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Le Cunff, Eric ORCID: 0000-0001-6608-7055 and Schlick, Sandra ORCID: 0000-0003-3661-0479 (2023) A system of customer co-creation for new product development of digital products with a pilot study of the Swiss media industry. In: Society 5.0 Conference, 5-6 June 2023, University of Pretoria, South Africa. ISSN 2398-7340

A system of customer co-creation for new product development of digital products with a pilot study of the Swiss media industry

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Abstract

In the age of digitisation, the media industry is faced with declining advertising revenues. Therefore, the focus on the development of new digital products is a key element to survive in such a fast-changing market and to increase the innovation performance. One of the most important elements thereby is the involvement of customers as co-creators in the new product development (NPD) process, so that new digital products are developed that are in demand on the market. However, the process of how companies turn external knowledge from customers into knowledge creation for generating new ideas and the development of innovative products has not been analysed. This pilot study, which presents an initial system of customer co-creation for NPD of digital products from the literature and searches for similarities and dissimilarities through an abductive qualitative data analysis from interviews with three managers in three different Swiss media companies, explores this unresolved research gap. The system of this study is based on an overarching phase model, which is derived from Application Lifecycle Management (ALM). The process anchored in it, which focuses on the customer co-creation of digital products, integrates process elements from the two user-centered approaches, namely User Centered Design (UCD) and Design Thinking (DT). The results from the interviews show that the system is largely in line with the NPD process procedures in the three media companies. It was found that customers can be involved everywhere in the NPD process, but that this is not yet implemented in practice. However, as the future ambition in media companies is to become even more customer-centric, the proposed system in this study is very promising.

1 Introduction

Increasing digitalisation in companies has led to a need to rethink old business activities and

thus established business models (Rachinger et al., 2019). In other words, the increasing demand for mobile and internet applications is forcing companies to rethink their customer needs and engage in a digital transformation that will allow them to survive in the market (Gurusamy et al., 2016). Thereby, the business models of many news organisations have been undermined by the enormous power and rigorous efficiency of the advertising activities of platforms of technology giants (Newman et al., 2019). With digitalisation, the need for innovation in business models is being raised to a new level (Heikkilä & Heikkilä, 2017). Thereby, to gain innovation and competitive advantage, new product development (NPD) is an essential business process (Papageorgiou et al., 2017). In this context, it has been analysed that involving customers in the introduction and ideation phase of NPD improves the financial performance of new products directly as well as indirectly through time to market (Chang & Taylor, 2016).

Consequently, so that media companies can survive in the market due to digitalisation, innovation approaches are sought that call for an NPD system for digital products which involves customers and empowers them to contribute their needs.

1.1 Problem Statement

The research statement at hand is the impact of digitalization on industries and the emerging topic of customer co-creation in NPD for improved performance and innovation in companies (Leung et al., 2020). Specifically, the Swiss media industry was chosen as the empirical focus due to the unique challenges it faces compared to other industries. Namely, digitalization has forced media companies to introduce cost-cutting measures and layoffs (Lischka, 2018).

1.2 Research Question

As a first phase of this study, a pilot study was conducted focussing on the theoretical research question with the purpose to understand the underlying problems and potentially emerging requirements having an initial impression of how the system of Application Lifecycle Management with customer co-creation could look like. With the research question "To what extent does the system for customer co-creation of new product development for digital products match with the new product development process in Swiss media companies?", this pilot study aims to obtain a discussion about the problems and requirements which the Swiss media industry has in their customer co-created NPD process of digital products.

1.3 Organisational Perspective in this Study

Through a quick implementation of ideas into objects, both internal and external feedback and communication mechanisms are triggered (Böhmer et al., 2017). To better understand the external and internal communication and feedback mechanisms within a company, this study takes an organisational view of the NPD process. Internally, this means that a clearer understanding can be set out of what role each interdisciplinary team has within a NPD process, but also how they need to communicate with each other. Externally, this means that a more explicit understanding needs to be provided for interdisciplinary teams in an NPD process as to when and how they interact with customers. This pilot study focuses only on the external feedback and communication mechanisms. Internal feedback and communication mechanisms will be addressed in the main study.

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2 Modelling Customer Co-Creation for New Product Development

To reduce the failure rate of new products, customer co-creation, meaning deep customer involvement in the development of new products, is seen as a new method (Piller & Rwth, 2012). However, the role of customer knowledge in the explorative development of new products remains unclear (Sihvonen eta al., 2021). Thereby, Goyal et al. (2020) describe that future research should focus on analysing the process by which companies turn external knowledge from customers into knowledge creation for the generation of new ideas and the development of innovative products.

This chapter therefore aims to demonstrate, by suggesting a system, what a process based on customer co-creation could look like to convert external knowledge sources (customers) into knowledge creation and the development of innovation new digital products.

2.1 The Relevance of Customer Co-Creation

Today, companies need to be innovative and creative to increase or maintain their market share. This puts the concept of value first and therefore before the product. This is because companies do not just sell products, but their values to customers (Hidayanti et al., 2018). Lusch and Vargo (2006), focused intensively on the topic of "value" and explain with the "service-dominant logic" that there are two different components for value co-creation. The first component refers to the value-in-use. This means that value can only be generated in the consumption process with the customer and determined by him. The second component is co-production. It is based on the co-creation of a core offer. Co-production is created together with customers or partners in the form of joint production of goods, development of product designs or inventiveness. In this regard, Dias et al. (2022) state that the creation of value among consumers is highly relevant nowadays due to the co-creation approach. This is because a competitive advantage can be gained through interaction with consumers.

Thus, with the approach of customer co-creation in NPD of digital products, an approach can be found to counter the problem description in Subchapter 1.1 and thereby gain a competitive advantage.

2.2 Fitting Lifecycle Models for the Aim of New Product Development

There are many lifecycle models in the literature, the most central of which for this study are the product lifecycle (Donoghue et al., 2018; Stark, 2018), the software lifecycle or waterfall model (Lee, 2022; Dwarakanath et al., 2020; Sommerville, 2015; Royce, 1987) and the Application Lifecycle Management (ALM) (Tüzün et al., 2019; Schwaber, 2006; Chappell, 2010). Thereby, a lifecycle model is highly dependent on the type of product, which affects the company's business processes (Terzi et al., 2010). Since this study focuses on the development of digital products that are software-driven, the application of a general product lifecycle is insufficiently specific. Going further, the waterfall model contains a procedure which is presented in such a way that first one phase must be completed before moving on to the next. This is appropriate for hardware developments, as there are high production costs. The software process, however, is never a simple linear model in practice, instead it should allow feedback to other phases (Sommerville, 2015). Therefore, the waterfall model approach is not considered as suitable for the overarching phase model, meaning the overall structure, of the system of this study. A far more concentrated model, which refers to various aspects of development, is the ALM. This model starts from the governance perspective, then includes the development but also operations (Tüzün et al., 2019). This model makes the most sense for this study, as this study focuses on the organisational view of NPD and therefore includes various internal views from interdisciplinary teams and not just pure software development. Therefore, in this study, the ALM approach is chosen as the overarching phase model for the system.

2.3   Development of the Model for Customer Co-Creation

The needs and wishes of a company's most valuable customers should be fully integrated into the products and services. This strategy aims to generate more profit in the long term (Fader, 2020). Design Thinking (DT) focuses not only on the translation process of the needs, aspirations and wants of customers and users into product and service solutions itself, but on the development of user experiences (Meinel et al., 2020). Therefore, with design thinking, problems are formulated, unobserved needs are identified, and the voice of the user is embedded in processes or systems (Lahiri et al., 2021). Thus, design thinking is considered as an innovation driver in academic literature (Magistretti et al., 2021), which contains 5 phases, namely empathize, define, ideate, prototype and test (Hasso Plattner Institute of Design at Stanford University, 2010). This study focuses on this five-stage design thinking process because DT emerged from Stanford University (Brenner & Uebernickel, 2016) and this process, consisting of five phases, represents the ideal-typical process at Stanford University (Reinecke, 2016). Nevertheless, Beverland et al. (2015) contended that barriers exist for organisations by adopting design thinking practices and Kwon et al. (2021) researched that DT is not used as a whole process in large companies. The most important phase elements are "ideate" and "prototype" followed by "test". This is because larger companies often have a hierarchical structure and work with waterfall structures. Furthermore, it is mentioned by Kwon et al. (2021) that in large enterprises, which use hierarchical operational sequences, it is almost impossible to apply a small number of user studies at the beginning of the project, as it is more concentrated on research ranges such as market study. Therefore, large companies often start with an already defined problem. Stickdorn et al. (2018) thereby expand that in such a mechanistic paradigm, companies see their activities as a series of business processes and try to improve each step. Often this is related to cost, as cost and efficiency are relatively simple tools for the management to target. The problem that arises is that entire organisational units are built based on work functions that do not reflect the customer's view. For this study, this means that another user experience-driven paradigm must be used additionally, which firstly ensures that an already existing problem can be addressed and secondly, that the process steps from ideate to testing from DT can be used as a process transition. To accomplish this, this study applies the User Centered Design (UCD) approach. The approach of UCD refers to the active involvement of users in every phase of the design process. The aim is to develop a more efficient, safer and more effective product (Kahraman, 2010) and is particularly interesting for this study because UCD with ISO 9241-210:2019 provides recommendations for human-centred design activities and principles for the entire life cycle of computer-based interactive systems. Computer-based interactive systems are, for example, standard software products (European Committee for Standardization, 2019). In ISO 9241-210:2019, two phases from UCD that are relevant for this study are used at the beginning of the customer co-creation process, namely "understand and describe the context of use" and "specification of the usage requirements". The first phase needs to describe the users and other stakeholders, the characteristics of the users or user groups, such as skills or preferences, the users' goals and tasks, and the system's environments, such as software, hardware, and materials. The second phase refers to user requirements as well as the requirements of other stakeholders, considering the usage concept. In addition, requirements can also be derived from organisational requirements that directly influence the users (European Committee for Standardization, 2019). The first phase of UCD is therefore suitable for starting with an already predefined problem, since no matter which problem is defined, the target group and its product use must be identified and researched. The second phase of UCD is further appropriate, as it fits into the chosen overarching phase model of the system in Figure 1, which is based on ALM. Thereby, the topic "requirements" becomes apparent in the development cycle and is thus consistent. Finally, the transition from UCD to DT can also be seen as coherent. This is because the phase after "specification of the usage requirements" in UCD refers to "developing design solutions" (European Committee for Standardization, 2019), which has a similar design purpose in the "ideate" phase in DT, where ideate is described as the phase of the design process (Hasso Plattner Institute of Design at Stanford University, 2010).

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2.4 Suggestion of a System of Customer Co-Creation for New Product Development of Digital Products

By merging the model of ALM for NPD with customer co-creation, a system view can be supplied that shows how each of the relevant aspects of the respective models can be exploited. The purpose is to suggest how customer co-creation can be integrated into an NPD process in the Swiss media industry to finally bring digital products on the market that are desired by customers. It also aims to show how to apply a structured procedure to execute an NPD process together with the customers.
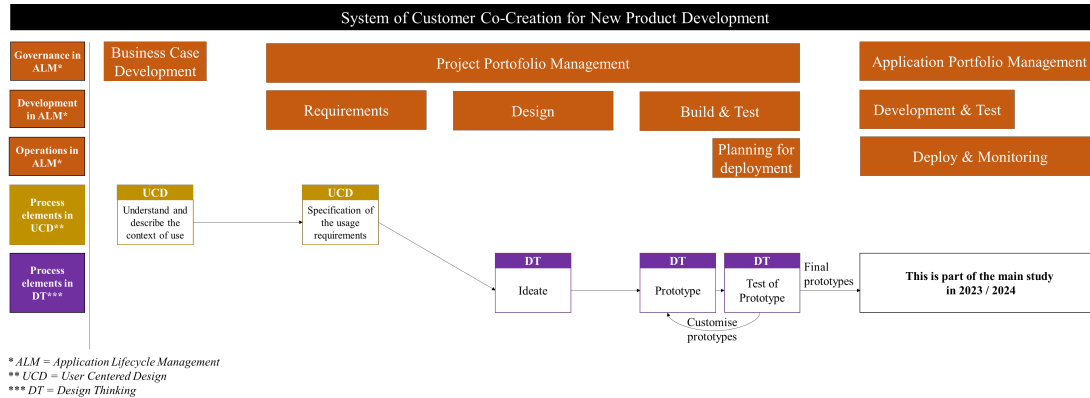

Figure 1: Overarching phase model of the system based on ALM derived from Tüzün et al. (2019), Chappell (2010), Schwaber (2006) and the main process for customer co-creation based on UCD and DT in the system derived from Hasso Plattner Institute of Design at Stanford (2010) and European Committee for Standardization (2019)

Based on the considerations in Subchapters 2.2 and 2.3, a visualisation of the system of this pilot study can be presented accordingly. With reference to the selection of the phase model from Subchapter 2.2, Figure 1 shows the phase model for the system of this study, which is based on ALM. It refers to the studies of Tüzün et al. (2019) and Chappell, (2010) but replaces the development activity with Schwaber's (2006) ALM 2.0 approach. This was done to take a less tool-focused view of ALM (Lacheiner & Ramler, 2011) and is highly relevant to this study, as this study does not create a software-based ALM tool, but uses ALM as an overarching phase model for the creation of the system. Figure 1 further refers to Subchapter 2.3 and shows the integrated process constellation for customer co-creation in the system. In this context, the merger of individual process parts of UCD (European Committee for Standardization, 2019) and DS (Hasso Plattner Institute of Design at Stanford University, 2010) are illustrated. How the process continues after prototyping is discussed in Subchapter 5.3.

3 Research Methodology for the Pilot Study

This chapter describes how the system of customer co-creation for NPD was empirically pilot tested.

Research Approach Thompson (2022) recommends that researchers acknowledge the abductive methodological approach when existing theories or frameworks play a significant role in coding and thematic development. Given that this study involves creating a system from theory and testing it for similarities or dissimilarities with a qualitative data analysis of interviews, the research approach utilizes an abductive qualitative data analysis.

Research Design The overall study will employ a design science research approach, with both the pilot study and main study utilizing Vaishnavi and Kuechler's (2004) process model of five steps: awareness, suggestion, development, evaluation, and conclusion. Since this study is a pilot study, only the awareness phase is covered. This means that a powerful research problem is identified, and a justification for the solution of the research problem is established by examining the theoretical system for similarities and dissimilarities with interviews.

Data collection and sampling In this study, the selection criterion was to choose among the main five Swiss media organizations with interview participants who possess a management-based view of the NPD process. Consequently, the three largest of those five Swiss media companies, namely SRF, Tamedia and Ringier, were selected. Due to the organisational perspective of this study, managers involved in the NPD of digital products were selected. The 30-minute interviews were guided by an interview protocol that supported the theoretical research questions of the main study, which were designed after identifying system requirements from the literature and assigning preliminary codes.

Data analysis The data analysis of this study is based on Yin's (2015) analysis phases. This process involves iterative phases that can involve jumping back and forth. The initial step in this study involved creating a preliminary coding tree from the literature, with codes such as life cycle management, iterative process, or ideation phase, followed by assigning whole answers from interview transcripts to the codes using NVivo software (QSR International LLC, n.d.). The patterns were then searched for and reinterpreted, leading to the formation of new code structures for the conclusion. This pilot study is about the problem awareness phase, meaning that the underlying problem for the development of the system is identified. The development and evaluation of the final system is part of the main study.

4 Key Results from Pilot Study

This chapter deals with the results of the data analysis from the pilot study. The results are used to find similarities or dissimilarities to the individual building blocks in the system of customer co-creation for NPD in Figure 1.

4.1 Application Lifecycle Model in the System

Compared to the system in Figure 1 no specific model (Interview 2, 12.01.2023) or specific framework (Interview 3, 16.01.2023) for lifecycles is used as an overarching phase model of the NPD process in the media companies. However, if a point is reached where it becomes apparent that the digital product has a technical lifecycle, which is more the case with an app than with a website, then it must be considered whether and for how long that digital product has to be kept alive (Interview 2, 12.01.2023). If an app needs to be developed further, meaning that it is renewed or expanded, then it must be decided again what that means when only further developing an app in terms of content, technology, or function (Interview 2, 12.01.2023). Even though the NPD phases are not based on a known lifecycle model in the media companies, it is evident in the data from the interviews that similar constructs exist across all three media companies for the process of NPD of digital products.

First, there is an idea phase, which can be titled with the approximate wording as "idea-backlog" (Interview 1, 06.01.2023), "ideation for the initiatives" (Interview 2, 12.01.2023) or "elaboration of a business case through idea generation" (Interview 3, 16.01.2023). The first phase, therefore, has a similarity to the first phase in the overarching phase model based on ALM of the system in Figure 1, in which a business case must be developed before the actual development process starts (Chappell, 2010).

Second, in all media companies, the ideas are assessed again in more detail before moving to the implementation phase. In one media company, these processes are called "discovery phase" and "delivery phase" (Interview 1, 06.01.2023). The discovery phase is about creating a concept for the digital product and incorporating various tests, such as user tests (Interview 1, 06.01.2023). Like during

the discovery phase, an ideation is carried out in another media company, in which surveys are conducted with customers (Interview 2, 12.01.2023). The next phase, the delivery phase, is about how the previous concept can be implemented. This is about sharpening the concept, where design and user flows also play a role. The agile development method "Scrum" is also used in this phase, where the teams develop the final product in sprints of 2 to 3 weeks (Interview 1, 06.01.2023). In another media company, in a similar way to the delivery phase, the point is reached at some point where the idea is good enough to be transferred to implementation. These advanced ideas then go into the big room planning, where the development is planned like an agile sprint planning (Interview 2, 12.01.2023). Another media company works with a process which is bound to an annual Objectives and Key Results (OKR) meeting in which the priorities for the entire company are decided. After that, further meetings take place 4 times a year, on a quarterly basis. And these quarterly goals are then broken down into sprints by the product teams. Then they work agilely in the direction of these goals (Interview 3, 16.01.2023). The approach of quarterly meetings, which are broken down into sprints, is therefore very similar to the big room planning and delivery phase approach, where sprints are also planned.

The overarching phase model of the system in Figure 1 which is based on ALM, therefore shows a similarity to the process approach of NPD of digital products in the three media companies. In the system of this study, once the business case has been developed, this concept is transferred to project management and integrated into the development building blocks in iterations such as requirements, design and testing (Chappell, 2010) before the digital product is effectively developed and tested live.

The last step in the system in Figure 1, that is, the actual development for instance by using the Scrum approach, will be discussed in more detail in Subchapter 5.3.

4.2   Customer Co-Creation in the System

Even though customers are involved in the NPD process in different ways in the three media companies, the picture that emerges is that customers can be involved at every stage of the NPD process. Customers are often involved at the very beginning of an NPD project. This happens in two media companies through market research (Interview 2, 12.01.2023 & Interview 3, 16.01.2023). In one media company, however, the integration of customers is most strongly used during the detailing phase of ideas (Interview 1, 06.01.2023) and finally, customers are also involved in the NPD process during development. However, in this case it is very specific because a precise target picture of the product is already available (Interview 2, 12.01.2023). In one out of three media companies, customers are even invited to a designated lab to conduct workshops on site (Interview 1, 06.01.2023). In the other two media companies this is not yet done (Interview 2, 12.01.2023 & Interview 3, 16.01.2023).

To make a direct reference to the customer co-creation process in the system in Figure 1, the individual process phases are compared below based on the data from the interviews.

Understand and describe the context of use: In the strategy process, consideration is given to which target groups are relevant with which offers (Interview 2, 12.01.2023). Moreover, the development of a new app is always based on the needs of the customers (Interview 1, 06.01.2023). Therefore, with these statements, it can be confirmed that the first process phase of customer co-creation in the system shows a close similarity to the procedure in the media companies.

Specification of the usage requirements: Other team constellations outside of the product teams also must work together in the phase before implementation, such as the user experience teams, a business project manager and a business owner, to unite the user and business requirements (Interview 2, 12.01.2023). This statement is thus in line with the system that integrates "specify requirements" in the second phase of customer co-creation.

Ideate: The specific approach of DT, which represents "ideate" as a single phase, is not implemented in any media company exactly according to theory. The approaches are rather inspired by it (Interview 1, 06.01.2023), are lived by the user experience team (Interview 2, 12.01.2023) or only

take place with internal stakeholders and not with customers directly (Interview 3, 16.01.2023). Therefore, ideation is used, but not according to the exact construct as shown in the system in Figure 1.

Prototype & Test of Prototype: Prototypes are used in various places in the media companies. Be it for user interviews, A/B tests (Interview 1, 06.01.2023), to verify content or to find out whether the design corresponds to the users (Interview 3, 16.01.2023). One media company wants to go to market with a small minimum viable product (MVP) as quickly as possible. This involves a validation of the biggest assumptions that were in place at the time (Interview 3, 16.01.2023). This procedure shows a similar approach as in the system of this study. Thereby, the prototypes that are tested have to answer a specific question (Hasso Plattner Institute of Design at Stanford University, 2010). Thus, it is likely that validating the biggest assumptions will lead in the same direction as the answer to that question. Furthermore, it was mentioned in one media company that an iterative measure-learn cycle is used for prototypes. This means that lessons can be learned from tested prototypes, and the modifications are integrated into a new prototype, which is then tested again (Interview 3, 16.01.2023). This implies that the prototype iteration "customise prototypes" in the system in Figure 1 has the same structure.

4.3   Conclusion of Pilot Study

For the overarching structure of the NPD process in media companies, no life cycle model is used. Nevertheless, the process of NPD in the media companies is very similar to the individual phases based on ALM used in the system of this study. For digital products being developed, customer co-creation is relevant for cost cutting. Thereby, first assumptions were validated with prototypes to save development costs. Further, customers can theoretically be integrated everywhere in the NPD process in the media companies. However, this does not have a very clear structure and changes from development to development. Even if customer-centred procedures are known, they are still not lived or integrated 1 to 1 in the NPD process. Since it is desired that the customer-centred approach is lived and pursued even more strongly in the media companies (Interview 2, 12.01.2023, Interview 3, 16.01.2023), the customer co-creation process, which is suggested in the system of this paper is highly promising.

5   Discussion, Quality Criteria and, Contribution

This chapter refers to the discussion, quality criteria and contribution of this study. Thereby, key results of the pilot study are discussed, followed by the evaluation of quality criteria. Finally, the chapter concludes with the contribution of the pilot study and a brief overview of the upcoming main study.

5.1   Discussion of Customer Co-Creation in ALM

This pilot study shows in Figure 1 the system created from the literature. It includes the overarching phase model for the NPD process of digital products, which is based on ALM. Embedded in it are individual process elements that address customer co-creation.

That the development of new products is supported by a digital product lifecycle management (Schweitzer et al., 2019) does not correspond with the data from the interviews of this study. In none of the respective media companies is a lifecycle model referred to as an overarching phase model of the NPD process for digital products. Nevertheless, the phases in the three media companies are based on similar phase constellations as in the system of this study. This means that first an idea generation for a business case results, then the concept is refined with elements such as user tests and in the last step an (agile) development of the digital products takes place. However, in the first building block "business case development" in the system of this study, it must be outlined that Chappell's (2010) study on ALM keeps it open how a business case can be developed and therefore does not refer precisely to a prior idea generation. With reference to the customer co-creation process in the system of this study, it was

possible to gather from the interviews that customers can be involved everywhere in the NPD process. This is thus in line with the study by El Nemar et al. (2022), which explains that customers must be integrated into the entire process of NPD. Furthermore, iterative prototyping is integrated in the DT process (Meinel et al., 2020) and all interviewed managers stated that prototyping is used in the media companies. However, the fact that DT is used as a whole process in the NPD process was not mentioned in any interview. Thus, as mentioned in study of Beverland et al. (2015), it still seems to be consistent that barriers exist in companies to integrate DT practices. This may be one reason why the "ideate" phase is not integrated as a single phase in media companies. However, it can be outlined that the NPD process in the media companies is very similar to the system in Figure 1. Therefore, the system can be used in its present form for the main study, which will be addressed in Subchapter 5.3.

5.2   Quality Criteria

To evaluate this pilot study against the quality criteria in qualitative research, all three criteria outlined by Steinke (2004), namely coherence, relevance and reflected subjectivity, are applied to assess whether the quality of this research is sufficient. Coherence is demonstrated in the study's development through a literature review and critical discussion with data from three interviews. In terms of relevance, this pilot study created a first phase model for NPD of digital products with a process focused on customer co-creation. Furthermore, after three interviews, saturation was reached, and no new ground-breaking results emerged for large Swiss-German media companies. Regarding reflected subjectivity, coding the data from the interviews helped to put the researcher's subjective and perhaps biased viewpoint into proper context by combining terms or whole sentences with similar meanings.

5.3   Contribution and Main Study

The theoretical contribution consists of providing a system of customer co-creation in ALM in Figure 1, in which external knowledge can be converted into knowledge creation, leading to the development of new digital and innovative products. Thus, not only new ideas can be found, but existing ideas can be improved. Through this approach, the research gap identified by Goyal et al., (2020) in Chapter 2 can be addressed.

In addition, this study offers managerial implications based on Figure 1, which introduces a novel approach for managers in the media industry to structure NPD processes for digital products and integrate customers in the pre-development phase. This approach is founded on ALM, which provides a framework for effective implementation.

The main study will be continued as a PhD dissertation. Therein, as noted by Kwon et al. (2021) in Subchapter 2.3, the integration of incremental process elements parallel to User Centered Design and Design Thinking will be emphasized to highlight the organizational view. Methodologically, the main study will build on the results of the pilot study, in which a final system will be developed and evaluated through a multiple case study approach in the five largest Swiss media companies. For this purpose, semi-structured group interviews of interdisciplinary teams within an NPD process of digital products will be conducted. To design the final system, two research gaps will be focused on. Namely, that researchers are looking for new, flexible and iterative processes in the area of NPD (Marzi et al., 2020), which in this agile setting must be submitted more frequently to customers for review (Islam & Storer, 2020). In this regard, the main study will add agile product development elements for the development phase.

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