained the design of an academic version of the strategy canvas: The alpha artifact [33].

As stated by ADR stage 2, we used the alpha version with the practitioners [19]. However, the jargon was too complicated. For instance, we used categories such as exogenous and endogenous. Then, we constructed the practitioner a user-focused version: The beta version [34]. In Figure 8, we show the service-dominant strategy canvas artifact: From the alpha version to the utility for the users in the last version. We tested the beta version in a workshop setting with executives from the conglomerate. During the workshop, we used an interactive approach with sticky notes and a poster version of the tool for

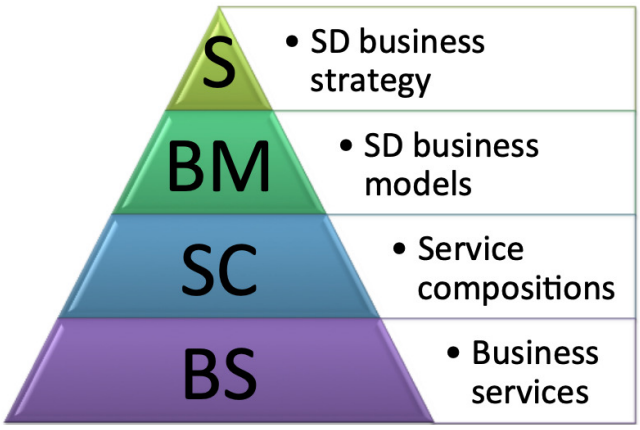


**Figure 7.** Service-Dominant Business Framework [29], [3].

enabling the collaboration. At first, when we started to use the elements, the executives were not too collaborative. However, after ten minutes with the tool, we were able to interact with the practitioners. By following ADR stage 3, we reflected on the workshop experience. As a lesson, we learned that the interactive poster with sticky notes approaches worked well with end-users, and we decided to use this approach with the remaining artifacts.

By following ADR stage 4, we have the service dominant strategy canvas with three categories as a generalized outcome: The value-in-use, the service ecosystem, and collaboration management. From the first category, the executives shifted their way of thinking from car leasing towards mobility solutions. From the second category, the executives defined their role within an ecosystem of service partners: The orchestrator. Finally, they identified the kind of partnership for playing this role. By following ADR stage 4, we can generalize the outcomes of the tool. Practitioners can not only design an orchestrating strategy but also identify other roles that could lead to different types of business models.

## 9. The Service-dominant Business Model Artifact: The Service-Dominant Business Model Radar

As stated by ADR stage 1, a practical problem drove the research: The need for designing solution-based business models derived from the adoption of a service-dominant strategy. In particular, as we identified in the strategic workshop session: The design of a mobility business model by playing the role of orchestrator. The Author identified the theory for developing the service-dominant business model artifact: The business model canvas that contains the elements of a traditional business model and the service-dominant strategy that contains the elements of a service-dominant mindset [29], [28]. The choice of the business model canvas as a theoretical foundation is justified by the popularity of the tool in business model design and business model innovation. Moreover, the business model canvas has a solid theoretical foundation because is the result of a PhD thesis in the area of Information Systems [27]. Hence, can be used as a solid foundation to further developing research in this area. This selection was based on a literature review on business models tool developed in information systems and its adoption in industry.

By following ADR stage 2, the Author developed the first business model radar (BMR) artifact by confronting the elements of the business model canvas with the elements of the service-dominant logic [29], [28]: The alpha artifact. We discussed the version in working meetings with the ADR team. However, the first goal was to test the circular shape of the service-dominant business model tool. The BMR has a circular shape for emphasizing the co-creation process due to the adoption of a value network structure. At the beginning the circular shape was questioned by the ADR team due the dominant thinking that a business model artifact should look like a rectangle just like the business model canvas [35].

Once the ADR team accepted the Author's argument on doing a circular-based representation on the tool, he produced a second alpha version by improving the confrontation process between the theoretical elements [36].

During our work on the BMR by following ADR Stage 2 (BIE), the practitioners influenced on the practicality and usability of the business model tool and the academics with the theory and the artifact: Achieving mutually influential roles (principle 4). The BMR alpha artifact versions were evaluated internally within the ADR team by following the principle 3 (reciprocal shaping) and then with the beta version we tested with a broader audience in a workshop setting [28]. In Figure 9, we present the evolution of BMR as an iterative development process: From the alpha version to the utility for the users in the last version.

As shown in Figure 9, the complexity increased as the BMR evolves. The increase in complexity is explained by discussing with practitioners and by updating our design principles. At first, there was not an explicit separation between costs and benefits because one senior manager insisted that he does not care about the benefits of the other parties involved in the business model. However, this was a particular aspect that hinders the artifact as a solution for a class of problems. The first researcher-driven version: The Alpha Version 1, set the direction on service-dominant business models and explored the circular shape for representing business models as value networks or business ecosystems. Afterwards, the Alpha version 2 of the artifact, service-dominant business ecosystem was developed on focus of value co-creation and business ecosystems.

By following ADR stage 3 on reflection and learning, the Author reflected on this issue and established a beta version of the BMR by including an explicit separation of cost-benefits to emphasize the business model aspect of the BMR. In this way, the end-users have to think about the costs and the benefits for each party involved. During the workshops, the BMR tool achieved the goal of designing a business model within the conglomerate: A mobility orchestrator business model. In

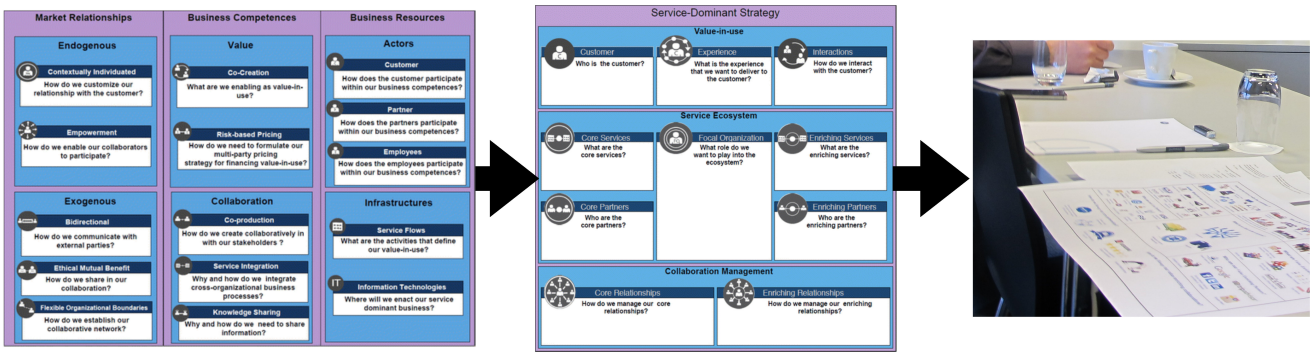


**Figure 8.** service-dominant strategy canvas artifact evolution: From the researchers driven Alpha version to the utility for end-users in a workshop session from the practitioners-enriched Beta version [3].

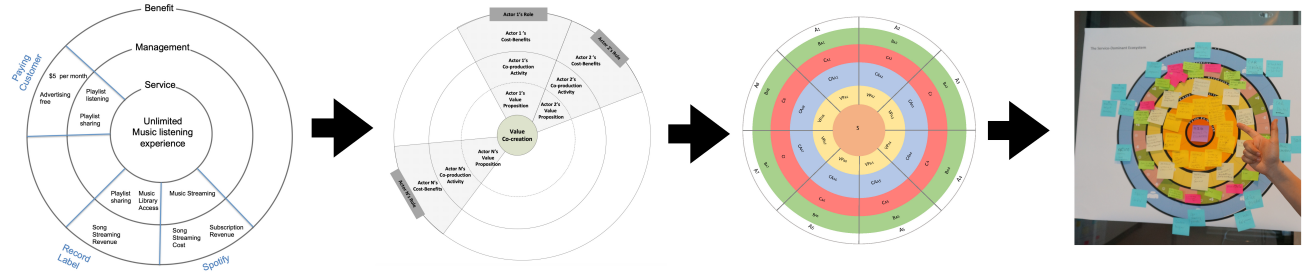


**Figure 9.** ADR development process for the service-dominant business model radar [3].

this BMR Pattern, there is one focal organization acting as orchestrator for providing an experience to a customer with the business services provided by partners.

As stated by ADR stage 4, we formalize the outcome: A service-dominant business model is the reframing of the business model concept by following a service-dominant strategy. This concept takes shape as a conceptual modeling tool for business model design: The business model radar. The business model radar (BMR) takes a value network organizational structure where each co-creation actor contributes to the overall solution with value propositions. For delivering a value proposition, each actor must perform a co-creation activity. By participating in the business model, a co-creation actor can incur in costs and gain benefits. This result extends the limited versions focused only on value-in-use enabling a broader business model development.

Practitioners and academics can use the BMR for designing business models as ecosystems beyond mobility business models [37]. The Author candidate has tested the generability in business model innovation workshops in Austria and international lectures about business models with students from universities in Finland, Sweden, Germany, Indonesia, and Austria. Furthermore, the business model radar can be use in combination with business model patterns for achieving business model innovation [38].

## 10. From BPEL and Web Services towards business service compositions as business processes

The first two layers are focused on the business direction of the business design and engineering approach of the framework. The remaining two layers are related with the business operalization.

In the third layer, the business service composition takes a customer-focused business process composition of business services. Finally, at the bottom layer, the business services act as the composable capability that are represented as a task within a business process. As mentioned previously, the Author was part of the XIS research cluster. Within XIS, the research focus was on BPEL and business process compositions. Hence a straight forward action was the adoption of business processes and Web services for the implementation of these layers.

Business Process Execution Language for Web Services (BPEL) is the de-facto standard for implementing business processes on top of web services technology. The BPEL language enables the execution of cross-organizational processes by invoking web service operations. BPEL is an orchestration language that specifies an executable process that involves message exchanges with other systems [39]. However, due

the business focus of our audience at the Dutch conglomerate, we decided to focus on lighter approach on business process and business services at the conceptual level rather the technical one. This line of reasoning is the shift towards a business focused framework due the interaction with practitioners by following ADR. We decided as a team to focus on service compositions of business services.

In particular we used two artifacts: A business service composition blueprint and a business services catalogue [28]. We describe them as follows:

The services composition is useful for identifying customer focused business processes that later were specified as a business process in BPMN. A business service composition blueprint takes the clues from a tool for service design: The service blueprint. This approach is useful for conducting workshops that leads to an end-user friendly way of specifying a workflow. This business service composition blueprint is aimed to non-engineers like business managers. This service composition blueprint can be further specified as a business process with business engineers [28].

The business services catalogue is based on the literature on service-oriented architecture. In a nutshell, is a way to classify business capabilities into domains. The business service catalogue is used in conjunction with the service composition blueprint and the derived business processes for designing customer focused business process as BPMN orchestrations diagrams [28].

## 11. Challenges Resolution and Lessons Learned

Due to the challenging collaboration, we were able to learn valuable lessons by solving the identified challenges from Section 4. In Table 2, a relation between the identified challenges and the lessons learned by solving such challenges. We further elaborate the described the lessons learned from the identified challenges as follows:

**Table 2.** Challenges and lessons learned

| Challenge | Lessons |
|---|---|
| CH1: Consultancy trap. | L1. Identify the practitioner's needs. |
| CH2: Artifact acceptance. | L2. Inclusive instead of exclusive: Include the industry side in the artifact development process.<br>L3. Artifact co-creation: The project meetings and workshops enabled practitioners to collaborate with academia.<br>L4. End-user focus: The practical approach oriented towards end-users changed the way the users interacted with our framework.<br>L5. Keep it simple but complete: Artifacts can not be too complicated or too simple |
| CH3: High revenue trap. | L6. Associate with industry partners:<br>L7. Convince with evidence: Proofs are essential for following a research and digital transformation directions<br>L8. Inside-out: Dual role by working as a staff member within the university and also spending time working within the conglomerate. |

**Escaping the consultancy trap:** For solving CH1, the shift towards ADR helped to find a relevant problem of the organization instead of formulating isolated academic-driven solutions. The ADR approach was fundamental for identifying the practitioner's needs. The consultancy approach was driven by solutions without a deep understanding of the conglomerate's digital transformation needs. We started the project with electronic contracting technologies. However, after we starting working together with practitioners, we were able to find the real needs for bringing benefits to the company and the university. Hence, we learned to start with a deep understanding of the practical problem before offering recommending solutions. Therefore, the first lesson is to identify the practitioner's needs (L1 in Table 2).

**Increasing the Artifact acceptance:** For solving CH2, the ADR method was fundamental for including the industry side in the artifact development process. First, We shifted from an abstract researcher-driven approach towards a practical end-user focus. This collaboration fostered the interaction between academics and practitioners and helped to reduce the knowledge gap between them. Academics gained insights from practitioners, and practitioners gained state-of-the-art knowledge from academics. Therefore, the second learned lesson is to be inclusive instead of exclusive (L2 in Table 2). This shift, changed the way our framework and tools were defined and presented. The project meetings and workshops enabled practitioners to collaborate. They brought valuable insights and to establish a reality check of the tool in the real business environment. Hence, the third lesson is the artifacts co-creation between academy and industry (L3 in Table 2). Then, the practical approach oriented towards end-users changed the way the users interacted with our framework (L4 in Table 2). This increased the usability and acceptance of the tools with practitioners. Finally, Artifacts can not be too complicated or too simple. Finding the right balance was is achieved with the interaction between academic practitioners and end-users. Leading to the framework and artifacts acceptance. Therefore, the fourth lesson is to keep it simple but complete (L5 in Table 2).

**Escaping the high revenue trap:** For solving CH3, we needed to convince the management of the urgency of the

digital transformation within the conglomerate. This problem was tackled as follows: First, the association with middle management was key. Middle management can offer access to resources on the industry's side. An innovator manager was essential in the company side for facilitating workshops, giving feedback, and spreading the new artifacts within the organization. Usually, senior managers have less time and energy to focus on non-urgent tasks like a research project. Hence, we learned to associate with industry partners (L6 in Table 2). Second, Proofs for following a specific research direction are essential for practitioners and academics. Proofs are particularly useful when the Author was new to the organizations involved in the project and new in the country. The attendance to a workshop at the University of Cambridge helped to convince the practitioners and then academics to solve the practice-inspired business design problem by developing the framework. Hence, convince with evidence is essential for gaining approval with senior managers (L7 in Table 2). Finally, adoption of an inside-out approach: The Author worked as a staff member within the university and also spent time working within the conglomerate (L8 in Table 2). This configuration helped to bring academics and practitioners closer and also influenced on reducing the knowledge gap by constant interaction and exchange.

## 12. Service-Dominant Business Design Framework and BPM Lifecycle: The ambidextrous BPM Lifecycle

Exploitative BPM is a legacy of Taylorism and Industrial Engineering for an improvement paradigm: Improved processes tend to be more cost-effective, faster and compliant [40], [41], [42]. However, in digital transformations, disruptive business models and co-creation with external stakeholders, exploitative BPM is no longer enough. The main reason is that exploitative BPM's focus on operational efficiency does not include a response strategy for the disruptive threats to the revenue model of a customer-facing business process. Thus, organizations need to deploy ambidextrous BPM and also explore previously untapped revenue opportunities as they relate to their existing business processes. This structured investigation of new sources of process value is called explorative BPM [43]).

Exploitative and explorative BPM differ in the body of related knowledge and the set of tools, methods and techniques available. Hence, the integration of different disciplines to extend the current BPM body of knowledge is important for achieving ambidextrous BPM: Exploitative and explorative BPM.

Service-dominant business design uses the foundational theory of service science, the S-D Logic, for reframing traditional business concepts such strategy and business models. This reframing enables towards the S-D Logic enables a process-oriented perspective that makes possible to extend the traditional exploitative BPM with explorative BPM.

The framework can provide a bridge between explorative and exploitative BPM by extending the BPM body of knowledge towards strategy and business models. The later helps to identify new business processes driven by new business models. The former helps in setting the direction on which new business models are designed. A well known artifact that represents the exploitative approach in BPM is the BPM lifecycle presented in [44]. The Figure 10, represents an illustration of the extension of the BPM lifecycle for achieving ambidextrous BPM. At the top, within explorative BPM aspect, we have the strategy and business models for identifying new business models. At the bottom, we have the exploitative BPM aspect, that seeks to improve business process in a continuous manner.

As previously presented, the service-dominant business framework has the following layers: service-dominant strategy, service-dominant business models, business service compositions, and business services. In the ambidextrous BPM lifecycle, these layers play the following roles:

The service-dominant strategy layer plays an explorative BPM role by extending the BPM body of knowledge towards strategy formulation. In the first layer, the service-dominant strategy canvas for defining a focal organizations' strategy focused on an ecosystem of capabilities. In this layer we identify the role that a organization will play within an ecosystem of partners. This role defines the way a business model will be designed in the second layer.

The service-dominant business model layer plays an explorative BPM role by extending the BPM body of knowledge towards business model design. In the second layer, the service-dominant business model radar, that is being generalized as the business model radar or BMR plays the role as a business model design tool. The BMR is a meta-model tool for developing business models as ecosystems. In further developing the BMR, the Author established business model patterns that represent a certain configuration of elements that can facilitate the business model innovation process. These BMR patterns are defined as a set of templates [38], [37]: For instance the personalized product BMR template [38]. This BMR pattern has been been applied for achieving business model innovation in smart production also known as Industry 4.0 within an European interregional project between Austria and Slovenia [38], [37], [31].

In the standard BPM layers: Business Service Compositions and business services. Business processes that implement a service business compositions are a suitable form of representing the operational aspects of a business model. Hence, these new business processes are part of an explorative approach on the process identification part within the BPM lifecycle. These business process can be further processes into exploitative BPM approaches for optimization goals on an as-is process model. For instance, Furthermore, the BMR can be transformed into business processes for performing calculations such as cost-benefit analysis with business process modeling tools [45]. These cost-benefit analysis tools are

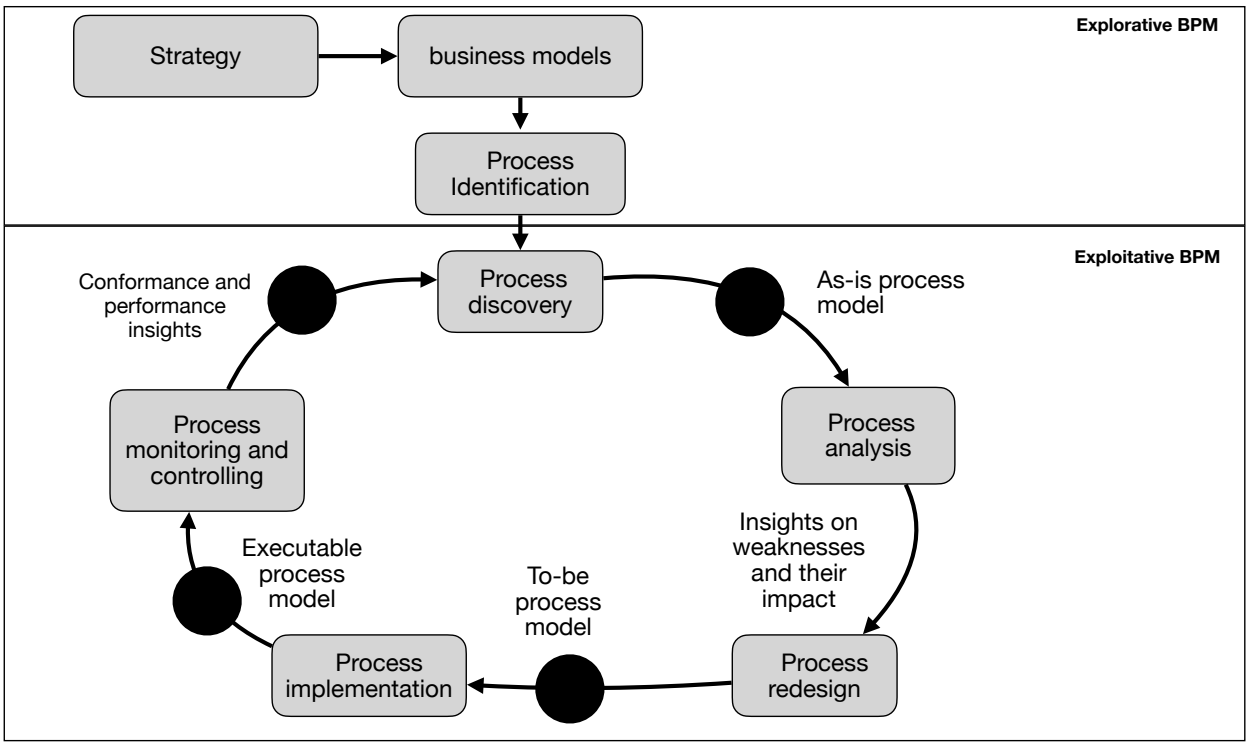


**Figure 10.** Ambidextrous BPM lifecycle

part of the process analysis stage within the BPM lifecycle that are the foundations for the process re-design stage. Afterwards, the To-be process model can be implemented into executable process models. These executions can be monitored and controlled. Furthermore, these process executions are the foundations for gaining performance and conformance insights.

## 13. Conclusions

R The frameworks and artifacts produced within the project achieved an impact in the academy and industry. The framework evolved from a researcher-only conceptualization towards a collaborative practitioners-oriented specification driven by academics and co-created with practitioners. On the one hand, the framework serves the purpose as a guideline and structure in the business design and engineering process. On the other hand, the underlying artifacts were co-created with practitioners for achieving impact and acceptability.

The ADR method proved in our project to be the right research approach for collaborating with the industry by co-creating solutions rather than just delivering them. By including the practitioner in the research, we were able to minimize the gaps in domain-specific knowledge. Furthermore, the company executives accepted and used the resulting artifacts for defining a new direction of doing business.

The service-dominant business model radar [28], has been applied in mobility solutions [29]. Furthermore, the BMR has been applied in a mobility project conducted by the IS group at the School of Industrial Engineering in Eindhoven University of Technology: C-MobILE (Accelerating C-ITS Mobility Innovation and depLoyment in Europe). Nowadays, the Author teaches how to use the BMR within an international course in collaboration with the competence center e-commerce [3] in Germany: The Network-Economy. In this course the Author teach how to use the BMR for designing innovative business models with international students from universities in Germany (South Westphalia University of Applied Sciences, Ruhr West University of Applied Sciences, and Free University of Berlin), Sweden (Kristianstad University), and, Indonesia (Swiss-German University). Currently the framework is an active research area within the IS group within the school of industrial engineering at Eindhoven University of Technology and by Author.

The presented work, provides a step forward in the explorative BPM research by including business artifacts focused on strategy and business models. These novel artifacts enable the design of completely new business processes driven by innovative business models. Therefore, the presented work provides a contribution towards the development of ambidextrous BPM by focusing on the under-research area of explorative BPM.

## Author contributions

The author of this journal paper produced the presented artifacts by applying ADR as described in the document. The

[3] https://ccec-online.de

author acknowledges the ADR team's contributions composed of the following members: Egon Lüftenegger as a former PhD candidate at the Information Systems sub-department within the Department of Industrial Engineering & Innovation Sciences at Eindhoven University of Technology (TU Eindhoven). Paul Grefen as former promotor. Marco Comuzzi as former co-promotor. Caren Weisleder as a former innovation manager at the global Dutch conglomerate.

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