Augmented and virtual reality in managing B2B customer experiences

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ABSTRACT

Augmented reality (AR) and virtual reality (VR) are promising approaches that B2B companies consider to be part of their customer experience management. However, this area is largely unexplored academically, resulting in a lack of theory and practical guidance. Based on existing customer experience and AR/ VR literature, we anticipate that these technologies can expand touchpoints in the customer journey, enhancing the experiences of professionals involved in purchasing activities by providing them with empowerment and support. Consequently, we applied exploratory, theory-building research to identify and organize current industry practices into a coherent framework and theorize their role in shaping customer experiences. For example, current marketing use cases include project and product visualization, event-based engagement, remote support, and employee training, and are particularly employed in the early stages of the customer journey. We also identified several benefits related to branding, relationships, transactions, costs, and sustainability. The theoretical contribution of our study extends the current understanding of the role of AR and VR in B2B customer experience management. It provides practical insights for B2B marketing professionals on the strategic deployment of AR and VR technologies to enhance customer experiences based on real-world examples.

1. Introduction

The concept of customer experience (CX) represents a key concept in today's marketing research and practice. CXs are made throughout a customer journey and encompass diverse interactions between actors at different touchpoints. In the end, value is a function of various experiences that come from interaction (Ramaswamy, 2011). Relevant CXs include the cognitive, emotional, behavioral, sensorial, and social responses of a buyer to the actions of a firm (Lemon & Verhoef, 2016).

Consequently, organizations have increasingly adopted a customer perspective to strategically manage the CX along the customer journey (Lemon & Verhoef, 2016; McColl-Kennedy, Zaki, Lemon, Urmetzer, & Neely, 2019). In recent years, these activities have evolved into a strategic concept called customer experience management (CXM). This concept is not just about improving customer journeys that describe a path with several stages, from getting to know a supplier and its products or services to using them (Følstad & Kvale, 2018). Rather, it includes a seller's strategic approach to create added value for both sides by consciously shaping a buyer's experience so that companies

continuously develop strategies to improve and align existing and new touchpoints along the customer journey. If managed effectively, CXM can result in competitive advantages of firms (Hilton, Hajihashemi, Henderson, & Palmatier, 2020; Klink, Zhang, & Athaide, 2020; Pine & Gilmore, 1998).

One approach to CX is to incorporate new technologies and media (Homburg, Jozić, & Kuehnl, 2017; Verhoef, Lemon, Parasuraman, Roggeveen, Tsiro, & Schlesinger, 2009). For example, augmented reality (AR) and virtual reality (VR) are two promising technological developments that have attracted the interest of marketers in recent years, as they allow users to either superimpose or replace the physical world. While a considerable amount of academic research has investigated the effectiveness of AR and VR on CX in the B2C sector (e.g., Farah, Ramadan, & Harb, 2019; Tan, Chandukala, & Reddy, 2021; tom Dieck & Han, 2022), their role in B2B contexts has received comparatively less attention. This is surprising, as B2B industry practitioners have frequently discussed the role of such new presentation formats as part of their CXM (Kostusev, 2019). For instance, IBM engineers used a proprietary AR tool (IBM Immersive Insights) to visualize Instacart grocery

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shopping data and better understand users' purchasing patterns. Likewise, Airbus used AR to present cabin models of aircraft to its business customers in Germany (Airbus, 2023).

Against this background, scholars have called for more research attention on the role of new technologies in improving B2B customer journeys (Mele & Russo-Spena, 2022; Purmonen, Jaakkola, & Terho, 2023; Rad, Oghazi, Palmié, Chhirumalla, Pashkevich, Pat, & Sattari, 2022; Rusthollkarhu, Toukola, Aarikka-Stenroos, & Mahlam, 2022). Specifically, researchers have repeatedly recognized the potential of virtual (e.g., VR) and hybrid (e.g., AR) presentation formats for B2B firms (Cardoso, Mariano, & Zorzal, 2020; De Jong, De Ruyter, Keeling, Polyakova, & Ringberg, 2021; Pöyry, Parvinen, Mattila, & Holopainen, 2020). However, except for Boyd and Koles' (2019) conceptual work on VR, to the best of our knowledge, there is no academic research on AR/VR technologies in the B2B marketing literature. At the same time, the differences between B2B and B2C customer journeys, as well as the motives, processes, and outcomes involved in them, are such (e.g., Cartwright, Liu, & Davies, 2022; Cortez & Johnston, 2017; Iankova, Davies, Archer-Brown, Marder, & Yau, 2019) that the results from empirical research on consumer contexts cannot be fully translated to business markets.

We aim to address this gap by taking an exploratory, theory-building research approach and asking the following question: How can AR/VR technologies support B2B customer experience management? More specifically, we tackle this issue from a managerial view and aim to identify and document common use cases, discuss their role as new touchpoints in CXM, and integrate them into a framework addressing CX. Therefore, we employ a qualitative research design using case study-based interviews with B2B marketing professionals.

We argue that exploratory and theory-building research is an appropriate step to identify relevant themes and patterns and to organize and simplify complex market observations (MacInnis, 2011). In accordance with MacInnis's (2011) categorization of conceptual contributions to theory, our study provides a contribution by simultaneously classifying AR/VR use cases within an established framework and the B2B customer journey. This leads to a new holistic perspective for research. Such findings are of theoretical interest, as they can ensure that the B2B literature remains current with industry developments and provide a starting point for further research to build on. Given the promising market forecasts for AR and VR (Marr, 2021), the relevance of AR and VR in B2B marketing theory and practice is likely to increase in the coming years, especially in relation to broader contexts such as the (industrial) metaverse and spatial computing.

Our research contributes to the literature in several ways. First, we are among the first to describe and classify AR and VR use cases in B2B marketing, thus contributing to the documentation of B2B marketing practices (especially in CXM). For each of the four identified cases (product or project visualization, event-based engagement, remote support, and employee training), we provide a detailed analysis of their anticipated benefits, their significance in various stages of the customer journey, and the characteristics of the experience they offer. Second, we organize these use cases in a taxonomy based on Flavián, Ibáñez-Sánchez, and Orús's (2019) framework for technology-enhanced customer experiences and the B2B customer journey (Brady, Davies, & Gann, 2005; Tuli, Kohli, & Bharadwaj, 2007; Witell, Kowalkowski, Perks, Raddats, Schwabe, Benedettini, & Burton, 2020). This contributes both theoretically and practically, offering a foundation for future research and guiding B2B marketers in the effective implementation of AR/VR technologies.

The remainder of this article is structured as follows. First, we start with the theoretical foundations and the current state of research. Second, we introduce the methodology—that is, an exploratory case study approach. Next, we present our findings. We close with a discussion of the implications and directions for future research.

2. Theoretical background

2.1. Customer journey and customer experience management in B2B marketing

2.1.1. B2B customer journey

Mapping customer journeys is a well-established tool in marketing academia and practice (for a review, see Tueanrat, Papagiannidis, & Alamanos, 2021). As stated by Purmonen et al. (2023), using customer journeys "has become one of the predominant concepts for business practitioners to use in understanding contemporary customer buying behavior" (p. 84). Although not consistently defined in the field, in general, the customer journey describes the entire path a customer takes when interacting with a company (or, for example, with its brands, products, technology, and employees), from initial awareness to purchase and post-purchase experiences, such as the use of products or customer service (Følstad & Kvale, 2018).

In B2B marketing, Purmonen et al. (2023) conceptualize customer journeys as "a combination of buying and usage center members' intertwined, goal-oriented paths to purchasing and using offerings along multiple direct and indirect touchpoints, which are affected by the context of business relationships" (p. 84). While modeled customer journeys are by definition prototypical, they simplify and visualize the complex behavior of customers from their perspective. Consequently, scholars and managers adjust customer journey models to their specific purposes, industries, and consumer groups. For instance, while many customer journey models simply differentiate between the pre-purchase, purchase, and post-purchase stages (e.g., Lemon & Verhoef, 2016), others propose more nuanced steps (e.g., Brady et al., 2005; Rauschnabel, Babin, Tom Dieck, Krey and Jung, 2022) — which might provide more detailed insights yet lack simplicity.

This research builds on an established four-stage approach from the B2B literature, with the interrelated stages referred to as (1) pre-bid engagement, (2) negotiation, (3) implementation, and (4) operations (Brady et al., 2005; Tuli et al., 2007; Witell et al., 2020). In the pre-bid engagement stage, informal conversations aim to identify potential overlaps between the buyer's business needs and the supplier's capabilities, potentially resulting in opportunities for value creation. During the negotiation stage, the buyer specifies the products to be procured, shares information about its operations and requirements through touchpoints, and selects the most appropriate supplier. Upon finalizing the contract terms, the implementation stage begins. Finally, the operations stage encompasses all activities occurring throughout the contractual period of the service offering or the product life cycle (Biggemann, Kowalkowski, Maley, & Brege, 2013).

As mentioned earlier, touchpoints are a core element of customer journeys since they shape how customers experience a brand and its offerings. A touchpoint is any point of interaction, whether digital or physical, between a customer and a brand, product, or service (Lundin & Kindström, 2023; Wang, Malthouse, Calder, & Uzunoglu, 2019; Witell et al., 2020). Here, AR and VR can represent touchpoints on their own (e. g., a virtual showroom that customers can experience without assistance) or contribute to existing touchpoints (e.g., a product visualization in AR at an exhibition booth). Lemon & Verhoef, 2016 distinguish four categories of CX touchpoints: (1) brand owned, (2) partner owned, (3) customer owned, and (4) social or external. First, brand-owned touchpoints refer to buyer interactions during the CX that are designed, overseen by, and under the control of the seller. Examples include a brand's website, advertising materials, product attributes, packaging, service, and the sales force. Second, partner-owned touchpoints represent buyer interactions that are collaboratively designed, managed, or controlled by the firm and one or more of its strategic partners. Third, customer-owned touchpoints represent customer actions that are not influenced or controlled by the firm, its partners, or other entities, such as a buyer determining their own needs or preferences in the pre-bid engagement phase. Fourth, social or external touchpoints are

dedicated to potential external influences, such as other customers or independent information sources – for example, product reviews on social media. Other authors (e.g., Hilken et al., 2018; Lundin & Kindström, 2023) distinguish between digital (e.g., social media) and analog (e.g., a newspaper ad) touchpoints.

In summary, a customer journey is punctuated by touchpoints - specific moments (i.e., experiences) of interaction between the customer and the brand, product, service, or employee. These touchpoints, which include everything from advertising to customer service interactions to the use of the product itself, shape customer perceptions and decisions. Customer journey maps are a strategic tool for visualizing and managing ideal stages or touchpoint sequences, and they help companies understand and optimize the customer experience at each stage of the journey.

2.1.2. B2B customer experience and customer experience management

As Abbott (Abbott Lawrence, 1955, p. 40) recognized early on, "what people really desire are not products but satisfying experiences." The enhancement of CX is widely recognized as a crucial driver of a company's competitive advantage and success (Lemon & Verhoef, 2016; Verhoef et al., 2009; Zolkiewski et al., 2017). The literature presents numerous definitions of CX. In general, CX results from various interactions between a buyer and an organization or a product (Gentile, Spiller, & Noci, 2007). These interactions elicit a particular response in the buyer and encompass cognitive, affective, emotional, social, and physical reactions toward the seller (Verhoef et al., 2009).

The factors that determine CX are twofold. Some are controllable, such as with a service interface or an assortment. In contrast, with certain CX factors, sellers only have reduced control (ranging from limited control to no control at all), such as with the impact of intermediaries (Payne & Frow, 2004), the behavior and communication of salespeople, or the behavior of other buyers (Lemon & Verhoef, 2016). Consequently, CX is a complex and dynamic construct, both from an academic perspective and in managerial practice, which as a whole is difficult to capture (McColl-Kennedy et al., 2019; Zolkiewski et al., 2017).

The vast majority of CX research has been conducted in the B2C context, particularly in service marketing. There has been notably less research on CX in the B2B context. It poses even greater challenges in capturing CX (Palmer, 2010; Zolkiewski et al., 2017). In a B2C environment, individual private recipients are the focus, while B2B consists of organizations with multiple stakeholders pursuing different interests (Pagani & Pardo, 2017). B2B relationships tend to be more complex, with high levels of interaction and interdependence between buyers and sellers (Dwyer, Schurr, & Oh, 1987). These interactions are usually driven by organizational goals, oftentimes conflicting ones, and are governed by formal rules and procedures (Johnston & Bonoma, 1981; Purmonen et al., 2023; Zolkiewski et al., 2017). Given the prominence of interpersonal interactions in a B2B context, it is surprising that the academic focus on B2B CX is limited (Lemke, Clark, & Wilson, 2011; Zolkiewski et al., 2017).

Prominent management literature, exemplified by the contributions of Pine and Gilmore (1998), underlines the importance of companies directing their attention to improving CXs. These sources argue that strategies based on service or pricing for differentiation are no longer sufficient (Verhoef et al., 2009). Ponsignon, Durrieu, and Bouzdine-Chameeva (2017) identified that achieving successful CX necessitates a thorough comprehension of both the intended and the realized experiences. Thus, it seems essential to effectively manage CX. In this regard, CXM represents a strategic approach employed by sellers to deliberately shape a buyer's experience, with the aim of generating value for both the buyer and the seller (Verhoef et al., 2009). In short, CXM is the process of strategically managing a buyer's entire experience with an organization or product (Homburg et al., 2017; Schmitt, 2003).

Nonetheless, research into CXM is rather scarce (Lemon & Verhoef, 2016). Furthermore, it displays notable fragmentation across various contexts and a lack of clear differentiation from other marketing

management concepts (Homburg et al., 2017), such as customer relationship management, relationship marketing, and customer engagement (Lemon & Verhoef, 2016). As an example, CXM differs from customer relationship marketing, as it focuses on the buyer's immediate experience instead of their documented history (Verhoef et al., 2009). Customer relationship marketing aims to know customers and utilize that data, whereas CXM focuses on understanding real-time customer reactions and behaviors (Meyer & Schwager, 2007). Nevertheless, there are areas of intersection. Some academics view these two aspects as encompassed within a strategic approach to customer relationship marketing and aiding in the assessment of whether the value proposition is likely to yield a superior CX (Payne & Frow, 2004). While scholars have thoroughly examined CX as the operational focus of CXM, particularly in the B2C context, there is a dearth of academic research dedicated specifically to CXM. Moreover, practitioners appear reluctant to attempt to determine the effective deployment of CXM (Homburg et al., 2017). Edelman and Singer (2015) highlight the necessity of performing CXM and specifically managing interactions at various touchpoints with a customer journey perspective to address relevant issues that can affect the entire experience.

2.2. Augmented and virtual reality

As we begin to explore the emerging areas of AR and VR in the B2B landscape, it is important to acknowledge their evolutionary journey (Farah et al., 2019; Rauschnabel, Felix and Hinsch, 2019; tom Dieck & Han, 2022). Initially developed several decades ago, AR and VR have undergone remarkable transformations fueled by the communication activities of the players in these markets, as well as research activities across disciplines. These dynamic developments have resulted in a landscape characterized by new, changing, and often inconsistent terminologies, concepts, and definitions. To provide clarity and facilitate a comprehensive discourse, we first provide working definitions and background information specifically tailored to each technology's corresponding applications and implications in the B2B sector.

Following the xReality view (Rauschnabel, Felix, Hinsch, Shahab, & Alt, 2022), we use the abbreviation "XR" as an overarching umbrella term. It is an abbreviation for xReality, where the "X" can be seen as a placeholder for any form of new reality. Under the umbrella of XR, there are two main categories: AR and VR. In VR, users are completely isolated from the real world, typically by wearing a VR headset. VR experiences can range from simple 360-degree environments to highly immersive virtual worlds, with telepresence as the force bridging the separation. Telepresence refers to the degree to which a user feels present in a virtual environment. Some use cases in VR, such as 360-degree videos, highly immersive games, and virtual meeting rooms or training, have received a great deal of public attention in recent years (e.g., Hennig-Thurau et al., 2023; Howard, Gutworth, & Jacobs, 2021). VR can be used to create completely new experiences that do not exist without the technology. In contrast to VR, AR allows users to perceive their physical environment and extend it with virtual content ranging from simplistic information (e.g., textual work instructions) to sophisticated 3D elements. Whereas VR is typically about telepresence, AR's conceptual core is local presence, which describes the degree to which users perceive virtual content as being present in their physical environment (Rauschnabel, Felix, et al., 2022). AR can be used with various devices, including standard smartphones and tablets, stationary installations, and wearable AR "smart" glasses. Common use cases include games (e.g., Pokémon Go), product visualizers (e.g., IKEA's AR app, which displays digital models of furniture in one's living room prior to its purchase), and navigation apps (e.g., Google Maps' "Live View" function).

Previous research on AR and VR marketing has primarily focused on its use in B2C contexts (Kumar, 2022). For example, research has shown that AR can be relevant throughout the marketing mix (Rauschnabel, Babin, et al., 2022). For instance, AR elements can be used to make products more interactive, as is the case with the IKEA Place app. By

adding AR features, products can be extended virtually, as can be observed with Lego. Furthermore, the BICK FOUR framework (Rauschnabel, Babin, et al., 2022) shows that AR can support the marketing goals of branding, inspiring, convincing, and keeping. In this context, games or product visualizations can enable a company to build brand awareness, strengthen its brand image (Rauschnabel, Hüttl-Maack, Ahuvia, & Schein, 2024), and inspire (potential) customers. Furthermore, regarding the objective of convincing, purchase interest can be generated (Jung, Bae, Moorhouse, & Kwon, 2021; Kowalczuk, Siepmann, & Adler, 2021), for example, by displaying products virtually, and willingness to pay can be enforced (Heller, Chylinski, de Ruyter, Mahr, & Keeling, 2019a). Regarding the goal of retaining customers, customer loyalty can be increased (Dacko, 2017) by offering additional services or adding value via AR content.

Without a doubt, such studies underline the power of XR in marketing. However, the extent to which this research can be applied to a B2B context may be limited given the important differences between the B2B and B2C markets. As mentioned in the context of CX, B2B is not focused on individuals, but on formally managed organizations with different stakeholders, often with conflicting interests. (Johnston & Bonoma, 1981; Pagani & Pardo, 2017; Purmonen et al., 2023; Zolkiewski et al., 2017). As a result, there is a higher level of complexity and more nuanced interactions and interdependencies between the relevant parties (Dwyer et al., 1987). This can affect the intended use, usefulness, and types of use cases that are relevant in the B2B context.

To the best of our knowledge, only one study has assessed XR in a B2B context. Specifically, Boyd and Koles' (2019) conceptual article discusses the role of VR in the post-purchase stage in B2B marketing. The authors theorize that VR can improve the effectiveness of buyer–supplier coordination and asset management effectiveness, which are important determinants of buyer–supplier resource integration quality. By theorizing about the potential of VR use cases, Boyd and Koles (2019) lay out theoretical arguments on the power of VR in B2B marketing. In addition, they provide a motivation for further research in this field, for instance, as they state, "at the pre-purchase and purchase stages of the buying journey" (p. 596). Our study responds to this call by researching both VR and AR along the B2B customer journey with boots on the ground.

2.3. AR and VR in customer experience management

The use of new technologies can significantly influence CX through a combination of digital and physical touchpoints, providing buyers with added-value propositions along the customer journey (Breidbach, Brodie, & Hollebeek, 2014; Flavián et al., 2019; Kumar, Dixit, Javalgi, & Dass, 2016). Several studies have emphasized the necessity of designing optimal CXs that transcend conventional interpersonal and physical connections between buyers and sellers (Breidbach et al., 2014; Flavián et al., 2019; Teixeira et al., 2012). Channel integration can help generate a comprehensive experience by providing the benefits of multiple channels, and human–technology interactions across various realities can enhance CX (Breidbach et al., 2014; Flavián, Gurrea, & Orús, 2016; Grohmann, Spangenberg, & Sprott, 2007; Verhoef, Kannan, & Inman, 2015). While conventional physical interactions, such as project meetings or on-site repairs, continue to hold significance in many B2B contexts, modern B2B customer journeys increasingly rely on digital touchpoints. Interactions now occur to varying degrees through digital channels, such as search engines, digital service platforms, and social media (Aichner & Gruber, 2017; Hallikainen, Alamaki, & Laukkanen, 2019; Lundin & Kindström, 2023). Firms are facing increasing media and channel fragmentation, with omnichannel management becoming the prevailing standard (Lemon & Verhoef, 2016). Consequently, firms face growing complexity in their efforts to design, manage, and control the experiences and journeys of individual buyers (e.g., Edelman & Singer, 2015; Lemon & Verhoef, 2016). The employment of digital technologies can result in new interactions between buyers and sellers. Additionally, it has the potential to facilitate existing touchpoints

(Lundin & Kindström, 2023).

Flavián et al. (2019) proposed a "technology-enhanced customer experiences" framework for XR by building on the experience hierarchy of Neuhofer, Buhalis, and Ladkin (2014). Here, the customer "core experience" is considered the fundamental basis, encompassing the basic, traditional customer experience without substantial technological involvement. New technological developments in XR can support and extend the core experience in four different ways: (1) directly supported experiences; (2) indirectly supported experiences; (3) related empowered experiences; and (4) diverted empowered experiences that assist a core experience in different ways (Flavián et al., 2019):

Directly supported experiences: In the context of directly supported experiences, digital technology enhances a core real-world activity through direct interaction with the physical environment. A prime example of such an experience can be found in the case of a truck driver utilizing an AR navigation system integrated into their vehicle's windshield while making deliveries to customer locations. While the central experience remains the act of driving from one destination to another, the technology, in this case, the AR navigation app, directly supports this experience by overlaying real-time directions, traffic updates, and estimated arrival times onto the driver's field of vision. This augmentation serves to significantly improve the driver's core experience, making the journey more informed, efficient, and aligned with the principles of AR experiences (Orús, Ibáñez-Sánchez, & Flavián, 2021), as digital navigation information seamlessly integrates with the surrounding physical world.

Indirectly supported experiences: These experiences refer to situations in which technologies aid customers' core experiences without seamless integration into the physical world. An illustration of indirectly supported experiences with technology can be observed when customers scan a QR code to receive further information on a YouTube Video (Flavián et al., 2019).

Related empowered experiences: Generally speaking, empowered experiences entail technologically enhanced experiences in which a technology creates a new experience that is either connected (related empowered experiences) or disconnected (diverted empowered experiences) from the customer's core experience. XR can generate technological enhancements of the CX that complement the core experience as new touchpoints. For instance, one such experience would be a 360-degree/VR video that potential attendees of a B2B trade show could view before attending the event to plan their visit and get an overview of the exhibitors (c.f., Flavián et al., 2019).

Diverted empowered experiences: Here, technologies generate novel encounters that are not directly related (or even unrelated) to the core experience but exert an influence on their ongoing experience. For example, an aerospace parts manufacturer specializing in creating high-precision components for aircraft could offer a diverted empowered experience to their B2B clients through a VR escape room team-building program. In this experience, client teams can participate in VR-based escape room challenges that require teamwork, problem-solving, and critical thinking. This diversion is unrelated to the manufacturing of aerospace parts but empowers clients by providing a unique and entertaining team-building activity that fosters collaboration among employees.

In conclusion, digital technologies have the potential to improve CX by supplementing core experiences or creating new experiences (i.e., new touchpoints; Flavián et al., 2019; Hilken et al., 2018; Ostrom, Parasuraman, Bowen, Patrício, & Voss, 2015). Scholars are calling for research on how information technology can transform interactions between buyers and sellers (Pagani & Pardo, 2017). We propose that, specifically, XR can contribute to heightened perceptions of value and involve buyers in a highly contextual and experiential way. However, as noted, research on XR in B2B marketing, particularly CXM, is still in its infancy. Responding to this call in the current article, we discuss common XR use cases in the B2B domain through the lens of the technology-enhanced CX framework (Flavián et al., 2019).

3. Research gap and study objectives

In the previous sections, we emphasized the use of digital technologies to support B2B CXM, particularly highlighting the potential of AR and VR in marketing. Given the lack of research and the novelty of the topic, we concluded that exploratory and theory-building research is best suited for extending the currently limited knowledge in this field, documenting actual B2B practices, and moving toward an organizing framework.

To better understand XR's potential and actual use in B2B marketing, we begin with the assumption that XR can play a central role in the CXM concepts of B2B companies. More specifically, based on our assessment of the extant general XR literature, we anticipate that XR can extend existing and create new touchpoints along the customer journey and, by doing so, enhance the core experience of actors involved in professional purchasing activities by providing them with empowered and supported experiences. Furthermore, since CXM is strategic, we propose that B2B firms integrate them in a goal-oriented way by exploiting specific benefits.

Against this background, our aims in the current research are to identify and describe common marketing use cases in B2B and organize them in a coherent framework that draws on both the CXM literature and the business relationship literature. In this context, we aim to answer the following research question: *How can AR/VR technologies support B2B customer experience management?*

This general research question encompasses three main sub-questions that we attempt to answer and were reflected in the interview guide used for the qualitative expert interviews:

1. What kinds of XR use cases do B2B firms currently implement in their CXM?
2. How can XR contribute to CXM concepts in B2B companies?
3. What benefits do B2B firms anticipate from the use of XR technology in CXM?

The next section describes the research approach used to provide answers to the research question and its sub-questions.

4. Methodology

4.1. Research design

To answer the proposed research question, we conduct a qualitative study by applying a case study approach with semi-structured, in-depth interviews (Arksey & Knight, 1999; Kumar, Stern, & Anderson, 1993; Stake, 1995; Yin, 1994). The case study approach is suggested for researchers to create a deeper understanding of theory building (Bonoma, 1985; Stake, 1995; Yin, 1994). This method allows us to generate valuable insights into the various structures and processes within the respective companies, but at the same time explore specific perceptions of pathways and challenges behind the individual use cases.

4.2. Data collection & analysis

Our primary data source consisted of semi-structured interviews (Arksey & Knight, 1999; Kumar et al., 1993; Stake, 1995; Yin, 1994) with 21 participants from 11 different firms who had prior experience with XR technologies in the B2B sector. Most of these interviews were conducted on an individual basis, while three were conducted as group interviews with multiple participants. The reason for this was that, in these cases, a group of people was found who had worked together on a specific AR/VR project. Group interviews were conducted to allow the respondents to stimulate and complement each other's responses. Interactions among participants can generate new perspectives and insights that may not emerge in individual interviews. For this reason, group interviews were considered a valuable addition.

The data were collected from late 2021 to mid-2022. We used specific criteria to select companies with prior XR experience in marketing. We insured that the informants in our sample included different types of B2B markets (Backhaus & Voeth, 2014), including project business ($n = 4$), product business ($n = 3$), supply business ($n = 3$), and system business ($n = 1$), to incorporate insights from a broader set of firms. Of the participating companies, seven were active in manufacturing industries, three represented the professional services industry, and the remaining firm acted within the financial services industry. To ensure anonymity of the participating companies, we do not present use cases in detail. Appendix A provides a summary of the participating firms.

Our informants represent a broad range of backgrounds and demographics, as outlined in Appendix B. All had been involved in either the adoption or operation of XR technologies in the firms. With one exception (face-to-face), all interviews were conducted online using video conferencing tools and lasted between 45 and 90 minutes. All interviews were audio-recorded and transcribed verbatim (Eisenhardt, 1989), resulting in 250 pages of transcripts. In addition, handwritten field notes were taken and included in our data analysis as well as various internal and external documents that respondents had shared with us. This triangulation of data allows for a more reliable and in-depth analysis of the materials (Yin, 1994) and, furthermore, allows for the verification of interview statements with additional sources.

Qualitative research should be grounded in existing theory, while it also generates unique insights into a specific, under-researched topic (Pratt, 2008). In our case, we incorporated previous work on XR in B2B marketing, B2B customer journeys, and CXM (as discussed in the theory section). We used a mixed inductive–deductive approach following the recommendations of the Gioia methodology (Corley & Gioia, 2011; Gioia, 2021; Gioia, Corley, & Hamilton, 2013), an established procedure in marketing and management research. To answer our research question, we analyzed the collected data in two consecutive steps. Looking at the interview material at first glance, one finds a variety of different aspects and categories. To obtain a general overview, we open-coded the transcripts in the first step (Corbin & Strauss, 2008). This enabled us to thematize the material and identify different use cases (Miles & Huberman, 1984). We included a data structure, as indicated by Gioia et al. (2013), and it shows the aggregation of data into use cases. In a second step, these use cases were attached to the four stages of the customer journey, where they illustrated the potential for enhancing the customer experience according to our respondents. At the same time, we assigned the use cases to the categories of Flavián et al.'s (2019) framework for technology-enabled customer experiences.

5. Findings

Our study aims to answer the research question of how sellers can use XR technologies at different stages of a B2B customer journey to enhance CX. To answer this question, we conducted semi-structured in-depth interviews (Arksey & Knight, 1999; Kumar et al., 1993; Stake, 1995; Yin, 1994). Based on the data from the interviews conducted with XR-experienced practitioners, we identified four main marketing-related AR/VR use cases that demonstrated the ability to support the customer experience: (1) product or project visualization, (2) event-based engagement, (3) remote support, and (4) employee training.

Below, we describe each use case in more detail, discuss its role in the customer journey and CX, and discuss the anticipated benefits B2B managers expressed before integrating the technology-enhanced customer experiences (Flavián et al., 2019). We consolidated the findings into a coherent framework (Fig. 1).[1]

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[1] The categorization of the use cases in the technology-enhanced experiences framework (Flavián et al., 2019) was discussed with the authors (Carlos Flavián, Sergio Ibáñez-Sánchez, Carlos Orús) of the framework. We would like to take this opportunity to thank them for their valuable feedback.
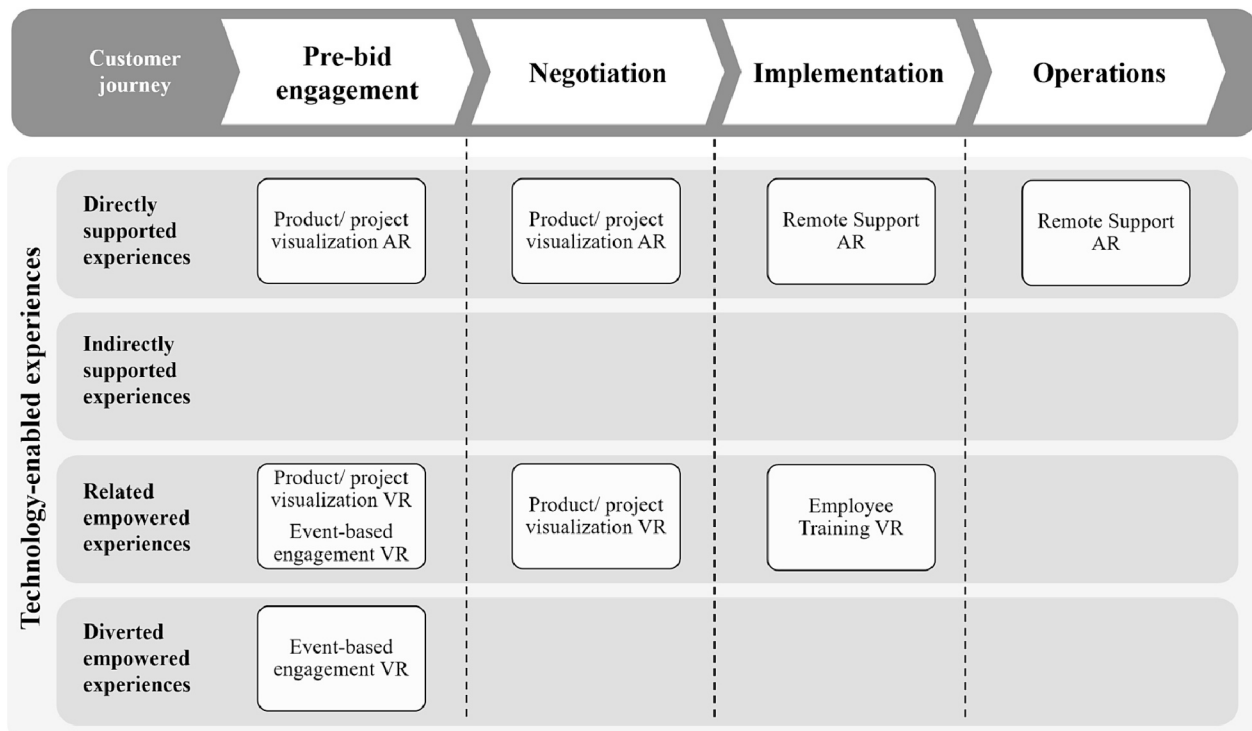
Note: AR = Augmented Reality; VR = Virtual Reality; XR = AR and VR („xReality", „Extended Reality"); here, they indicate prevalent presentation formats

Fig. 1. XR use cases along the B2B customer journey.

5.1. Product or project visualization

5.1.1. Description

B2B firms can utilize XR to visualize and demonstrate complex or highly customized offers tailored to individual buyer needs. For instance, a manufacturer of professional kitchen supplies in our study used an AR tool to display professional kitchen appliances in restaurant kitchens. This use case extends to visualizations for substantial project proposals, such as factories or power plants. Among the manufacturing companies we interviewed, four had explored XR for product and project visualization. While three of these companies had actively integrated it into B2B customer journeys, one was still in the development and testing phases. It is important to note that, unlike many B2C use cases, XR is typically used as a supporting tool in face-to-face interactions. For example, a salesperson can have an AR app installed on their tablet and operate it together with the customer. Most likely, this is justified by the complexity of products and the "standards" of personal interactions in B2B.

AR visualization is especially valuable in situations in which the physical context matters (Von der Au, Rauschnabel, Felix, & Hinsch, 2023). For instance, an interviewee (**Michael**) from the above mentioned B2B kitchen supplier highlighted the advantages of AR in realistically visualizing the sizes and proportions of professional kitchen equipment. The company achieved this by virtually showcasing kitchen supplies, such as a professional dishwasher, within an existing kitchen or restaurant setting. Such a setting allows for a more personalized presentation of products (e.g., what does a dishwasher look like in your kitchen versus in a standard restaurant kitchen in a brochure), further information (e.g., space requirements with open versus closed doors) and by doing so, contributes to the reduction of complexity and information overload. Moreover, such tools can contribute to the innovative brand image of the seller. However, VR visualizations might prove more effective in situations in which the physical context is absent, inaccessible, or undesirable. Another informant (**Tom**) reported a possible use case in which planned factories were visualized in VR. While

acknowledging VR's potential here, such use cases were less prevalent in our study.

5.1.2. Role in CXM and anticipated benefits

Throughout the interviews, we observed that product or project visualization via AR and VR mainly supported the CXM in the first two engagement phases. This was because this visualization typically supported sales teams by showcasing and demonstrating complex products prior to a purchase.

In the pre-bid engagement phase, the buyer is considering possible matches of the business requirements with the supplier's capabilities so that added value can be created from the business relationship. Product or project visualization via AR allows a seller to show a (potential) buyer how "well" a specific product fits into the buyer's business or the existing landscape of the buyer's business (Kumar et al., 2024). The buyers themselves can imagine the seller's product or service in a facilitated way and, by doing so, enhance their understanding of an offer. This can, in case the product really matches well with the customer's business, improve brand perceptions, generate buying interest, or increase existing interest as well as a willingness to pay. In the B2C literature, such an effect has been documented repeatedly by showing that AR visualizations can trigger purchase decisions through numerous mechanisms, including reduced imagination gaps (Hilken et al., 2021), better evaluations (Von der Au et al., 2023), endowment effects (Carrozzi et al., 2019), and inspiration (Rauschnabel et al., 2019). In a nutshell, product visualizers, typically in AR, contribute to CXM by offering "directly supported experiences" that extend a brand's core offerings (Flavián et al., 2019).

During the negotiation phase of the B2B customer journey, buyers specify their requirements regarding a product, while the seller tries to respond to these needs and possibly finds or creates a compatible product. The customer's initial interest is already present, and the finer details of the product or project are negotiated. Traditionally, buyers have used abstract descriptions of customized products or expensive/ unpractical prototypes. Visualizations in AR can clarify how, for

example, a specific industrial kitchen machine needs to be tailored in terms of size to fit a customer's existing environment. By doing so, such AR visualizations provide benefits beyond the core experience, in particular "directly related" experiences (Flavián et al., 2019).

In addition to AR, visualizing a product or project via VR also enables new customer experiences. For instance, if a seller shows a buyer how a specific machine can be integrated into a planned factory building. The buyer can then experience and assess this machine together with other anticipated plans (e.g., interior or other machines) in the pre-bid engagement phase. Furthermore, such use cases can also assist both the seller and the buyer in understanding the product's fit to their requirements and needs and facilitate the negotiation of details (c.f., Azuma, 1997; Hilken, de Ruyter, Chylinski, Mahr, & Keeling, 2017; Hoyer, Kroschke, Schmitt, Kraume, & Shankar, 2020; Yim, Chu, & Sauer, 2017). This leads to our suggestion that product or project visualization via VR also qualifies as a related empowered experience in the negotiation phase B2B customer journey.

The main benefits to be expected by applying XR technologies are facilitated and enhanced information exchange (e.g., more realistic, vivid, and personalized), reduced costs (e.g., 3D/CAD models exist for most products that can be integrated quite easily into XR), reduced waste, and their impact on CX. For instance, one participant stated the following:

Because we have a lot of products that require extensive explanation and it's incredibly difficult for customers to understand if we only show them on paper. That's why the visualization is very helpful. It always provides an 'aha' moment, too. **(Lisa)**

5.2. Event-based engagement

5.2.1. Description

We employ the term "event-based engagement" to describe use cases that complement events, such as trade fairs. The most common approach we were able to observe was the presence of XR booths and demonstrations at physical trade fairs. In this context, XR has two main purposes: first, to present content, for example, tours through a factory or the visualization of products. Similarly, an interviewee (**Jack**) stated that XR can be used for recruitment purposes by demonstrating virtually how the firm is designed and operates, which enhances employer branding (and branding in general). Second, it can serve as an engaging attraction at events. For instance, XR can gain the attention of visitors to a brand's booth and contribute to an emotionalized or innovative brand image. It is important to note the potential overlaps with product visualization tools because many B2B brands use XR to showcase products. However, in the previous use case, a seller typically displays customized offerings to a potential buyer, such as a particular machine, as part of negotiations or specific offers. In contrast, in the context of events, the content is typically more generic and sometimes even entertaining, and thus requires presentation of all the equipment a company offers, with more focus on the overall brand. Another potential application is to use XR to host or participate in purely virtual events, including the use of XR booths. In this context, XR does not complement a physical event but rather replaces it, typically in VR, or allows individuals to join an existing event through VR (**Tom**).

Two of the participating firms in our sample have used VR technologies for engagement at trade fairs. One participant mentioned that they had considered using AR but ultimately decided against it because the focus of the firms was on completely virtual trade show booths. Thus, we conclude that AR for event-based engagement is possible, VR tends to be more prevalent in today's B2B marketing practice.[2] Conceptually speaking, VR in event-based communication can range from a simple

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[2] Note: AR use cases on events are typically employed for product/project visualizations (direct supported experiences, as discussed previously).

add-on to a physical experience (i.e., a VR device at a booth) to being a core element or attraction to being the event itself (i.e., an event exclusively in VR).

5.2.2. Role in CXM and anticipated benefits

Our informants expressed that event-based engagement via VR could mainly support the pre-bid engagement phase. VR is most useful in scenarios in which the physical space is limited, the objects to showcase are either not yet available or too bulky for convenience, or for highly immersive—and primarily entertaining—experiences. For example, one respondent highlighted how VR could effectively showcase cleanrooms used in high-tech manufacturing. Traditional trade show booths do not have space for a full-size cleanroom. Furthermore, one of our respondents working in professional services concluded the following:

The goal was to make it possible to display large exhibits in small areas. And to emotionalize the experience much more at that point. (**Harry**)

By showcasing the possible cooperation between buyer and seller, for example, in what a tailored product or project could look like, various results can be shown. In this way, enthusiasm and creativity can be fostered, and new needs and opportunities can be discovered. A joyful experience with a trade fair can enable a potential buyer to associate positive attitudes with the company, which can lead to a motivational state of inspiration and increased engagement (Nielsen, 2016; Rauschnabel et al., 2019; Van Kerrebroeck, Brengman, & Willems, 2017). If the content is strongly linked to the core experience or a seller's specific offer, then event-based engagement via VR can be classified as a *related, empowered experience*.

However, there are also cases where VR at trade fairs has relatively little to do with the seller's actual offering and is mainly used for entertainment and gaming purposes. This can mainly help sellers position themselves to potential buyers as an innovative, future-oriented company and strengthen its brand image (Javornik et al., 2021; Rauschnabel et al., 2019; Rauschnabel, Babin, et al., 2022; Sung, Bae, Han, & Kwon, 2021). Because the buyer's core experience is not the focus in such cases, we assigned this type of use case to the category of *diverted empowered experiences*.

As discussed, also AR might be effectively used at events, yet typically for product/project visualizations and not typically for event-based engagement. Some informants reported observations of gamified AR experiences to explore the product, which informants tend to see more as a "gimmick" (**Julian**). Thus, we exclude the role of AR from furthers discussed as event-based entertainment.

5.3. Employee training

5.3.1. Description

B2B firms often offer complex products, and therefore buyers require certain skills to operate them after purchase. Thus, offering some sort of training and guidance is a core element of many B2B offerings. We identified XR's potential to support training. During employee training, VR is used as a pedagogical approach to display learning content. This can include entirely virtual learning environments, such as virtual classrooms, as well as 360-degree content.

The interviewees generally agreed that XR can be an effective training environment. We observed the training of both the seller's employees and buyers. VR is mainly used for employee training in manufacturing industries, for example, regarding the operation of certain machines, but we also found a case in the financial services industry, specifically in B2B insurance services. Four firms considered XR technologies for training, with all relying on VR. Two companies had successfully implemented this use case, while one was still in the development phase. However, in one instance, the benefits did not appear to outweigh the costs. As a result, the company decided against adopting the proposal, at least for the time being.

5.3.2. Role in CXM and anticipated benefits

Our respondents indicated that employee training via VR can support CXM during the implementation phase of the B2B customer journey. VR usually allows individuals to train independently of their actual environment (off-the-job training). The literature discusses the DICE criteria (Bailenson, 2018) for VR, highlighting its effectiveness in addressing topics that are dangerous (e.g., radiation exposure, as mentioned by one informant), impossible (e.g., rare situations), counterproductive (e.g., errors halting an assembly line or learning about common mistakes in sales training), or expensive (e.g., product destruction). While our informants did not explicitly mention this framework, their examples aligned with its principles. One of our informants summarized this as follows:

> We have to ensure that they receive the proper training, that they are capable of working in this area, and that it is expensive on the one hand, but also very time-consuming and theoretical, in other words, very dry. And so we thought we could make the whole thing a bit more hands-on with virtual reality and increase the learning effect. By presenting the environment virtually and then offering individual training courses in the virtual world. (**Jack**)

To simplify product or project implementation, the seller can also provide training to the customer's employees. This is particularly useful in potentially dangerous situations, rare extreme cases, or when errors in handling can be counterproductive in terms of generating value for the customer or can end up being expensive (Bailenson, 2018). Most commonly, training on new products or specific projects is carried out using virtual products in VR. This allows the creation of a realistic environment with minimized risk and costs, testing scenarios (e.g., emergency situations), and a new experience that supports the buyer's core experience. As a result, we categorized the use case of buyer's employee training via VR as a related empowered experience, according to Flavián et al. (2019).

Although our informants only revealed use cases for VR training, we recognize that AR could also be relevant for training purposes in B2B companies. More specifically, AR learning content (e.g., work instructions or background information) could be overlaid on a machine and train a buyer's employees on the job. Such use cases could typically represent directly supported experiences. However, as we did not identify any such use cases for AR learning in our interviews, we do not discuss them further and leave them out of Fig. 1.

5.4. Remote support

5.4.1. Description

As B2B services are often very consulting-intensive, customer support is a core element for many B2B offerings. Traditionally, service technicians visit customers, or customers request support remotely via telephone or other communication channels. XR, in particular AR, allows a new form of remote support (sometimes also called "remote assist"). Here, service technicians can link directly to the customer's field of vision and display information where it is needed, providing immediate assistance to customers without travel. This is especially helpful in cases of unexpected problems with the seller's machines, resulting in costly downtime for the buyer or for regular machine inspections, without the need for a seller's employee to be personally on site. Typically, AR headsets (e.g., Microsoft HoloLens) or handheld devices (e.g., smartphones and tablets) are utilized for this purpose, depending on the specific requirements, availability, and safety standards in factory buildings. Five of the companies participating in our study considered using XR technologies for remote support, with four of them successfully implementing AR in this area. One firm reported a lack of efficiency and decided against continued use for now. However, they remain open to future uses in general.

In the present use case, the commonly used approach was AR, the visualization of which was especially valuable in situations in which the physical context mattered (Rauschnabel, Felix, Heller, & Hinsch, 2024; Von der Au et al., 2023). One interviewee described the use of AR in such a way that in the event of problems with a machine, a support employee could connect directly to the operator via AR headsets and thus see what was happening on site with the buyer. Accordingly, the employee could supplement important helpful elements with AR features and provide instructions, for example, by referring to corresponding parts of the machine with arrows. This helps to "simplify this bidirectional communication" (**Tom**). This informant also stated the following:

> And, if you really look at the facts, yes, you have a better first-time fix rate. That means you can find the error faster and also fix it. These were the main reasons why AR was introduced in support, besides the whole issue of communication problems. (**Tom**)

5.4.2. Role in CXM and anticipated benefits

Our results show that remote support via AR was mainly used during the implementation phase as well as during the fourth and final phase of the B2B customer journey, the operations phase. By offering remote support, the seller can respond quickly and accurately to problems encountered by the buyer during the implementation of the product while reducing travel (which implies cost savings and sustainability). This prevents, for example, cost-intensive, lengthy breakdowns in fields such as manufacturing. Therefore, a seller can offer buyers added value through AR content and increase customer loyalty through improved service in the form of cost reductions and increased communication efficiency. Remote support via AR technologies supports the customer's experience in a targeted manner by simplifying implementation. If a specific project has already been realized, such as the construction of a factory building, or a product, such as a specific industrial machine, is already in use, the operations phase is reached. While the product is in daily use by the customer, remote services via AR can be a beneficial use case in the context of after-sales services. Costly product failures here can again be prevented by providing the buyer with prompt support without the need for a service technician from the seller traveling to the site (improved sustainability through a reduction of emissions). This can provide the buyer with assurance that the seller offers ongoing, lasting support and maintains long-term relationships. Moreover, this can simplify and improve communication between buyers and sellers during and after sales, reduce costs, and increase customer loyalty in the long run (Dacko, 2017; Rauschnabel, Babin, et al., 2022). Furthermore, it is important to note that AR remote support solutions are standard software tools offered by firms such as Microsoft, TeamViewer, and PTC; thus, the required investments can often be manageable.

For these reasons, we categorized AR remote support during both phases of the B2B customer journey as *directly supported experiences* (Flavián et al., 2019).

5.5. Consolidating the findings in a coherent framework

To summarize, the four use cases we found could be categorized as directly supported, related empowered, and diverted empowered experiences along the B2B customer journey. What is noticeable here is that no indirectly supported experiences could be achieved through the XR use cases we identified, as Flavián et al. (2019) suggested. Fig. 1 presents our framework.

It is particularly striking that product or project visualization appeared to be the most versatile use case because it could provide directly supported as well as related empowered experiences during the first two phases of the B2B customer journey – pre-bid engagement and negotiation. Furthermore, AR's role lies in creating directly supported experiences. In contrast, VR applications typically enabled empowered and diverted empowered experiences.

5.5.1. Responsibilities for augmented and virtual reality

Our findings replicated a recent call in the B2C-literature (e.g.,

Rauschnabel, Felix, et al., 2022; Tan et al., 2021) to separate AR and VR based on the characteristics of a use case. For example, AR was found to be more appropriate in situations where a physical object is relevant, while VR was the format of choice when something did not yet exist (e.g., a planned factory building) or existed only as a hypothetical scenario (e.g., emergency training). However, we also found that AR and VR are managed by the same people and departments in companies (commonly in digitalization, product management or innovation management) – often in cross-disciplinary collaborations (e.g., with sales, IT, data security, compliance).

5.5.2. Anticipated benefits of augmented and virtual reality

Our informants expressed several anticipated benefits of using AR and VR in and beyond their CXM. We grouped these benefits into five categories: (1) branding, (2) relationship, (3) transactions, (4) costs, (5) and sustainability. Table 1 summarizes these categories and lists examples of the benefits expressed in the interviews.

6. Discussion

AR and VR have gained recognition as powerful tools in B2B marketing, as evidenced by the existing literature (Boyd & Koles, 2019; Royo-Vela & Velasquez Serrano, 2021). In addition, reports from the business sector confirm that B2B companies are not only experimenting with XR, but also actively incorporating it into their marketing, and more specifically customer experience management (e.g., Adobe, 2022; Linkedin, 2023). Despite this growing interest and relevance, there is a substantial research gap in the academic field, making the available academic material insufficient to guide practical applications.

Considering this gap, our study adopted an exploratory and theory-building approach to examine actual XR use cases within B2B marketing. Specifically, we used CXM as a foundational theoretical lens to answer our overall research question: How can AR/VR technologies support B2B customer experience management? Our research uncovered four main use cases: (1) product/project visualization, (2) event-based engagement, (3) employee training, and (4) remote support. We closely described and examined these use cases and highlighted their current and potential impact on B2B marketing practices, including branding (e.g., creating an innovative brand image), relationships (e.g., loyalty), transactions (e.g., facilitation sales), cost reduction (e.g., lower costs for prototypes), and sustainability (e.g., reduction of emissions).

Building on the framework of technology-enabled experiences rooted in the XR literature (Flavián et al., 2019), we categorized the identified use cases into three distinct experiences (see Fig. 1): (1) direct supported experiences, (2) related empowered experiences, and (2) diverted empowered experiences. Echoing Flavián et al. (2019), we also noted that indirectly supported experiences appeared to be less relevant to the application of XR in B2B marketing. Next, we systematically integrated the use cases within a customer journey model. Our findings show that these XR can substantially contribute to CXM along the customer journey.

We also uncovered that both AR and VR have unique strengths. For instance, VR can be used in situations in which a product or situation does not exist (e.g., a planned factory building) or is not desirable (e.g., simulation of an emergency); in contrast, AR is beneficial if the physical context is existent, and the content has a specific contextual relevance (Von der Au et al., 2023; Rauschnabel, Felix, et al., 2022), such as size comparisons. Likewise, direct supported experiences are typically realized in AR, whereas most of the cases we found for related and diverted empowered experiences employed VR. Thus, while neither AR nor VR is superior to the other, each warrants different considerations from a customer perspective, highlighting the need for a differentiated approach to their application.

6.1. Theoretical contributions

Our research provides two key contributions to theory:

First, our research advances the B2B marketing literature, in particular with a CXM focus. Our work extends early research on new technologies and responds to numerous calls to keep up with new technological advancements. One of the key contributions of this study was to "establish or make known something that has yet to be established" (MacInnis, 2011, p. 143) by introducing and delineating XR's role in B2B CXM. So far, the scarce literature has discussed XR's role in B2B loosely among other technological advancements (De Jong et al., 2021) or theorized VR as a tool in the B2B post purchase phase (Boyd & Koles, 2019). We extend the literature with a more "holistic" view on XR's role by discussing several types of experiences throughout the entire customer journey. By doing so, our study shows that XR can enhance the core experience of a B2B firm in three different ways: *First*, through directly supporting the core experience (e.g., by supporting a customer in the early stage of the buying process through AR product visualizations at the intended place where a product will be used). *Second*, through related empowered experiences (e.g., visualizing product-related content in VR). *Third*, by using XR content that "itself creates a new experience that is not directly related to the user's core experience but influences what they are actually experiencing" (Flavián et al., 2019; p. 554) – for instance, by providing entertaining and engaging content on fairs. Moreover, we identify and describe common use objectives B2B firms aim to achieve XR. This list of objectives can guide future scholarly endeavors by presenting managerially relevant outcome variables.

Second, in addition to identifying and describing XR use cases, our study also contributes to the B2B-CXM literature with an "integration contribution" by providing "a simple and parsimonious perspective that accommodates complexity" by showing how existing practices and concepts (i.e., use cases, journey models, and CXM) are related (MacInnis, 2011, p. 146). More specifically, we contribute to the B2B CXM literature by presenting a framework that combines and integrate the technology enabled experiences framework (Flavián et al., 2019) with an established B2B customer journey model (Brady et al., 2005; Tuli et al., 2007; Witell et al., 2020). This framework organizes the identified four key use cases as digital (VR) or phygital (AR) touchpoints. It presents a parsimonious overview to better understand XR's role in a B2B context.

Third, this study contributes to the literature on AR and VR marketing in general (Kumar, 2022). Over the last few years, this stream of research has predominantly focused on B2C applications, with very few exceptions (e.g., Boyd & Koles, 2019) and documented its potential to impact core variables that marketers target, such as brand management (Rauschnabel et al., 2019), increasing sales (Tan et al., 2021), and

Table 1
Benefits of XR use cases along the B2B customer journey.

Benefit categories	Example benefits expressed in the interviews
Branding	• Promoting an innovative brand image • Clarifying what a brand stands for (e.g., through virtual tours)
Relationship	• Fostering interactions between buyers and seller • Improved customer service • Enhanced learning (e.g., among a customer's employees) • Increased loyalty
Transactions	• Facilitation of imagination and understanding of products and services • Reduction of purchase risks through clearer presentation of (complex) products • Triggering/increasing purchase interest
Costs	• Reduction of costs, for instance, by showing virtual products instead of physical prototypes or by reducing travel • Better use of space and time (e.g., by making use of event space more efficiently)
Sustainability	• Reduction of waste (e.g., by using virtual versus physical prototypes or demo products) • Reduction of carbon emissions through reduced travel

achieving higher prices (Heller, Chylinski, de Ruyter, Mahr and Keeling, 2019b). However, we also note that, given the lack of technological prevalence, many of these studies take place in lab settings. For instance, many papers have used VR in a lab setting because the diffusion of VR devices in mass markets is still very low. Likewise, many actual AR use cases can be employed on smartphones, but the actual benefits arise from hands-free use on a headset. B2B firms often have a core advantage, particularly by having more clearly delimited markets or fewer customers with higher sales volumes, where investments in particular devices could even be delivered by the firm. Thus, extending the XR marketing literature to B2B is an important contribution of this study because it maps many of today's real-world applications very well — maybe, in some regard, better than studies and scenarios in the B2C literature.

6.2. Managerial implications

Our study acknowledges the growing market relevance of AR and VR technologies within the B2B CXM context. This recognition not only underscores the theoretical significance of our research but also aligns with current industry trends, affirming its practical applicability and importance. In this context, this research offers valuable practical insights that directly cater to B2B marketing professionals who seek to enhance their CXM strategies.

First, this study outlines the specific roles that AR and VR technologies can play in enhancing the CX. This practical information guides B2B marketers in understanding where these technologies might fit best within their CXM strategies and how they can create value.

Second, we offer real-world examples of how AR and VR can be effectively leveraged to help marketers make informed decisions. For each documented use case, we offer a detailed exploration of the characteristics, manifestations, and anticipated benefits. These practical insights empower B2B marketers with information on the potential returns on investment and expected improvements in CX associated with AR and VR implementation.

Third, by categorizing use cases based on their significance at different stages of the customer journey, this research provides additional guidance for B2B marketers. This categorization allows marketers to align their AR and VR strategies with the specific demands and expectations of customers at distinct touchpoints along their journey.

6.3. Limitations and avenues for further research

There are several directions for further research. Some of them have their origin in the limitations of this study, others in the remaining gaps in the literature regarding exchange and interaction in business markets.

First, our qualitative study provides, in a sense, cross-sectional insights from a limited number of industry representatives. While we continued to add interviews until a point of saturation was reached, it is possible that interviews from certain industries that we did not include in our research and changes in the market could have provided additional insights that this study does not provide (e.g., AR's role in training, as discussed in Section 5.3). Replications and extensions can address this limitation.

The purpose of this research was to analyze how AR and VR technologies can support B2B CXM, and thus, we discussed the findings on a high level of abstraction (e.g., the use cases or anticipated benefits/

objectives). Our insights can provide starting points for many scholarly endeavors that could into more depth (e.g., specific manifestations of use cases) or beyond this study. Likewise, future research could study if and when XR actually leads to the expected objectives/benefits. For instance, XR's profitability could be assessed using quantitative, longitudinal research designs that include both self-reported and actual sales data. Such studies could, for instance, apply dyadic datasets with insights from both sellers and buyers. In addition to financial outcomes, research might also assess the impact on a firm's sustainability performance (e.g., does XR significantly reduce emissions?). Future studies might require specific groundwork, such as measurement scales for B2B-specific constructs, which represents another avenue for additional examination.

Alongside XR, many B2B companies currently explore the use of AI and data analytics, blockchain technology, and industrial metaverses (including digital twin technology). In the end, customer journeys and the experiences customers have encompassed all these building blocks, as well as any possible interaction effects among them. Future studies could analyze the synergies and challenges associated with combining these technologies for enhanced B2B CXM.

Finally, this research focused on the customer side of experience management along journeys. However, exchanges in business markets typically encompass a series of interactions between buyers and sellers in which both sides regularly assess their interactions with the other actor. Consequently, industrial manufacturers and professional service providers also implement supplier relationship management in their procurement activities. To maintain stable and valuable relationships with their most important suppliers, they need to systematically manage supplier journeys by defining corresponding touchpoints and the way they wish to interact with their suppliers at these touchpoints. Here too, AR and VR technologies may constitute useful building blocks. However, to the best of our knowledge, research has not yet addressed how XR can be and is used in the context of supplier experience management. Future research may fruitfully attempt to close this gap.

CRediT authorship contribution statement

Acknowledgements

Appendix A. Case descriptions

Identifier	Industrial sector	Company size[1]	Headquarters	Use Cases
S1	Manufacturing industries	Large-sized	Germany	Remote support
S2	Manufacturing industries	Large-sized	Germany	Product visualization
S3	Professional Services	Small-sized	Germany	Product visualization
S4	Manufacturing industries	Large-sized	Germany	Remote support
S5	Manufacturing industries	Medium-sized	Germany	Employee training
S6	Professional services	Small-sized	Germany	Entertainment
S7	Professional services	Large-sized	Germany	Entertainment
S8	Manufacturing industries	Large-sized	France	Employee training, remote support, product visualization
S9	Financial services	Large-sized	Germany	Employee training
S10	Manufacturing industries	Large-sized	Germany	Remote support, employee training
S11	Manufacturing industries	Large-sized	Germany	Remote support, product visualization

[1] In terms of number of employees: large-sized >500, medium-sized >50, small-sized <50.

Appendix B. Interview respondents

Identifier	Gender, age	Industrial sector	Industry experience	Department	Company affiliation
Tom	m, thirties	Manufacturing industries	16 yrs	Product management	S1
Susan	f, thirties	Manufacturing industries	16 yrs	Product management	S1
Peter	m, thirties	Manufacturing industries	14 yrs	Innovation management	S1
Mark	m, thirties	Manufacturing industries	7 yrs	Product management	S1
Mary	f, twenties	Manufacturing industries	6 yrs	Sales management	S1
Michael	m, fifties	Manufacturing industries	4 yrs	Campaign management	S2
Oliver	m, thirties	Professional services	7 yrs	General management	S3
Fred	m, fifties	Manufacturing industries	2 yrs	Digitalization	S4
Jack	m, twenties	Manufacturing industries	1 yr	Innovation management	S5
Harry	m, fifties	Professional services	17 yrs	General management	S6
John	m, thirties	Professional services	7 yrs	Digitalization	S7
Lisa	f, forties	Manufacturing industries	6 yrs	Product management	S8
Edgar	m, forties	Manufacturing industries	15 yrs	Innovation management	S8
Arthur	m, forties	Manufacturing industries	16 yrs	Sales	S8
Patrick	m, forties	Manufacturing industries	8 yrs	Section management	S8
Walter	m, forties	Manufacturing industries	1 yr	Digitalization	S8
Steven	m, forties	Manufacturing industries	3 yrs	Digitalization	S8
Lucas	m, thirties	Financial services	3 yrs	Innovation management	S9
Julian	m, thirties	Manufacturing industries	11 yrs	Sales and Marketing	S10
Henry	m, fifties	Manufacturing industries	24 yrs	Automatization	S10
Ben	m, forties	Manufacturing industries	10 yrs	IT	S11

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