

HOW CAN VIRTUAL REALITY AND/OR AUGMENTED REALITY INFLUENCE THE CUSTOMER JOURNEY?

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Ruben Coppens

Foreword

This master's thesis is the result of an intensive research on how Virtual Reality and Augmented Reality can influence the customer journey.

I would like to thank my promotor, Prof. Dr. Len Lemeire, for his guidance, constructive feedback, and invaluable insights throughout this research journey. His support was crucial to the successful completion of this thesis.

I also wish to thank the experts who contributed their knowledge and experience to this research: Kevin Alderweireldt, Marijn Goossens, Chan Grant, Kevin Laibson, Matthew Marshall, and Susheel Nath. Your input was greatly appreciated.

I hope this thesis helps in understanding the impact of virtual and augmented reality on the customer journey and inspires further research in this area.

Abstract (Dutch)

Deze masterproef onderzoekt de invloed van virtual reality (VR) en augmented reality (AR) op de customer journey (CJ). De probleemstelling richt zich op hoe deze technologieën de interacties en ervaringen van klanten met bedrijven kunnen transformeren. De centrale onderzoeksvraag is: *"Hoe kunnen Virtual Reality en/of Augmented Reality de customer journey beïnvloeden?"*

Het onderzoek is gestart met een uitgebreide literatuurstudie om een theoretisch kader te bieden. Daarnaast is een kwalitatieve benadering gebruikt, waarbij semigestructureerde interviews zijn gehouden met zes experts in de sector. Tot slot is de data-analyse uitgevoerd met behulp van thematische analyse om patronen en inzichten te identificeren.

Uit het onderzoek blijkt dat VR en AR aanzienlijke voordelen bieden in alle fasen van de customer journey, van bewustwording tot loyaliteit. VR biedt diepgaande immersieve ervaringen, terwijl AR praktische en verbeterde interacties in de fysieke wereld mogelijk maakt. Deze technologieën verbeteren de klantbeleving, verhogen de betrokkenheid en kunnen leiden tot hogere conversiepercentages.

De conclusie van deze studie is dat VR en AR de potentie hebben om de gehele customer journey te transformeren door innovatieve en boeiende klantervaringen te bieden. De conclusie is daarom dat bedrijven die deze technologieën effectief implementeren, een concurrentievoordeel kunnen behalen en klanttevredenheid kunnen verhogen.

Echter, de kleine steekproefomvang is een belangrijke beperking. Bovendien kan het gebrek aan diversiteit onder de deelnemers, die allemaal mannelijk waren, de bevindingen hebben beïnvloed. De geografische focus van de studie is een andere beperking. Naast deze beperkingen zou toekomstig onderzoek zich kunnen richten op een longitudinaal onderzoek om te beoordelen hoe de invloeden van VR en AR zich in de loop van de tijd ontwikkelen.

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Abbreviation List

Abbreviation	Full Term
AEC	Architecture, Engineering, and Construction
AI	Artificial Intelligence
AR	Augmented Reality
ARSG	Augmented Reality Smart Glasses
CAGR	Compound Annual Growth Rate
CE	Customer Engagement
CEV	Customer Engagement Value
CIV	Customer Influence Value
CJ	Customer Journey
CJM	Customer Journey Mapping
CLV	Customer Lifetime Value
CRM	Customer Relationship Management
CRV	Customer Referral Value
GDPR	General Data Protection Regulation
HMDs	Head-Mounted Displays
IoT	Internet of Things
MAR	Mobile Augmented Reality
MR	Mixed Reality
PBAR	Projection-Based Augmented Reality
VPS	Visual Positioning System
VR	Virtual Reality
XR	Extended Reality

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1. Introduction

In the current digital transformation, the customer journey (CJ) is increasingly influenced by the integration of advanced technologies (Lindberg & Vermeer, 2019). Therefore, understanding the impact of virtual reality (VR) and augmented reality (AR), collectively known as extended reality (XR), on the customer journey (CJ) has become a critical area of research.

Focusing specifically on the application of VR and AR technologies within the context of customer relationship management (CRM), this research aims to map out how these technologies can be integrated to improve the customer journey (CJ). The central objective is to analyze how VR and AR influence each phase of the customer journey (CJ), identifying. To support this analysis, a SWOT framework is used to evaluate the strengths, weaknesses, opportunities, and threats associated with implementing XR technologies in CRM.

The relevance of this study is both theoretical and practical. On the theoretical side, it aims to add to the academic conversation about digital customer engagement by presenting existing data on how effective XR technologies are. On the practical side, it aims to give businesses useful advice on how to use VR and AR to improve their customer relationship strategies.

The central research question guiding this study is: “How can Virtual Reality and/or Augmented Reality influence the customer journey?” To answer this question, the research employs a qualitative methodology, specifically semi-structured interviews with six XR experts. Next to the theoretical SWOT Analysis, these interviews aim to gather in-depth insights into the practical applications and challenges of integrating XR technologies into the CJ. The data collected will be analyzed to draw conclusions on the practical feasibility and strategic value of XR in enhancing the customer journey (CJ).

2. Literature Overview

2.1 Customer Relationship Management

The business landscape has shifted from a product-centric approach to one that prioritizes the customer (Soltani et al., 2018). Customer Relationship Management (CRM) tools empower businesses to gain a deeper insight into both the explicit and implicit needs of their customers (Soltani et al. 2018). The primary goal of CRM is to maximize the present and future value of customers to the company (Kumar & Reinartz, 2018). Furthermore, effective customer relationship management has shown to have significant positive influence on metrics such as profitability and customer engagement (CE) (Inuit, sd).

When discussing CRM, it either refers to a technology or a company policy (Salesforce, sd; Santouridis & Tsachtani, 2015). CRM can refer to the technology that companies use to record, report, and analyze interactions between customers and brands. This technology helps businesses keep track of customer engagements and understand their behaviors. On the other hand, CRM can also refer to a strategy, which is a company's approach to managing long-term relationships with their customers. This strategy focuses on how to build and maintain these relationships over time, ensuring customer satisfaction and loyalty (Salesforce, sd). In summary, customer relationship management, or CRM, is described as the development of a culture focused on customer needs, through which a strategy or technology is formulated to not only attract, but also increase the profitability of, and retain customers (Santouridis & Tsachtani, 2015).

The study of Navarro V. et al. (2021) refers to 4 different CRM dimensions all companies should focus on to maximize the use of CRM as a tool (Navarro et al., 2021). Having a good understanding of who the potential customers are is a crucial first step. Secondly, companies need to identify the actions that they can take to attract customer interest in their services. Third, there is the follow up with a decent level of customer service with the aim of building customer loyalty and long-term relationships. The fourth and last dimension refers to the possibilities to expand on new ways of interacting with potential customers

and improving customer relationships, through for example, customer lifetime value analysis.

A crucial aspect of CRM therefore involves recognizing the various customer groups, crafting specific strategies for engaging with each group, and understanding different customer values (Kumar & Reinartz, 2018). Understanding the customer journey (CJ), customer lifetime value (CLV), and customer journey mapping (CJM) is crucial for achieving this.

2.1.1. Customer Journey

2.1.1.1. What?

The customer journey is a visual representation of the cycle customers go through when considering, buying and using products (Santouridis & Tsachtani, 2015). The goal of this journey is to turn people into paying customers, (Durán et al., 2021) and for this reason, understanding the customer journey is a critical aspect for firms (Lemon & Verhoef, 2016). The journey is dividable into different phases, which are unique to each company (Santouridis & Tsachtani, 2015). The traditional customer journey consists of 5 phases (Figure 1) (Durán et al., 2021). These 5 stages are *Awareness*, *Consideration*, *Purchase*, *Retention* and *Advocacy* (Lucassen, sd). The customer journey is also dividable into 3 different groups based on when the particular segment/action takes place. These groups are *Pre-sale*, *Sale* and *Post-sale* (Qualtrics, 2024). In this case, the *Awareness* & *Consideration* stage belong to the *Pre-Purchase* group, *Purchase* is *Sale* and *Retention* and *Advocacy* are positioned in the *Post-Purchase* group.



Figure 1: The 5 stages of the Customer Journey (Qualtrics, 2024)

Group 1: Pre-sale

Phase 1: Awareness

Awareness is the initial stage of the customer journey where potential customers become aware of your company and services (Joosten, 2024). The goal of this particular stage is to capture the potential customers' attention (Durán et al., 2021). Experiencing this stage is either a passive or active action. Passive means that the potential customer doesn't have a deep understanding of his/hers needs, nonetheless, due to advertisements for example, their interest is provoked to search for further information (Qualtrics, 2024). Active means that a person actively did research on a specific need and discovered your company as a result (Joosten, 2024).

Phase 2: Consideration

In the *Consideration* phase the potential customer has already done some research on their need and is aware of various solutions. This is the moment where competition starts to heat up, because at this point the potential buyer is comparing alternatives based on features such as price and reviews (Kaliyur, 2024). Since individuals know their specific requirements now, they are more focused on details, which makes it critical for a company to differentiate itself from competitors (Agius, 2023).

Group 2: Sale

Phase 3: Purchase

The stage of *Purchase* is often referred to as the decision stage (Qualtrics, 2024). It is the point when the individual has compared various alternatives, finished their decision and becomes a paying customer (CIM, 2022). A great amount of potential customers actually abandon in this stage. Reasons for this could be the complexity of the transaction, such as setting up another time-consuming account or extra unaware transaction costs (CIM, 2022). It is crucial for a company to be as transparent as possible with costs related to their product and to make the purchase action as easy as possible (Gleeson, 2024).

Group 3: Post-sale

Phase 4: Retention

Once the potential customer becomes a paying customer, it's vital to build a long-term relationship. The reason for this is that new customers actually cost 5 times more than a loyal customer (IoDigital, sd). This means that companies should do as much as they can to help and leave a positive impression. For example, companies can set-up a loyalty program, knowledge base FAQ, provide excellent customer service, ... to have regular communication and increase customer engagement, which will lead to a higher customer retention rate (LaFleur, 2022). *“Research indicates that by improving customer retention rates by a mere 5%, businesses can witness a substantial boost in profits ranging from 25% to 95%”* (heyTony, 2024).

Phase 5: Advocacy

This is the most difficult phase which can only be achieved by succeeding very well in phase 4: *Retention* (Qualtrics, 2024). During this final phase, the customer becomes an actual advocate for the company. They like the companies' products and services so much that they start telling others about it, which will attract new customers (Hamilton, 2024). This is highly beneficial for brands, since word-of-mouth marketing is among the better forms of advertising as 88% of customers trust their friends' recommendations (Hayes, 2022). The increasing amount of ways to do this, or later called *touchpoints* (*infra chapter 2.1.1.2*), with customers puts a high pressure on companies to create omnichannel

customer experiences aimed at achieving a long lasting customer loyalty (Leva & Ziliani, 2018).

2.1.1.2. Touchpoints

Touchpoints are defined as the moments of interaction between customers and an organization across various channels over time, like seeing an advertisement on social media or seeing a commercial on TV (Shiratori et al., 2021). During the customer journey (CJ), individuals experience a great amount of interactive moments with businesses and its offerings (Maechler et al., 2016). The study of Aichner T. and Gruber B. (2017) even identified 48 different touchpoints in which a customer interacts with a company (Aichner & Gruber, 2017). Knowing which touchpoints have the most significant impact for a company is hard to define. Nonetheless a decent understanding is required to create a seamless and positive customer journey (Leva & Ziliani, 2018). Moreover, studies point out that business leaders benefit from clustering their touchpoints according to the customer's perspective instead of the classical company perspective (Zimmerman et al., 2022). It used to be that customers' interactions were majorly in physical forms such as flyers, retail stores, newspapers, ... However, due to the blow-up of digital technologies and the rise of new devices, customers now interact with companies through innumerable touchpoints in various forms (Herhausen et al., 2019).

Present-day, due to the use of physical and digital touchpoints, studies often refer to as "*phygital touchpoints*" (Mele et al., 2021). Additionally, through the expansion of touchpoints and ways to participate in these channels, clients nowadays have an exceptional range of choices to individualize their customer journey (Barwitz & Maas, 2022). Companies are among things able to sort touchpoints by time or type, for example physical or digital touchpoints (Shiratori et al., 2021). Consequently, they have the possibility to map when, where and how the interactions with the customer take place and pinpoint those touchpoints that may have been under or overvalued by the business (Shiratori et al., 2021). This method is called Customer Journey Mapping (*infra chapter 2.1.3*). An example of different kinds of touchpoints is given in Figure 2.

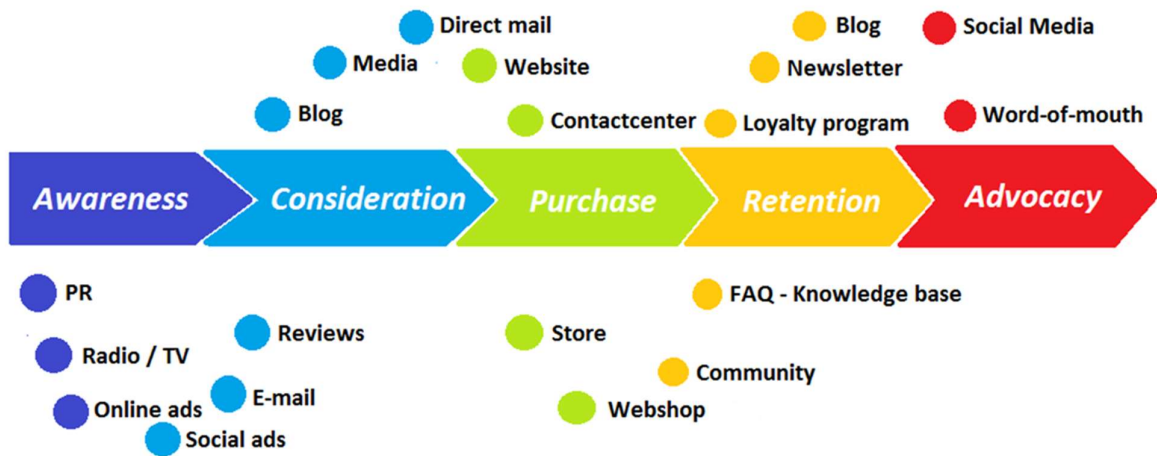


Figure 2: The stages and possible touchpoints in the Customer Journey
(FutureBusinessTech, 2021)

2.1.1.2.1. Physical touchpoints

Physical touchpoints are moments of interaction between the customer and a brand which takes place by physical human contact and with optionally tangible properties (Fierro et al., 2021). Some examples of physical touchpoints are the store, physical products, coupons, newsletters, product packaging, ... (Indeed, 2022). Even while non-physical touchpoints have exponentially grown in recent years, marketers point out to not forget about the importance and benefits of physical touchpoints (TheMarketingBlog, 2023). For instance, research indicate that offering human physical touchpoints lays at the foundation of all following phases in the customer journey (CJ) and are more suitable for creating long-lasting connections with customers (Höfling, 2018).

Although this study primarily focuses on digital touchpoints, it's essential to recognize how virtual reality (VR) and augmented reality (AR) technologies enhance physical environments, transforming them into interactive physical touchpoints. VR and AR extend the digital experience into the physical space, offering immersive, multi-sensory interactions that enrich the customer journey and bridge the gap between online and offline

channels (Pitt, 2019). For example, as Farah M. et al. (2019) note, stores like Volvo have used VR to allow customers to experience driving a car in various virtual environments while being physically in the showroom, which not only attracts more visitors but also enhances their shopping experience by minimizing the expectations gap (Farah et al., 2019). According to Pitt B. (2019), companies will increasingly integrate VR/AR technologies into physical touchpoints to stay competitive and to enhance the customer experience (Pitt, 2019). This integration highlights the evolving role of VR and AR as critical components in both digital and physical customer interactions.

2.1.1.2.2. Digital touchpoints

With the increasing importance of digitalization, consumer behaviors have significantly changed in recent years, with more people choosing online shopping instead of visiting traditional physical stores (Muthaffar et al., 2024). In retail stores, digital touchpoints are increasingly taking over as the main way retailers interact with customers, replacing traditional face-to-face interactions. (Vannucci & Pantano, 2019). Digital touchpoints refer to the online engagements between consumers and a company. These interactions span across multiple devices, such as smartphones and tablets, and encompass a variety of channels, including social media, websites and emails (HexIQ, sd). Additionally, consumers often switch between different channels for searching and purchasing, and sometimes they use multiple channels at the same time for both activities (Muthaffar et al., 2024). In addition, consumers increasingly expect a cohesive and personalized customer experience across all channels, presenting a major challenge for retailers (Muthaffar et al., 2024).

The study by Höfling S. (2018) points out the benefits and shortcomings of digital touchpoints in comparison with physical touchpoints (Höfling, 2018). Among the main benefits, they deliver substantial responsiveness, are customizable for distinct target audiences, and can be scaled up at a relatively low cost. Tracking a fully digital customer journey from its beginning to completion generates a wealth of data for further analysis and refinement. A significant shortcoming of digital touchpoint is that they only engage two of the five human senses, namely vision and hearing. This implies that a purely digital

customer journey activates and utilizes just 20–40% of our sensory perception. However, Höfling mentioned that the human brain functions, learns, and develops best in environments that stimulate multiple senses. Customer journeys that cater to multiple senses can offer a more immersive and dynamic experience with the brand than those limited to one or two senses (Höfling, 2018).

Different typologies of digital channels exist as well. For instance, the typology of Hellikainen H. et al. (2019), suggests that digital touchpoints can be categorized into *functional*, *social* and *community channels* (Hallikainen et al., 2019). The authors describe *functional touchpoints* as primarily featuring one-way communication, with goals that include delivering general brand information, reminding customers of their online purchases, offering incentives for brand interaction, and increasing website traffic. *Social touchpoints*, on the other hand, facilitate two-way interactions, distribute information and promotional content, and focus on fostering customer engagement and interest. *Community touchpoints* are built around digital user groups, promoting content sharing, offering detailed information, encouraging consumer participation, and enabling businesses to establish relationships with potential customers. The typology of Straker K. et al. (2015) adds *corporate channels* as a fourth category (Straker et al., 2015). Corporate touchpoints involve one-way interactions, with objectives that include obtaining customer feedback, offering customer support, promoting loyalty, and delivering comprehensive information about the company (Straker et al., 2015).

While current typologies lead to various classifications of touchpoints, they universally acknowledge that different touchpoints possess distinct features and are, therefore, more effective for achieving certain goals (Livas et al., 2022). However, the results of Hallikainen H. et al. (2019) regarding individual preference of digital touchpoints point out that individuals generally favor functional digital touchpoints known for their straightforward functionality, such as email, websites and search engines, over options like social media and community-related alternatives (Hallikainen et al., 2019). Nevertheless, social media and community-related alternatives are excellent for creating awareness and triggering interests (Hallikainen et al., 2019).

2.1.2. Customer Lifetime Value

Today's business competition demands that companies differentiate themselves not solely with their product or service offerings but through the excellence of the customer experience they provide (Bansal, 2023). One way to measure this is through customer lifetime value (CLV) strategies, which measures a customer's total worth to your company throughout the entire relationship, rather than just evaluating individual financial transactions (Kumar & Rajan, 2020). The concept of customer lifetime value (CLV) is one of the most central subjects within customer relationship management (CRM) (Kumar & Reinartz, 2018).

Based on the study results of Venkatesan R. (2017), CLV is a central metric within the field of customer engagement value (CEV) strategies, giving a full understanding of the complete value of a customer (Venkatesan, 2017). Moreover, this concept is linked to a variety of metrics within an extensive framework for customer engagement management (CEM), including customer referral value (CRV), customer influence value (CIV) and customer knowledge value (CKV). Customer referral value (CRV) measures the benefit a customer brings by referring new customers. Customer influence value (CIV) evaluates the impact a customer has through social or personal influence. Customer knowledge value (CKV) evaluates the useful information a customer provides, such as feedback or ideas. These metrics help understand the diverse values customers offer beyond purchases (Venkatesan, 2017).

Pradhan P. et al. (2021) highlights the fact that a universal method or formula for calculating customer lifetime value (CLV) that applies to all scenarios does not exist (Pradhan et al., 2021). Instead, the calculation should be adapted to specific business contexts using methods such as analytic hierarchy process (AHP) to determine the most relevant factors and their weights for a company (Pradhan et al., 2021). Therefore, a good understanding of the customer journey (CJ) is crucial, highlighting how effectively each stage, *Awareness*, *Consideration*, *Purchase*, *Retention* and *Advocacy*, enhances CLV. Initial stages attract and build customer interest, which is crucial for guiding them towards purchase. Optimizing the *Purchase* and *Post-Purchase* phases increases satisfaction, encourages repeat

business, and fosters loyalty, thereby boosting CLV (Moedristscher, 2022). Integrating these insights allows businesses to personalize customer experiences and strategic planning, maximizing profitability and strengthening customer relationships (Moedristscher, 2022).

Performing an excellent CLV research within a company results in several benefits. For instance, businesses can categorize customers by their expected value and adjust their limited resources and marketing strategies to match these (Hajipour & Esfahani, 2019; Pradhan, et al., 2021). This approach allows for personalized messages and offers, and specific service improvements that enhance customer satisfaction and loyalty (Lew, 2017). Furthermore, by prioritizing customers with the highest lifetime value (LV), companies are able to secure more stable and consistent revenue streams which generates long-term profitability and sustainability (Pradhan et al., 2021).

2.1.3. Customer Journey mapping

Research highlight that over 80% of customers view their interaction with a company to be just as crucial as the products they offer (Yasar, 2023; Agius, 2023). To better understand their potential and current customers' experiences, companies can use customer journey mapping. Customer journey mapping (CJM) is an excellent strategic management tool for understanding an organization's customer experience (Rosenbaum et al., 2017). A customer journey map visually represents each interaction or touchpoint of a customer with a service, brand, or product and helps to explain the way interaction occurs in a specific moment and influences other moments (Micheaux & Bosio, 2018). This mapping process allows an organization to step into the shoes of their customers, offering insights into the customer's journey with the objective to identify opportunities for improvement (Bischoff, 2024). Considering the pivotal role that touchpoints play in shaping consumers' experiences with a brand, it is essential for marketers to pinpoint both positive and negative interactions. Following this, they should focus on enhancing the positive ones while making efforts to address and improve the negative ones (Livas et al., 2022). For constructing such a map, diverse aspects, such as expectations, perceptions and satisfaction of the client, have to be taken into account (Alvarez, et al., 2020).

The study by Bernard G. and Andritsos P. (2017) gives a clear overview of all components of CJM (Bernard & Andritsos, 2017). According to the authors, this management tool consists of 11 different components: customer, journey, mapping, goal, touchpoint, timeline, channel, stage, experience, lens, and multimedia. The process begins by identifying the "Customer" or "Persona", which includes anyone experiencing a service. The "Journey" itself is an 'expected' journey or ideal path designed internally. "Mapping" records these experiences, visualizing the customer's interactions across various touchpoints on a map. The creation of every CJM is driven by a specific "Goal," which directs the mapping process and can range from simple tasks to complex engagement strategies.

"Touchpoints" represent the interactions between the customer and the company, occurring in a dynamic way that can sometimes lead customers to revisit certain points or end their journey abruptly. The "Timeline" of the journey details the sequence of these touchpoints, and the "Channel" refers to the methods or platforms, like physical or online techniques, through which the customer engages with the service. "Stages" of the journey group touchpoints into phases such as pre-purchase, purchase, and post-purchase.

The "Experience" component captures both emotional feedback and quantitative assessments from customers, using scales of satisfaction and direct quotes to measure reactions. Additionally, "Lens" layers provide deeper insights by incorporating factors like weather conditions that might affect customer satisfaction, offering a multifaceted view of the journey. Finally, "Multimedia" elements such as audio, video, photos, and sketches enrich the CJM, making it more engaging and providing a real-time portrayal of customer experiences (Bernard & Andritsos, 2017). A hierarchical presentation of the authors findings can be seen in Figure 3.

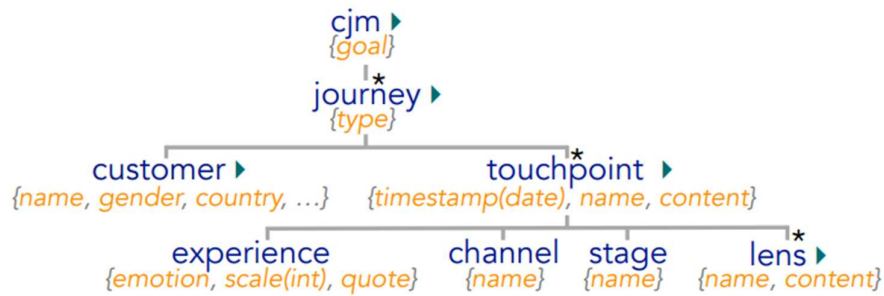


Figure 3: Hierarchical presentation of CJMs' components
(Bernard & Andritsos, 2017)

Moreover, there is no universal guideline to create a customer journey map. However, certain steps are generally found back within literature. Overall steps for customer journey mapping should include:

1. **Set clear objectives:** Each map should target a specific business aim, like enhancing customer satisfaction or boosting sales, by addressing key questions about customer choices and experience improvements. Make sure that these objectives are measurable (Yasar, 2023).
2. **Creating a customer persona:** Companies should create a fictional crafted from user and market research to embody the typical customer for the company. Envisioning this persona's characteristics, such as age and demographics, helps in understanding and building the customer journey story (Bischoff, 2024).
3. **Define customer touchpoints:** Businesses should identify all the possible customer touchpoints with the company. These moments of interactions will form the basis for the customer journey map (Duangthida & Koomsap, 2018).
4. **Integrate Emotional Considerations:** Brands should consider emotions in the customer journey (CJ). Remembering that emotions play a significant role in business decisions and purchases. It's crucial to include both logical reasoning and emotional responses in customer journey maps (Weir, 2021).

5. **Visualize:** Companies should visualize the customer's journey using a timeline, flowchart, or pictograph that includes all phases of the journey and the previously mentioned touchpoints in the visual representation (Yasar, 2023).
6. **Actively improve:** Businesses should pinpoint and align customer pain points with tailored solutions throughout the customer process using your customer journey map. Continually refine and update this map to improve aspects like customer service, sales, and product design, thereby enhancing the overall customer experience (Buhler, sd).

Performing CJM results in various benefits. For instance, CJMs help in understanding customer's experiences and behaviors when they interact with various touchpoints, which helps better to meet customers' needs (Bernard & Andritsos, 2017). Additionally, a customer journey map reveals gaps in the customer journey, for instance when switching devices, moving between channels, or changing from social media to a website (Yasar, 2023).

On top of that, a watch-out emerging from the literature is that some approaches to customer journey mapping (CJM) make a key assumption: companies often believe every customer encounters the same touchpoints and views them as equally important (Rosenbaum et al., 2017; Yasar, 2023).

2.2 Extended Reality

The concept of optical illusions and the notion that our perceptions can be manipulated have been around for a long time. It is only when these illusions became digital that extended reality (XR) was born (Greengard, 2019). Extended reality (XR) is the overall term that includes the full spectrum on the reality-virtuality continuum, containing augmented reality (AR), mixed reality (MR) and virtual reality (VR) (Figure 4) (Arena et al., 2022). XR blends the digital and physical realms, establishing settings where the virtual and actual can coexist and interact instantaneously (Marr, 2019). These technologies provide immersion through visual, auditory, and potentially even smell and touch feedback (Alizadehsalehi et al., 2020). These revolutionary experiences are made possible by wearable technology, including head-mounted displays (HMD), smart glasses, and other interfaces that are still in the development stages (Stanney, et al., 2021). This idea of a combined online world where people can work, learn, have fun, and share things with others is known as the "Metaverse" (Warin & Reinhardt, 2022).



Figure 4: Reality–Virtuality Continuum (Arena et al., 2022)

Extended Reality has made its debut in a variety of industries such as education, healthcare, construction, automotive and many other (Robledo et al., 2022). In healthcare for instance, XR offers groundbreaking methods for surgery simulation to practice in a much safer way (Andrews et al., 2019). Whereas in education, XR provides the possibility for students to interactive learning experiences that go beyond the capabilities of traditional methods such as textbooks (Guo et al., 2021). Currently, the highest demand for these immersive technologies is observed in the "creative" sector, including video entertainment and gaming (Alizadehsalehi et al., 2020; Andrade & Bastos, 2019). However, according to

Alizadehsalehi et al. (2020), XR holds significant promise for enhancing efficiency and productivity in the Architecture, Engineering, and Construction (AEC) industry in upcoming years (Alizadehsalehi et al., 2020).

To give a more comprehensive understanding of extended reality (XR), its components (VR/AR/MR) will be explained in more depth.

2.2.1. Virtual Reality

2.2.1.1. Definition

Virtual reality (VR) has become one of the most popular IT topics in recent years (Wohlgenannt et al., 2020). On the reality-virtuality continuum, it is the most extreme virtual experience up to date (Arena et al., 2022). What is so unique about this technology is that with virtual reality (VR), our senses are tricked by an artificially made reality (LaValle, 2023) to make us believe we are in a fully new, but simulated world (Stanney, et al., 2021).

2.2.1.2. Mediums

Virtual reality (VR) mediums include a range of devices and technologies designed to deliver immersive experiences. Key among these are **head-mounted displays** (HMDs), which users wear over their eyes to enter virtual environments (Martínez, 2023). VR headsets, such as the Oculus Rift or HTC Vive, usually cover the user's face entirely, isolating them from the surrounding real-world environment (Bailenson, 2018).

VR users can even interact and socialize with things in the new world (LaValle, 2023). This is achieved through **motion controllers**. Motion controllers offer users the ability to interact with the virtual world through gestures and movements that are mirrored in the VR space (Krompiec & Park, 2019). These controllers sometimes feature haptic feedback, giving tactile responses to actions taken in the virtual environment (Pirker et al., 2017).

Additionally, there are **specialized suits & gloves** that track body movements and provide haptic feedback. For instance, The Senso Glove & Senso Suit are wireless tools designed

to track the movements of the wearer's hands, fingers and body. These devices communicate data to a computer wirelessly, thanks to its integrated Bluetooth connectivity, eliminating the need for physical cables (Fahmi, et al., 2020).

Furthermore, **locomotion devices**, such as treadmills, provide the possibility for physical movement within virtual spaces, allowing users to walk or run through vast environments without leaving a confined physical space (Chermi et al., 2021).

2.2.1.3. Applications of VR

In education and training, virtual reality (VR) has improved how students and employees learn and work by providing information quickly (Xi et al., 2023). The use of these technologies in education has proven significant positive effects, such as higher motivation, increased time-on-task, long-term knowledge recognition and deeper learning (Kavanagh et al., 2017). However, due to technology and cost limitations, this type of technology still needs to make its global entrance as a standard for educational purposes (Kavanagh et al., 2017).

In the medical field, VR has proven to be a valuable tool in enhancing surgical techniques, offering precise virtual representations of a patient's anatomy. It enables doctors to navigate and examine 3D virtual images from various perspectives, aiding in their ability to plan and execute procedures (Izard et al., 2018). Currently, this technology is being applied in fields such as cardiology and neurology, supporting patient monitoring and leading to better health outcomes (Javaid & Haleem, 2020). It also plays a crucial role in assisting physicians in managing trauma and fractures (Javaid & Haleem, 2020).

In sports, there's a growing trend of using virtual reality (VR) technologies to boost training and performance. These technologies allow athletes to train in environments that simulate real-world conditions, offering immediate feedback and analyzing their performance data (Neumann et al., 2017). At the same time, fans can enjoy new forms of interaction with

their favorite teams through immersive experiences, such as experiencing games in virtual stadiums (Martínez, 2023).

In construction it is being used to develop environments that facilitate the visualization of complex work scenarios, enhance risk-prevention knowledge, and support comprehensive training programs (Li et al., 2018). Also, VR exposure therapies have proven to be particularly effective in treating anxiety. They create realistic scenarios that trigger genuine responses to situations people usually fear (Park et al., 2019). The list of sectors where VR plays a significant role extends well beyond these examples.

2.2.2. Augmented Reality

2.2.2.1. Definition

Augmented reality (AR) is founded on principles such as motion tracking, understanding of the environment, and light estimation (Andrade & Bastos, 2019). These elements are used to generate settings and position 3D objects within the real world (Andrade & Bastos, 2019). While VR brings you in a completely new world, augmented reality (AR) is the technology that aims to digitally integrate and expand the physical environment in real time, by adding new layers of digital information such as numbers, symbols, videos, ... (Arena et al., 2022).

2.2.2.2. Mediums

Augmented reality (AR) creates a link between what's digital and what's real, making how we see the world around us more interesting by adding computer generated visuals to it (Chen, et al., 2019). AR uses different tools and technologies to bring digital information into our real environment as it happens, mixing the real and the digital in a special way. These technologies are often referred to as mobile augmented reality (MAR) technologies (Litvak & Kuflik, 2020).

Smartphones and tablets are some of the easiest ways to experience AR. Using their cameras to take pictures of the real world and then adding digital images on top. This

approach introduces AR to many people by utilizing devices they already use every day (Hayes, 2024).

Expanding the possibilities of AR technology, **augmented reality smart glasses** (ARSG) are an innovative development that integrates AR directly onto the eye's surface, for instance Google Glass or Microsoft HoloLens (Ahn et al., 2019). These lenses are designed to either reactively or proactively enhance a visitor's perspective with relevant information, without making the devices themselves the main focus (Litvak & Kuflik, 2020).

Apart from glasses and lenses, AR technology is being incorporated into a range of other wearable items, such as **watches** (Lee et al., 2018) and **jewelry** (Rantala et al., 2018). These wearables merge digital information with the wearer's physical movements and surroundings, providing customized data and interactive experiences that adapt to the user's specific environment and activities (Hojoong, et al., 2020).

Although the equipment used for AR can differ, it undoubtedly incorporates sensors that monitor and record various movements of the user's body, like head movements (Franco & Lanier, 2017). Additionally, the technology frequently gathers extensive data on the user's physical condition, including posture, strength, metabolic rates, internal body sensations, among other factors (Franco & Lanier, 2017).

2.2.2.3. Applications of AR

Through projection-based AR (PBAR), any surface can become a lively screen, enabling interactions through touch and gestures with digital components as though they seamlessly exist within the physical space. This approach casts artificial light onto real-world surfaces, converting them into interactive displays (Ahn et al., 2019). Additionally, Spatial AR introduces a new visual positioning system (VPS) capable of scanning environments, accurately placing augmented reality content within them, and maintaining its position consistently throughout the user's interaction (Onirix, sd). These applications have made its debut in a variety of industries, such as gaming, healthcare, construction and architecture.

One of the most famous AR examples is the mobile game app Pokémon Go. With Pokémon Go, users need to go outside and walk around to catch digital creatures named Pokémons. With these Pokémons, they can battle other players or trade them (Matusz, 2016). The game made its introduction in 2016 and immediately became a global success (Chong et al., 2018).

Another example is Levis Visualizer. With the use of VPS, users can scan a room, choose a color and digitally see how the setting looks before buying the actual paint (Levis, sd). This enhances the customer experience by making every color very customizable. The app offers a modern solution for anyone looking to repaint their home or office, making the selection of paint colors more interactive and enjoyable (Apple, 2024).

The IKEA Place app uses augmented reality (AR) to allow users to see how furniture looks in their home before buying. It features 3D models of IKEA products, making it easy to visualize their size and design in real settings. This innovative tool is part of IKEA's effort to transform the furniture shopping experience, leveraging technology to simplify home decoration and purchase decisions (Inter IKEA, 2017).

In healthcare, smart glasses have been utilized in AR-enhanced neurosurgical guidance. Three-dimensional graphics, derived from pre-surgical MRI scans, were displayed through transparent smart glasses. Optical markers were placed on both the smart glasses and the patient's head to facilitate precise navigation and accuracy (Maruyama, et al., 2018).

2.2.3. Mixed Reality

2.2.3.1. Definition

Mixed Reality (MR) is often defined as simply a combination of VR and AR (Rauschnabel, et al. 2022). However, the study of Speicher M. et al. (2019) emphasizes that MR is not just an advanced form of AR or a mix of AR and VR, but rather a complex spectrum where

physical and digital realities coexist and interact across multiple dimensions like immersion, virtuality, and interaction modes (Speicher et al., 2019).

2.2.3.2. Mediums

Mixed reality (MR) employs a variety of mediums to merge the physical and digital realms seamlessly. **Head-mounted displays (HMDs)** are a prime example of this. For instance, Microsoft HoloLens, the first commercially available mixed reality device that offers heads-up display functionality without disrupting the surrounding visual environment (Tepper, et al., 2017).

On June 5, 2023, Apple revealed its highly awaited mixed-reality headset, named the Apple Vision Pro. The device's main way of interacting involves using eye tracking, hand gestures, cameras, and sensors, removing the necessity for traditional physical controllers like keyboards or touch screens (Waisberg, et al., 2023).

2.2.3.3. Applications of MR

Collaborative design is a prime application example of Mixed Reality (MR). In the study of Piumsomboon et al. (2018) an innovative "Mini-Me" avatar is introduced to enhance remote collaboration between a local augmented reality (AR) user and a remote virtual reality (VR) user (Piumsomboon, et al., 2018).

The "Mini-Me" avatar effectively mirrors the gaze and gestures of the remote VR user, adjusting dynamically in size and orientation to stay within the AR user's view. The avatar is especially useful in two collaborative scenarios: one where a remote expert in VR helps a local worker in AR, and another where two users work on urban planning. In both cases, the avatar greatly enhances spatial awareness, social presence, and overall collaboration.

A user study showed that the "Mini-Me" boosts social presence, makes tasks easier, and reduces mental effort, making it a valuable tool for improving remote collaboration in MR environments (Piumsomboon, et al., 2018).

2.3 SWOT Analysis

Throughout a customer journey, customers engage with companies through various touchpoints during pre-sale, sale or post-sale time periods (Aichner & Gruber, 2017). Considering the significance of customer experience in today's marketplace, these interactions encompass sensory, emotional, behavioral, and cognitive experiences, which collectively form the essence of the customer journey experience (Sultan, 2018). It's critical for companies to effectively manage these customer experiences, as it plays a central role in business strategy and overlaps with several marketing areas such as brand management, market research, and advertising (Baxendale et al., 2015). Nowadays, the customer journey is not viewed as a linear progression, but as a complex network of intertwined interactions, enhanced by insights from digital data (Schweidel, et al., 2022). The strategic incorporation of digital data technologies, such as XR technology, is increasingly crucial, enabling firms to enhance their offerings with unique value propositions that blend digital and physical interactions to create superior customer experiences (Flavián et al., 2019).

“... most companies still view customer journeys as a linear sequence of standardized touchpoints within a given channel. But the future of customer engagement transforms touchpoints from nodes along a predefined distribution path to full-blown portals that can serve as points of sale or pathways to many other digital and virtual interactions.”

(Tordjman & Bertini, 2023)

The study of Farah M.F. et al. (2019) indicates that the impact of extended reality (XR) differs at various points in the customer journey. In the initial phases of gaining awareness and evaluating options, VR significantly boosts engagement. Yet, its direct effect on actual purchase decisions is minimal (Farah et al., 2019). Nonetheless, VR could play a strong role in fostering customer loyalty and promoting advocacy after a purchase has been made, by continuing to engage customers with immersive experiences (Bialkova & Bigné, 2019). However, other studies highlight the significance of XR in all phases of the customer journey (D'Arco et al., 2019; Hollebeek et al., 2020). Through a SWOT analysis, the influence of extended reality on the customer journey will be looked at in more detail.

2.3.1. Strengths

2.3.1.1. Customer Engagement

Virtual reality (VR) is increasingly recognized for its capability to engage consumers at early stages of the customer journey, specifically during the *Awareness* and *Consideration* phases (Hollebeek, et al., 2020; Simoni, et al. 2022). Moreover, did AR prove its significance to enhance customer engagement during these phases (Lin & Huang, 2024). This is as a result of the interactivity and vividness these technologies provide potential customers (Simoni, et al. 2022; Lin & Huang, 2024). XR technologies enable a shift from traditional storytelling to story living, where customers are not just passive recipients but active participants in the brand narrative (Saccoccio, 2021).

Immersive content like 360-degree videos not only makes messages look better and easier to imagine, but also draws in customers more effectively than traditional media (Orús et al., 2021) and as a result can significantly enhance user engagement by merging digital and physical worlds (Hilmersson & Lindström, 2023). Additionally, interactive touchpoints can also significantly influence customer's positive emotions and deeper connections (Saccoccio, 2021).

For instance, AR allows customers to see how cosmetics look on their faces before purchasing (Bialkova & Bigné, 2019) or have a look at a 3D version of shoes, which will heavily influence the *Pre-Purchase* phases (Yazici et al., 2024). Thus, VR and AR can create highly engaging and memorable experiences, potentially exceeding the impact of physical and online store interactions (Triviño, 2023).

2.3.1.2. Personalization

As technology advances, 73% of customers expect better personalization and over 60% anticipate that companies will adapt to their changing needs and preferences (Salesforce, sd). Through spatial computing and immersive interactions, XR allows for personalized recommendations and services, enhancing the customer's journey, user experience and enforcing a stronger sense of connectivity and loyalty (Saccoccio, 2021). By using

consumer digital signals in XR platforms, companies can customize the virtual environment to match individual preferences (Schweidel, et al., 2022). The capability of personalization through VR and AR technologies shows significant influence in the *Pre-Purchase* and *Post-Purchase* phases. As an example in the *Pre-Purchase* phase, VR technology enables potential customers to customize their prospective cruise experience. These customers are able to select and modify various aspects of their cruise such as the type of ship, level of service, and cabin location, thereby making the experience more personalized and tailored to their preferences (Simoni, et al., 2022). Next, augmented reality (AR) can significantly enhance customer service by providing real-time, personal and interactive support, which could improve customer satisfaction and plays a notable role in the *Retention* and *Advocacy*, or *Post-Sale* phases of the CJ (Yazici et al., 2024).

2.3.1.3. Data Collection

Advancements in augmented and virtual reality technologies, including enhanced tracking and interaction capabilities, enable the collection of more accurate and comprehensive data (Rauschnabel, et al., 2022). For instance, eye-tracking in virtual reality and spatial tracking in augmented reality offer in-depth insights into user focus and activity in virtual spaces (Rauschnabel, et al., 2022). Additionally, XR technologies excel at gathering detailed real-time data from user interactions within these immersive environments, which is crucial for understanding nuanced user behaviors and preferences (Krodel et al., 2023).

This extensive data collection is valuable across the entire customer journey, not just in a specific stage or phase, effectively bridging the gap between expected and actual customer experiences (Bernard & Andritsos, 2017; Krodel et al., 2023). By analyzing customer journey maps created from real obtained customer data (actual journeys) against the ones planned by the organization (expected journeys), companies can identify and correct mismatches between what customers expect and what they experience (Bernard & Andritsos, 2017). This process enables businesses to make informed adjustments to their interactions, thereby more effectively satisfying real customer needs (Bernard & Andritsos, 2017). Thus, the data generated from XR interactions leads to a better understanding of consumer preferences, enabling more personalized marketing and product development

strategies, optimizing every touchpoint throughout the customer journey (Bialkova & Bigné, 2019).

2.3.1.4. Conversion Rates

Due to increased interactivity, XR technology has a significant effect on the decision-making processes and cart abandonment (Delinikolas et al., 2022). The immersive nature of these technologies allows consumers to visualize and interact with products in a more engaging way, facilitating quicker and more confident purchasing decisions directly within the XR environment (Hilmersson & Lindström, 2023). This improvement in interactivity diminishes decision-making hesitation, which subsequently increases conversion rates and decreases cart abandonment rates, thus having a critical impact during the purchase phase of the customer journey (Delinikolas et al., 2022).

2.3.2. Weaknesses

2.3.2.1. High costs

The investments required for implementing XR technologies poses a significant challenge across the whole customer journey. Initially, the high costs of creating immersive marketing campaigns can deter particularly smaller companies to invest in XR (Faria & Cunha, 2023), restricting their ability to attract new customers during the *Awareness* phase. These costs limit the market to well-funded companies (Yamakami, 2020).

During the *Consideration* phase, the extensive costs associated with hardware, software, maintenance, training, and testing (Akyildiz & Guo, 2022) can restrict how often XR content is updated. This can hinder the ability to iterate based on user feedback, making the XR interactions potentially less relevant and engaging (Hillmann, 2021).

In the *Purchase* phase, the high implementation costs can lead to increased prices for products or services featuring XR, which might turn away price-sensitive customers and reduce conversion rates (Wallgrün, et al., 2019).

Finally, in the *Post-Purchase* phases, the ongoing investment required to maintain and update XR technology can impact customer satisfaction. Slow production cycles and the struggle to meet increasing demand can frustrate customers expecting timely improvements, thereby affecting their loyalty and long-term engagement with the brand (Ziker et al., 2021).

2.3.2.2. Technological Limitations

The success of XR applications frequently depends on technological capabilities, such as a strong internet connection, to provide smooth, high-definition content (Pfeiffer & Weiss, 2023). Potential customers living in regions with unreliable internet infrastructure may not experience the intended immersive engagement, leading to a decreased interest and awareness of the product or service (Pringle, et al., 2022). Following up in the *Consideration* and *Purchase* stages of the CJ, technological hitches such as delays and reduced visual fidelity can create a frustrating experience, negatively affecting customers' perception of the brand's reliability and quality (Pringle, et al., 2022). This can deter potential customers from moving further along in their journey towards choosing a product or service.

2.3.2.3. Physical Discomfort

In the study of Kuber P.M. and Rashedi E. (2023), a significant weakness identified in the use of XR technologies is the physical discomfort experienced by users. This discomfort is primarily due to the physical demands imposed by the ergonomic design of virtual reality (VR) and augmented reality (AR) devices. The study points out that such discomfort can negatively impact the user experience, potentially decreasing satisfaction and limiting the frequency of use (Kuver & Rashedi, 2023).

Users often feel discomfort when using extended reality (XR) technologies, possibly caused by a mismatch between visual input and physical sensation of movement (Clua, et al., 2021). For instance, motion sickness, often referred to as VR sickness, is described as a condition that occurs when there is a disconnect between what a person sees and what their body feels, particularly when the visual motion cues from the VR environment do not match the physical motion cues that the body experiences (Kim et al., 2018).

Furthermore, the study of Pladere T. et al. (2022) highlights the eye strains issue. The fixed focal point of XR devices can force the eyes to focus differently from normal conditions, leading to what is known as the vergence-accommodation conflict. This conflict arises when the eyes must adjust their focus to view images at a fixed distance presented by XR displays, while simultaneously trying to process depth cues from virtual content that appears to be at varying distances. It demands constant eye adjustments, leading to visual fatigue and strain (Pladere et al., 2022).

Consequently, physical discomfort not only affects user retention but also acts as a barrier to the adoption of XR solutions, restricting the technology's potential to enhance and transform customer journeys effectively (Kuver & Rashedi, 2023). These effects point to the need for XR designers to balance immersive experiences with the cognitive and physical demands on users, ensuring the broader acceptance and effectiveness of AR technologies (Xi et al., 2023).

2.3.3. Opportunities

2.3.3.1. User Experience

Studies highlight that the next major competition will center on the creation of customer experiences, regardless of whether companies are engaging with businesses or consumers (Triviño, 2023). Leading-edge firms have begun to incorporate customer experience into their new business model as a means to stand out and thrive in the rapidly evolving market landscape (Keiningham, et al., 2020). The study by Hillmann C. (2021) emphasizes that well-designed user experiences are essential for the wider adoption of XR technologies within the customer journey, as they help in creating intuitive, enjoyable, and meaningful interactive touchpoints for users (Hillmann, 2021).

Building on this, research by Duangthida H.N.A. and Koomsap P. (2018) discusses an advanced method to design and assess customer journeys by incorporating the 4Es model (Entertainment, Educational, Esthetic, and Escapism), leveraging experiences that span from purely educational sessions to fully immersive adventures. This model, often integrated into customer journey mapping (CJM), aims to significantly enhance the user

experience by making it more memorable, which is critical for customer loyalty and satisfaction. XR technologies, due to their immersive and interactive capabilities, are particularly well-suited to enhance these dimensions of the customer journey, making each touchpoint within the journey more effective and memorable. For example, by using XR to simulate realistic and engaging environments, companies can provide esthetic experiences where customers feel truly immersed in the setting or escapism experiences that transport them away from their everyday environment. Additionally, XR can transform educational content into engaging, interactive learning sessions that capture customer interest and enhance retention (Duangthida & Koomsap, 2018).

2.3.3.2. Immersive Collaboration

Due to time and cost savings, numerous systems for remote collaboration have been researched and brought to the market. However, initially their use was limited mostly to virtual objects and data (Lee & Yoo, 2021). Recent research has now shifted toward collaboration involving physical environments and objects, with the use of for example virtual and augmented reality (Lee & Yoo, 2021).

Research points out that there is a preference for virtual attachment cues due to their high accuracy and low mental effort, which could enhance the initial engagement and *Awareness* stage of a customer journey (Irlitti et al., 2019). In a marketing context, using these virtual attachment cues in XR setups could make first interactions with products or services more intuitive and memorable (Alcañiz et al., 2019). In environments where decisions are made collaboratively (e.g., business meetings and virtual showrooms), the findings of Irlitti A. et al. (2019) about the increase in mental load with multiple collaborators could inform the design of XR tools. Optimizing these tools to reduce clutter and cognitive overload could support better decision-making processes (Irlitti et al., 2019).

The study of Fadzli F.E. et al. (2020) details how 3D telepresence, powered by advanced sensors, revolutionizes post-purchase customer support. This technology enables customer service representatives to appear virtually in a customer's space to assist with product setup, troubleshooting, or training. Such immersive customer service can

significantly enhance satisfaction by providing immediate, effective, and personal support, potentially increasing brand loyalty and long-term customer engagement (Fadzli et al., 2020). This capability exemplifies how XR can transform traditional customer service interactions into more engaging experiences during the *Post-Purchase* stages.

2.3.3.3. Integration With Other Technologies

In the book "User Experience Design and Strategies for Immersive Technologies" by Hillmann C. (2021), are detailed discussions on how extended reality (XR), when integrated with AI (Artificial Intelligence) and IoT (Internet of Things), significantly impacts each stage of the customer journey (Hillmann, 2021).

AI-driven analytics analyze customer data during the *Awareness* stage to identify trends in behaviors and preferences. This allows businesses to create targeted marketing campaigns that connect more effectively with potential customers.

In the *Consideration* stage, combining XR with IoT devices transforms the customer experience by providing real-time data and visualizations. For instance, in a retail environment, customers can use augmented reality (AR) to see how a product would look and fit in their own space.

At the *Decision or Purchase* stage, AI analyzes data from previous interactions to provide personalized recommendations. This personalized approach simplifies the decision-making process by focusing on products or services that match the customer's specific preferences and needs, thus increasing the chances of a purchase.

After the purchase, during the *Post-Purchase* stages, XR applications improve customer support by using AR for immersive tutorials and help sessions. AI helps by offering customized, interactive guides that reflect the customer's usage habits and preferences. Meanwhile, IoT monitors how the product is performing in the customer's setting, ensuring it works well and providing timely updates for maintenance or problem-solving. (Hillmann, 2021).

Furthermore, other studies highlight the future of extended reality (XR) is set to be significantly influenced by the advent of 5G technology and the integration of digital twins. 5G promises to revolutionize XR applications with its faster data transfer speeds and lower latency, leading to smoother, more realistic experiences in virtual and augmented realities (Hilmersson & Lindström, 2023). This technological leap will allow for more complex XR features, such as real-time 3D rendering and AI-driven simulations, enhancing applications in healthcare, education, and entertainment (Martínez, 2023). Meanwhile, digital twins are becoming pivotal in XR's evolution, offering detailed simulations and monitoring of real-world entities in virtual spaces (Stacchio et al., 2022).

2.3.4. Threats

2.3.4.1. Rapid Technological Change

As highlighted as a potential issue in the study of Hilmersson T. and Lindström E. (2023), consumers are constantly thinking about whether or not to adopt a new digital device and might feel hesitant if they are already overwhelmed by the number of devices they currently use (Hilmersson & Lindström, 2023). This feeling of being overwhelmed can lead them to reconsider decisions, making them more critical and selective about adding another device (Hilmersson & Lindström, 2023), thus having a significant effect on the *Consideration* stage of the CJ.

Moreover, there is a constant need for adaptation by users to new tools and platforms, involving retraining, system updates, and reassessment of XR applications, which can be both expensive and time-consuming (Orús et al., 2021). Therefore, potential XR customers are more likely to buy a new product or service if they have confirmation regarding future support and updates, increasing the workload on customer service to manage expectations and maintain satisfaction (Pitt, 2019).

2.3.4.2. Market Competition

Extended reality (XR) is undergoing rapid expansion with an estimated compound annual growth rate (CAGR) of approximately 39% until 2032 (Imarc, 2024). In the *Pre-Purchase*

phases, the market competition threat is evident as XR applications become more mainstream, creating a highly competitive market environment. This means that a great number of brands compete for the same spotlight, making it difficult for any single XR product or service to capture the consumer's initial attention and achieve market dominance (Ziker et al., 2021).

As customers evaluate their options, The amount of similar technologies in the market could confuse customers and make it difficult for them to choose (Ziker et al., 2021). Additionally, due to the high prices of VR/AR mediums and unavoidable impact on body discomfort, the demand for these technologies is quite low compared to other consumer electronics (Shukla, 2020), influencing the Decision-Making or Purchase stage.

Next, maintaining customer loyalty in a competitive environment by focusing on the importance of building long-term, trust-based relationships with customers is a crucial challenge. Customer loyalty is pivotal for achieving sustainable competitive advantage, as loyal customers not only contribute to business continuity by increasing their purchase frequency and volume but also facilitate the acquisition of new customers through referrals (Arslan, 2020).

2.3.4.3. Privacy Concerns

With these upcoming technologies come problems, especially with keeping personal information safe (Yamakami, 2020). XR gadgets are equipped with various sensors capable of monitoring users' behaviors, actions, and eye movements, as well as their environment, including people, locations, and objects (Abraham et al., 2022). The collection of vast amounts of personal & biometric data, often without explicit informed consent, is a major issue and therefore XR technologies present significant challenges to privacy and security (Warin & Reinhardt, 2022). Over 70% of customers express concerns over the unethical application of upcoming technologies (Salesforce, sd).

Problems with collecting data, user profiling, and AI making decisions without clear explanations or accountability are major concerns (Qayyum, et al., 2023). Yet, most existing platforms haven't fully tackled the security, privacy, and safety problems, but

instead they're still mainly concerned with the hardware and commercialization of implementing the technologies (Roesner & Kohno, 2021).

The EU's General Data Protection Regulation (GDPR) has encouraged many countries to make similar laws to keep internet users safe. These laws focus on preventing the creation of detailed user profiles without consent and making it clear how and why user data is collected and used (Li et al., 2019). For AI and XR technologies used in the metaverse, it's important to be open about what data is collected and how it's used, to get clear permission from users, and to think carefully about making rules (Qayyum, et al., 2023).

If XR data is mishandled, it could lead to a loss of trust, which might hurt customer retention and the effectiveness of creating positive awareness (Schweidel, et al., 2022). Therefore, it's important to find a balance between innovation, ethics, and privacy to keep XR technologies growing sustainably (Warin & Reinhardt, 2022).

2.3.5. Overview

Table 1 indicates which SWOT component influences a particular stage in the customer journey based on literature.

Table 1: SWOT Mapping on Customer Journey Phases

Stage	Strengths				Weaknesses			Opportunities				Threats	
	Customer Experience	Personalization	Data Collection	Conversion Rates	High Costs	Technological Limitations	Physical Discomfort	User Experience	Immersive Collaboration	Integration With Other Technologies	Rapid Technological Change	Market Competition	Privacy Concerns
Awareness	X	X	X		X	X		X	X	X		X	X
Consideration	X	X	X		X	X	X	X	X	X	X	X	
Purchase			X	X	X	X		X		X		X	
Retention		X	X		X		X	X	X	X	X	X	X
Advocacy		X	X		X			X	X	X	X	X	

3. Methodology

The goal of this study is to see how virtual and augmented reality (VR/AR) can influence the customer journey. This study first identified the strengths, opportunities, weaknesses and threats of implementing XR technologies into the customer journey based on literature (*supra chapter 2.3*). Next, this study will examine whether the factors identified in the literature hold true in practical settings by interviewing six extended reality (XR) experts.

In the following chapter, first a more detailed description of the selected research method is provided. Following this, the profiles of the extended reality (XR) experts are shown, along with additional information on why these people can contribute to this research. Lastly, the related questions and topics are presented to streamline the interviews.

3.1 Research Method

To be able to answer the central research question, this study will be done through a qualitative method, more specifically through interviews with six XR experts. Research highlights that data saturation, “*the moment when no new themes or significant insights emerge*” (Quantilope, 2024), occurs between nine to seventeen interviews (Hennink & Kaiser, 2022). In this research, six interviews will be taken, therefore limiting the risk of data saturation.

There are three main types of interviews (Schwab, 2020). First, the unstructured or open interview allows for a flexible conversation where the questions aren't pre-determined, but instead arise from the flow of the interviewee's responses (Adhabi & Anozie, 2017). In contrast, a structured or closed interview involves a fixed set of questions that the interviewer strictly follows. This method is inflexible, with no room for spontaneous questions or deviations; every interviewee is asked the same questions in the same order (Podolsky, 2019). Lastly, the semi-structured interview combines elements of both the unstructured and structured approaches. It starts with predetermined questions and topics but is flexible enough to include further discussion and additional insights from the interviewee (Adhabi & Anozie, 2017).

According to the study of Döringer S. (2021), a semi-structured interview is the best approach for this study. This method provides flexibility and depth, allowing for the exploration of emergent themes and the collection of both explicit and implicit knowledge from experts. Semi-structured interviews provide room for improvisation, enhancing the richness of data collected (Döringer, 2021).

Because the experts are located all over the world, the interviews were conducted via Teams. This study performed one-on-one interviews to create a more comfortable setting for the interviewees. The particular reason for this is to facilitate open communication and help minimizing the likelihood of respondents providing socially desirable answers.

3.2 Interviewees

The interviews begin with the XR expert sharing a bit about themselves, including their age, background, and experience. These industry professionals are key players in the world of extended reality (XR), each offering a unique perspective and set of skills. Additionally, the respondents come from various roles, companies, locations and age groups. While this study tried to include female respondents, it was only male individuals who were willing to participate.

The following part provides a brief description of the interviewee's experience in the field of virtual and augmented reality (VR/AR). The full introduction given by the experts can be found in Appendices 2 – 13.

3.2.1 Kevin Alderweireldt

Kevin Alderweireldt is a pioneering figure in XR technology application, with a career spanning over 15 years in the field. Starting in 2013 with the first Oculus Developer's Kit, Kevin ventured into VR with a focus on real estate, leading to the successful founding and later sale of a company dedicated to real estate VR. Post-2017, he founded Yume and later Bureau Beatrice, transitioning to create experiential brand stories and advertising innovations. With extensive experience in both Europe and the Middle East, Kevin has shifted his expertise toward AR, driving forward projects that blend brand storytelling with

cutting-edge technology for top-tier clients like Aston Martin and Cartier. His work now primarily enhances brand engagement prior to sales, leveraging AR to create impactful customer experiences at global events.

3.2.2 Marijn Goossens

Marijn Goossens is a pioneer in the extended reality (XR) industry, with 7 years of experience blending film directing skills with immersive technologies. He started his career by creating the first Belgian virtual reality film as a graduation project, which propelled him into the spotlight and led to commercial opportunities. As co-founder of Soulmade, a company that started as a 360-video agency and evolved into a comprehensive XR agency, Marijn has been at the forefront of creating immersive media projects. His agency specializes in producing innovative XR solutions for business-to-business applications, including training, marketing, and experiential campaigns, often incorporating elements like augmented reality and holography to enhance customer engagement and education.

3.2.3 Chan Grant

Chan Grant is an accomplished Lead XR Developer with over a decade of experience in the virtual reality industry, including nearly six years at Futurus. He specializes in developing XR products that enhance customer engagement by bridging the gap between digital and physical realities. Chan's expertise extends from early VR development kits to the latest advancements in augmented reality, making him a key voice in leveraging immersive technologies to improve the customer journey.

3.2.4 Kevin Laibson

Kevin Laibson is the Experience Director at Agile Lens, blending his extensive background in theater and performance with cutting-edge XR technologies. With six years of specialized experience in XR, Kevin has transitioned from an artistic director and improvisation teacher at NYU to a pivotal role in virtual reality productions. At Agile Lens, he primarily focuses on theater and performance-based projects, leveraging his expertise to bridge the gap between artistic vision and technological execution. His role often

involves translating complex technical capabilities into accessible experiences for artists and clients, ensuring that each project not only meets artistic standards but also pushes the boundaries of immersive storytelling.

3.2.5 Matthew Marshall

Matthew Marshall, with twenty years at Procter & Gamble, has become a visionary at the intersection of digital commerce and the consumer experience. As the leader of P&G's digital commerce network, which he spearheaded from its nascent stage, Matthew has grown the team from forty to nearly a thousand members, reflecting the rapidly increasing importance of digital platforms in consumer interactions. His role centers on democratizing digital commerce, making complex digital marketing metrics and strategies accessible and understandable, thereby empowering a broad spectrum of the company's personnel. Passionate about educating and facilitating learning within his field, Matthew applies his deep understanding of consumer behavior, AI, and extended reality to enhance P&G's go-to-market strategies across regions and categories.

3.2.6 Susheel Nath

Susheel Nath is a dynamic expert in extended reality (XR) technologies, particularly focusing on their application in healthcare and children's physical health initiatives. With a background that includes a master's degree from Trinity College Dublin, where he specialized in AR and VR, Susheel has demonstrated a deep commitment to using XR to improve human life. His professional journey includes significant roles at a startup, where he partnered with major brands like Ferrero to use XR for enhancing healthcare, and later at FARI, where he managed and developed XR projects. Currently, at FARI, he manages the CAVE infrastructure and designs and supervises XR projects that use game engines like Unity and Unreal to create immersive educational experiences.

3.2.7 Overview Respondents

Table 2 provides an overview of all experts contributing to this research. Some general information, such as name, age, company and function of the respondents is provided.

Table 2: Overview Respondents

Name	Age	Location	Company	Function	XR Experience	Interview Duration
Alderweireldt, Kevin	39	United Arab Emirates	Bureau Béatrice	Co-Founder & CEO	15 years	0h 56m 50s
Goossens, Marijn	28	Belgium	Soulmade	Managing Partner	7 years	0h 38m 16s
Grant, Chan	29	United States	Futurus	Developer	10 years	1h 11m 47s
Laibson, Kevin	42	United States	Agile Lens	Experience Director	6 years	1h 3m 34s
Marshall, Matthew	42	United States	P&G	Director Global Sales & Innovation	3 years	1h 3m 24s
Nath, Susheel	28	Belgium	FARI	CAVE Manager / AR VR XR Specialist	7 years	1h 43m 23s

3.3 Questions

To streamline the interviews, a set of questions is prepared in advance. These topics and questions (Appendix 1) are shared with the interviewees beforehand, along with a note indicating that the questions are flexible, ensuring the interview is not closed.

This study tries to give an answer to the central research question: *“How can Virtual Reality and/or Augmented Reality influence the Customer Journey?”*. The central research question is divided into 2 main topics, along with additional sub-topics.

First, a good understanding of customer relationship management (CRM), specifically the customer journey (CJ) concept is crucial. The interviews start with a discussion about what the customer journey (CJ) actually is. The overall question regarding this topic is: *"What is the current understanding of the Customer Journey in today's digital environment?"* Additionally, some sub-questions are asked to go more in depth. Here, this study concentrates on the various stages of the CJ, the points of contact, and the professional experiences related to these.

Second, we delve deeper into the impact of VR and AR on the customer journey. The overall question here is: *"What are the most significant ways VR and AR can influence the Customer Journey?"* In this part of the interview, the goal is to discuss what role extended reality (XR) plays in the customer journey (CJ). Here, CJ phases that are most influenced by XR, potential transformations of specific touchpoints and the SWOT analysis are discussed.

3.4 Data Analysis

This study uses the data analysis explained by Cassell, C. and Bishop, V. (2018). According to the authors, template analysis is a valuable method for the systematic and flexible analysis of qualitative data. This approach involves creating a structured template to categorize and interpret the data effectively (Cassell & Bishop, 2018).

The process began with the development of an initial template (Appendix 1). Themes and categories were identified based on the SWOT-analysis (*supra chapter 2.3*), and responses from the interviewees were placed next to each corresponding question. This initial template served as the foundation for coding the transcripts, allowing for the emergence and refinement of additional thematic categories as more data was analyzed. This iterative process ensured that the template remained dynamic and responsive to the data, capturing the nuances and complexities of the interview responses (Cassell & Bishop, 2018).

4. Results

In this section of the paper, this study seeks insights from the XR expert regarding the SWOT components that were identified earlier (*supra chapter 2.3*). This analysis highlights areas of consensus and disagreement among the experts.

4.1 Understanding of the Customer journey

As we divided the central research question into two parts, a good understanding of the customer journey (CJ) is the first part we discussed with the six experts. The concept of the customer journey was well understood by some interviewees, while others needed further explanation to grasp the full scope of the phases involved.

Among the interviewees, Matthew Marshall from Procter & Gamble had a strong understanding of the customer journey (CJ). He articulated that the customer journey is not a linear path but rather a continuous and interconnected web of interactions. He identified the traditional phases of *Awareness, Consideration, Purchase, Retention, and Advocacy*.

Similarly, Kevin Laibson had a basic understanding of the concept. He acknowledged the traditional phases of the customer journey (CJ), but noted that his experience is primarily in the realm of user experience. Laibson mentioned that his work, especially in the context of virtual reality (VR) productions and performances, focuses significantly on the *Advocacy* phase. He described the challenges of creating awareness and engaging customers in a niche market such as VR theater.

In contrast, the other three XR experts needed an explanation of the customer journey (CJ) phases. Once explained, they acknowledged the importance of understanding and implementing these phases within their projects. Kevin Alderweireldt, for instance, who was initially unfamiliar with the structured framework, recognized the value of focusing on *Pre-Sale* activities to drive traffic and create brand awareness.

Overall, the interviews revealed varying levels of familiarity with the customer journey concept. Furthermore, after explaining these phases, the experts were able to categorize their company's focus into the most appropriate phase. A summary of this can be found in Table 3. It's crucial to recognize that each expert is engaged in specific phases of the customer journey, which shapes their unique perspectives on the impact of extended reality (XR).

Table 3: Interviewees' focus on Customer Journey Phase

Interviewee	Customer Journey Phase	Details
Alderweireldt, Kevin	Awareness and Consideration	Focuses on brand learning and launching new products, driving traffic towards sales.
Goossens, Marijn	Awareness, Consideration	Creates B2B solutions that enhance awareness and aid in consideration, using immersive and augmented reality.
Grant, Chan	Awareness, Consideration, Retention, Advocacy	Focus varies with the app and product, covering most phases.
Laibson, Kevin	Advocacy	Most of his marketing work is show and experience-based, aligning predominantly with the advocacy phase.
Marshall, Matthew	Awareness, Advocacy, Purchase	Involvement depends on the shopping experience and needs, with roles in creating awareness, enhancing purchase, and advocacy.
Nath, Susheel	Awareness & Consideration	FARI does not commercialize products directly but rather supports and educates on the technology itself.

4.2 Understanding of Touchpoints

In exploring how VR/AR influences the customer journey (CJ), understanding the role and perception of touchpoints is crucial. Touchpoints are any instances where a customer interacts with a brand, ranging from traditional advertising to immersive digital experiences (Shiratori et al., 2021). Insights from industry experts highlight how these touchpoints are evolving with XR technologies.

Marijn Goossens shared how XR technologies have transformed physical touchpoints, particularly in retail environments. For instance, by creating holographic campaigns, his company allows consumers to interact with products through holographic representations before engaging with salespeople.

Matthew Marshall highlighted how touchpoints in digital commerce have evolved, with search functionalities becoming essential. He stated that around 80% of sales come from search functionalities on platforms like Google and Amazon. Marshall believes that the shift from traditional advertising to digital search touchpoints is profound. He anticipates that XR will play a significant role in complex purchase cycles, where immersive experiences can provide detailed product insights. Furthermore, Kevin Laibson emphasized that while physical touchpoints will remain, it will be reserved for more premium, luxury experiences by saying: “...*shopping retail is probably going to be more and more a luxury experience and digitally using XR is going to become much more common*”.

Looking to the future, both Kevin Alderweireldt and Matthew Marshall see potential in XR technologies to transform touchpoints further. Kevin Alderweireldt envisions a more integrated approach where XR could enhance more physical touchpoints, provided the technology becomes more user-friendly and less intrusive. Similarly, Matthew Marshall anticipates that XR will play a larger role in categories with longer purchase cycles, offering detailed product interactions that traditional media cannot. Also, Kevin Laibson highlights the future ubiquity of XR in everyday interactions. “*I think every conceivable touchpoint in the physical world will have its sister version in mixed reality and they will be absolutely as effective*”. This prediction aligns with the vision of a world where XR is not just an add-on but an integrated part of how businesses and consumers interact.

4.3 Experts' SWOT Analysis

This section of the paper analyzes the insights from the six XR experts to conduct a new SWOT analysis. Through interviews, these experts provided valuable perspectives on the strengths, weaknesses, opportunities, and threats associated with the implementation and impact of VR/AR technologies in the context of the customer journey (CJ).

4.3.1. Strengths

4.3.1.1. Customer Engagement

Enhanced customer engagement through XR technology is recognized as a significant strength, with experts highlighting its immersive and interactive nature as the key to deepening customer involvement with products and brands.

For instance, Marijn Goossens believes that XR's interactive nature helps consumers connect more deeply with brands than traditional media. Marijn mentions: *"It's true that holographic technologies push towards engagement, because you have this headset on. It's a first-person point of view, you are there, you are asked to do something and that does bring you closer towards the product and the brands"*. Kevin Alderweireldt has a similar point of view, but he emphasizes that current XR technology is limited to visual and auditory experiences. He suggests adding scents and touches to make XR even more engaging for customers.

Furthermore, Chan Grant shares insights from his work with AR and VR applications designed to encourage specific behaviors, such as children's dental hygiene. The engaging nature of these XR applications successfully captivated users, driving higher engagement and consistent usage. Grant believes that the interactivity provided by AR and VR can transform customer experiences, stating: *"... But what I think that AR and VR is going to be effective at is, ..., is adding a hint of interactivity something to touch, something to move with something to interact. It's that little extra step that will get people engaged"*.

Additionally, Susheel Nath and Kevin Laibson agree that VR/AR can improve customer engagement, but they immediately connect this to increased sales (*infra chapter 4.3.1.3*)

However, Matthew Marshall notes: *"Extended reality is going to have to get to that level where it becomes so easy that there are no barriers for usage"*. Meaning that for XR to truly enhance customer engagement, the technology must first become as seamless and

intuitive as current QR code interactions. He argues that the additional steps currently required pose a barrier to widespread adoption, and reducing these barriers is crucial for XR to drive significant behavioral change among consumers.

4.3.1.2. Personalization

On the positive side, XR technologies can revolutionize how consumers interact with the world, providing detailed, personalized information. Chan Grant envisions a future where headsets are ubiquitous and provide personalized recommendations, such as suggesting nearby services based on physical conditions or preferences. This level of personalization, driven by extensive use of user data, can create highly personalized experiences.

Matthew Marshall identifies personalization as the most significant trend, calling it “*the biggest trend I see across the globe in digital commerce or physical retail*”. He envisions a future where XR eliminates irrelevant products and ads, tailoring the shopping experience to individual preferences based on user data. “*That’s the standard that we need to get to. It needs to feel like a magic experience that you know me better than I know myself. And you make shopping so easy that I don’t even have to think about it. And I 100% think that’s where extended reality plays a role, because it can be 100% personalized.*”. The expert emphasizes repeatedly that VR and AR will be able to create personalized experiences.

However, there are also some challenges and limitations to consider according to certain experts. Kevin Alderweireldt points out that while AR allows for virtual try-ons, its effectiveness varies by product category. For instance, early attempts with cars did not significantly succeed, suggesting that the impact of personalization in XR depends on the context and the product. However, he doesn’t seem to believe personalization will add more value to customers: “*And even with AI integration on it, I don’t see a massive, big added scene elements with personalization to it, to be really honest.*”

Marijn Goossens discusses the potential for XR to customize content mentioning: “*There is a lot of opportunity..., but the problem is that there is still a long way to decent implementation also because there are some technical limitations of challenges*”. While

there are promising projects, Marijn notes that technical complexities still limit the widespread implementation of these technologies. Mainly linking the personalization concept to the technical challenges, even concluding with *“how are you even going to do that”*.

For Susheel Nath, personalization is highly possible with VR/AR. He explains that data gathered through XR technologies helps build personalized recommender systems, improving user convenience and satisfaction. However, he refers to another barrier, specifically the sensitivity around data collection, which could be a difficult challenge for companies to overcome.

4.3.1.3. Data Collection

Chan Grant discussed that VR environments offer an extensive range of data points that can significantly enhance the understanding of customer behavior. Chan discusses how VR headsets enable detailed tracking of user focus, movement, and interaction within virtual spaces. This includes monitoring where users look, how long they focus on specific areas, their hand movements, and their physical actions, such as sitting or crouching. Such detailed data allows for the creation of heat maps that highlight areas of interest and engagement, helping companies understand what captures user attention and how they navigate virtual environments. Next, AR provides unique insights due to its interactive nature, which goes further in capturing user interactions than traditional mobile data collection. As Grant points out, AR data collection focuses on screen interactions, button clicks, and device movements, offering a richer dataset than traditional apps.

Marijn Goossens and Susheel Nath continue to investigate how anonymous data from XR technologies can be used to improve products and services. Nath mentions that this data helps to configure and personalize user experiences, ensuring convenience and satisfaction. Additionally, Goossens highlights that companies shouldn't use the data collected by XR technologies to target specific individuals, however he highlights *“Personally, I don't think that brands should focus on capturing specific targeted data with*

their XR experiences, unless it's maybe for training or so, but they can use anonymous abstractions of that data to just improve their products and services“.

Moreover, Matthew Marshall discusses how well-utilized data can transform the customer journey (CJ) by making interactions feel personalized and valuable. He compares effective data utilization to the personalized recommendations provided by services such as Spotify, which enhance the user experience by suggesting relevant content. In the context of XR, this implies that companies can use collected data to personalize experiences based on individual preferences, thereby enhancing the engagement and enjoyment of the customer journey. However, Matthew highlights the fact that data will be linked to some trust barriers *“So it's how do you strike that balance between being a value ad and not being creepy, right? And so that's where I think extended reality is going to have to walk that fine line. Like add value in a way that still, it feels wrong to say, but it's the truth. Even if I don't have control, makes me feel like I have control as a consumer right.”*. Immediately linking data collection to privacy concerns (*infra chapter 4.3.4.3*).

Furthermore, Kevin Alderweireldt emphasizes the importance of user engagement in effective data collection. He notes that persuading users to share their data, such as through rewards or exclusive experiences, significantly increases the quality of collected data, saying *“... the data you're getting is way more valuable and way cleaner and proper than any other data”*. In his examples, campaigns that offered tangible rewards for data submission saw much higher engagement rates and more valuable data compared to those that did not. This approach highlights that while data collection is vast, its success depends on how well companies can motivate users to participate. Next to collecting data, Kevin Alderweireldt highlights the usability of it: *“And again, data, everybody's talking about data, data, data, but what are you going to do with the data?”*. He points out that the data collected by XR is not that beneficial if it's for the sole purpose of collecting data. Companies should have a plan on what they want to achieve with it, mentioning: *“... I have a very skeptical opinion about data, because it's like, all right, it's a new gold, it's a new gold, but I don't see that to be honest. Like, I really don't see it as a new gold, as long as you're not doing anything properly with it, with your data, it's nothing”*.

4.3.1.4. Conversion Rates

When talking about the capability of XR to increase purchase and decision making, Chan Grant states: *“I think that there's going to be a small boost in it”*. He suggests that the interactivity and immersive nature of XR can engage users more effectively than traditional advertising methods. Grant believes that XR's ability to provide a tactile and engaging experience will captivate users, increasing their interest in products and services. He compares the evolution of XR to past shifts in advertising effectiveness, where once impactful methods like billboards and banner ads have become less effective over time.

Marijn Goossens agrees and provides a practical example from his work with Telenet, where holographic campaigns in retail stores significantly increased customer engagement and attention. The success of these campaigns, sustained over three years, underscores XR's potential to drive sales.

Another personal experience, now shared by Susheel Nath, with the Apple Vision Pro illustrates the impact of hands-on trials in creating engaging experiences. Such immersive demonstrations significantly boost customer interest and involvement, leading to increased purchases. This resonates with the observations of Kevin Laibson, who points out that our brains process XR experiences similarly to real-life memories, making XR a powerful tool for influencing purchasing decisions. The success of simple XR implementations, like Amazon's furniture fitting feature, further underscores how even basic XR can enhance the shopping experience and drive consumer behavior.

However, not all experts are uniformly optimistic. Kevin Alderweireldt points out that the novelty of VR experiences has worn off by mentioning *“So there's no massive added value, let's say, anymore. On the sense that it will bring in way more business. Doesn't happen anymore”*. Suggesting that while XR may increase brand initial awareness, *“I think it doesn't increase sales in that sense. I think it increases brand awareness, especially in the beginning”*., its ability to drive significant business growth may diminish over time.

Similarly, Matthew Marshall mentions: *“I think the barrier is getting them to use it. Like the barrier is adoption. I think there's a lot of power if you can get consumers to want to use the extended reality, right?”*, emphasizing the challenge of consumer adoption. He believes that while XR has great potential to increase purchases, the key is getting consumers to try and embrace these technologies. Once they do, the immersive and engaging experiences could become indispensable or in other words by Matthew: *“... once you try it, you can't live without it”*.

4.3.2. Weaknesses

4.3.2.1. High Costs

Chan Grant points out that the initial costs for XR technology are steep *“this headset was when we originally bought it about \$300. I think \$300, \$400. For an average person, that's a lot of money for something that they generally don't use very much”*. The expense of acquiring a VR headset, is prohibitive for many potential users, especially when considering the limited audience currently engaged with VR. Susheel Nath emphasizes that major players like Apple, Microsoft, and Meta drive consideration through continuous innovation. Susheel makes a connection to the crucial role of affordability in moving customers from consideration to purchase.

For XR devices to gain widespread adoption, Kevin Alderweireldt emphasizes that their prices must match those of popular consumer electronics such as PlayStations: *“Even though we have cell phone that now costs 1,500 euros, but if they want to have an entertainment thing extra than their cell phone, anything is a PlayStation point”*. The expert highlights a step in the right direction mentioning the Oculus Quest 2, priced around \$300, *“That's a good price point, right? But anything above that, it's getting too expensive”*. Kevin Laibson supports this skeptical view suggesting that the XR market is not yet mature enough to be viable for most consumers.

Matthew Marshall and Susheel Nath discuss the economic challenges faced by brands in creating XR content. Marshall notes that the current low adoption rates make it

economically unfeasible to invest heavily in XR content. Matthew makes an analogy with early Blu-ray players, which were prohibitively expensive until market penetration reached a critical mass. He says “.... *ridiculously expensive because penetration was so low. And once you reach critical mass, then it becomes cheaper. You've got scale economies, things just flow better. Content creation for extended reality is there today*”. Brands hesitate to spend significant amounts on XR content when it will only reach a small audience, leading to an unsustainable cost per user interaction. Nath adds that the novelty of XR allows companies to overcharge for their products, further limiting widespread adoption. For instance, the Apple Vision Pro is priced at \$3,500, which, despite its advanced features, is not accessible to the general consumer. Additionally, Susheel Nath mentions that VR and AR is just too niche right now, which increases prices, “*But then again, pricing of a product also is based on the amount of awareness and consideration that the people have on that*”. He believes that when people learn more about all of these technologies' possibilities, prices will drop.

4.3.2.2. Technological Limitations

First, Susheel Nath talks about significant advancement in software developments, but mentions the limitations of current hardware in keeping up with these ‘... *the hardware tries its best to catch up...*’ This inconsistency complicates the development and deployment of XR applications as developers must account for a wide range of device capabilities and limitations. Nath also highlights the challenge of battery life and the physical discomfort of XR devices, which can limit prolonged use and detract from the user experience. Chan Grant highlights the difference between AR and VR mediums. He mentions that AR devices such as phones have multiple uses, while this is not possible with VR. “*Headsets are very singular.....Only one person can wear a headset at a time, at least even with your cell phone, if you want to show your friend a video, you can kind of like, you know, hold it in front of them and you both can look at it, you can't do that with a VR headset. So that experience is very singular.*”

Kevin Alderweireldt and Kevin Laibson touch on the social and psychological barriers, emphasizing that many users still prefer real-life interactions over virtual experiences.

Alderweireldt mentions skepticism about the necessity of VR headsets for everyday use, as many people, are unlikely to adopt such technology. He highlights the fact that VR and AR are not yet at the point where virtual connections feel personal. Adding that he doesn't believe this will ever be the case. Laibson adds to this vision that XR's lower fidelity and overall experience compared to real-life interactions currently diminish its perceived value. The technology must improve significantly before it can match the convenience and quality of real-world experiences.

Marijn Goossens and Matthew Marshall point out the logistical and practical challenges associated with XR technology. Goossens explains that XR requires specific hardware, *"... XR technology is always specific hardware related. So, with regular devices, you cannot, you can barely use it"*, which involves complex setup processes, ensuring sufficient battery life, and connecting to fast networks to provide a seamless experience. This technical complexity can be a significant deterrent for users. Marshall suggests that a major technological leap by a significant player is necessary for XR to become more universal: *"... meaning it's going to have to take some major player to take significant steps in this direction to make it more universal"*. To make this statement more practical, Matthew Marshall provided a possible future use case for Netflix, mentioning: *"Like if Netflix came out with a wearable where, hey, you can watch your favorite content all the time, something like that would be big enough and have enough of a population size to really get things going. I'd be like, hey, you can, we'll send you this wearable as part of your monthly subscription, it's going to be ad-based initially and then you can start to get into some of the AR, VR, that could be huge"*.

4.3.2.3. Physical Discomfort

When talking about physical discomfort, Kevin Laibson mentions *"I think they will get better"*, believing that while hardware improvements will continue to make XR more comfortable, some level of discomfort may remain, especially for prolonged use. He notes that personal adaptation plays a crucial role. Many users, including himself, have gradually become accustomed to VR and experience less discomfort over time.

Moreover, Marijn Goossens and Matthew Marshall both emphasize the rapid improvements in hardware quality, such as higher resolution and better refresh rates, which have significantly reduced motion sickness. Goossens notes that as technology evolves, the discomfort will diminish further, particularly as software and hardware continue to be optimized for user comfort. *“So, I would say that this is something that will get better along the years, anyhow, really good”* – Marijn Goossens. Matthew Marshall adds that like any new technology, there is an initial adjustment period, but as users become more accustomed to XR, the physical discomfort will likely decrease. Matthew provided an example where many years ago, even television was new, now kids grow up with games like Minecraft and Roblox, immediately learning to be comfortable around new technologies. Additionally, Matthew Marshall makes a small hint linking comfort to the increasing competition by saying: *“Competition will play the role of whoever creates the most seamless, comfortable experience is going to win. That's when you're going to see innovation drive”*.

Although Chan Grant agrees that we can significantly reduce these issues, he believes they are unlikely to completely disappear. He states: *“It's always going to be there, but it's going to be mitigated as time goes along here”*. Chan points to various strategies developers and hardware manufacturers employ, such as improving frame rates, resolution, and ergonomic design. For example, fading the screen to black during movement transitions and creating more comfortable headsets with adjustable lenses and lighter designs are some measures taken to enhance user comfort.

Kevin Alderweireldt agrees with the statement of Chan Grant, comparing the physical discomfort in XR to car or plane sickness: *“People still get car sick as well, right? People still get sick in a plane, people travel by the train, and they get sick or they hurt themselves on the door. Will that change?”*. He stresses that advancements have already made significant improvements since the early days of VR, where heavy, low-resolution headsets were the norm. Additionally, Susheel Nath underscores the subjective nature of physical discomfort in XR, noting that individual sensitivity varies greatly. He explains that software techniques such as transition effects can help alleviate motion sickness. However, he

acknowledges that while discomfort can be managed and reduced through technological tweaks, it cannot be entirely eliminated. Concluding his answer with the statement: “So there are many tricks that can be done. Can it be avoided? No. Can it be altered? Yes”.

4.3.2.4. User Acceptance

The perceived value of VR/AR also influences user acceptance. Kevin Laibson discusses the difficulties in selling VR experiences, particularly highlighting the challenge of convincing consumers unfamiliar with VR to invest in the technology. He mentions: *"Potential customers often struggle to understand the value proposition of VR because it is so different from traditional screens and requires an experiential understanding"*.

Despite advancements in XR, awareness remains limited to niche enthusiasts. Susheel Nath notes, *"... even though there was awareness out there, but not to an extent where people want to integrate that into their normal lives"*. Early adopters explore XR's capabilities, but widespread acceptance is still on the horizon. In addition, Chan Grant mentions that many potential users exhibit a natural resistance to XR technologies due to unfamiliarity or past negative experiences.

Matthew Marshall says: *"I think the barrier is getting them to use it. Like the barrier is adoption. I think there's a lot of power if you can get consumers to want to use the extended reality, right?"*. This highlights the importance of creating intuitive, seamless experiences that can be easily adopted.

Kevin Laibson emphasizes that many consumers do not see a clear, compelling reason to switch from traditional media to VR/AR experiences. *"Without a clear, compelling reason to switch from traditional media, many consumers remain skeptical about the value of VR/AR"*. According to Kevin, this skepticism is particularly strong among older demographics who may be less inclined to adopt new technologies.

4.3.3. Opportunities

4.3.3.1. User Experience

Kevin Alderweireldt notes: *“It has a massive enhancement on user experience”*. Giving an example of working with a yacht builder in Holland, to provide their clients, who live far from the wharf. VR headsets and 360 cameras allows them to virtually walk into their custom-made yachts and monitor the build progress in real-time. They can jump between different views and see the ship whenever they wanted via a 24-hour live stream. This project showcased the incredible use of VR technology to enhance the user experience.

Marijn Goossens mentions that virtual simulations allow consumers to engage with products, such as seeing a virtual pool in their backyard, which creates a deeper connection and likelihood of purchase. However, Marijn argues that not every product or company will benefit from VR/AR: *“I do see it in things where there is a real use case, like for example, as I said, or new designs that you're going to implement or products you will purchase where you can already have a better understanding of how they will be in your life”*.

VR and AR are also transforming customer service and marketing by enabling real-time, interactive experiences. Matthew Marshall explains that traditional marketing often feels like a monologue, whereas XR allows for dynamic conversations between brands and consumers. He mentions: *“Extended reality gives you that ability to, A, have a real-life virtual assistant, somebody that you can pay commiserate with their expertise, their ability to help, and B, it opens the door for AI”*. Already providing a link to XR's integration with other technologies.

Educational and institutional support can accelerate user experience. Nath suggests incorporating XR into educational curricula to normalize the technology at a young age. He envisions students using VR glasses for class activities, stating, *“necessary institutes like governments and educational institutes need to bring up at least from an experimental standpoint that hey class we're going to do a VR session next week”*

4.3.3.2. Immersive Collaboration

Chan Grant emphasizes that AR applications like Ikea Place allow users to visualize products in their own spaces, offering a clear understanding of how items will fit and function. This level of immersive planning extends to industrial applications as well, where AR is used for logistical planning on construction sites, as illustrated by JLG's use of AR to manage site logistics, saving time and resources.

According to the experts, the educational sector stands to benefit immensely from XR technologies. According to Kevin Alderweireldt, VR can transform learning by immersing students in historical settings or complex concepts, offering a deeper understanding than traditional methods *“When you talk about Romans and then you put a VR headset on and you're suddenly in a Roman empire following the daily life, which gives a way better, deeper impression to you than just reading it in a book or looking at some slides on it”* – Kevin Alderweireldt. Kevin Laibson reinforces this by *noting “... it's just an incredible opportunity for education”*, giving examples of productivity gains in training applications, which are now being adapted for educational purposes.

Susheel Nath opens this discussion by highlighting *“XR experiences of immersion is prime. Immersion is at the top”*, adding that VR's 360-degree immersive experiences can captivate users both logically and emotionally, creating a powerful "wow" effect: *“I suppose complete immersion of users into that environment plays a big effect, because again, you're going for the wow effect, and wow effect can only be done if people are completely immersed both logically as well as emotionally into that environment”*.

Examples such as VR-enabled chemistry classes, where students and professors collaborate in a virtual lab, demonstrate the potential for immersive collaboration in practical applications. Despite these advancements, the widespread adoption of VR headsets among general consumers remains a challenge, as noted by Marijn Goossens: *“... I don't see that coming in the near future, to be honest”*. Until these technologies become more commonplace, their use in regular consumer interactions will be limited.

4.3.3.3. Integration with other Technologies

AI's ability to personalize VR and AR content is a recurring theme in the experts' interviews. Chan Grant highlights how AI can adjust virtual elements to suit user preferences, enhancing comfort and appeal. This includes optimizing content placement to match the user's physical movements, making interactions more intuitive. Similarly, Matthew Marshall mentions: "... I think a lot of what we've talked about around the personalization component is where AI plays the role, right? That AI becomes the backbone of content creation", emphasizing AI's role in personalizing customer experiences through for example personalized pricing and targeted promotions, adapting to individual behaviors and contexts.

Kevin Alderweireldt illustrates AR's practical applications, particularly in retail. When talking about the integration of other technologies the expert mentions "... I personally don't see a massive gain on that one". Nevertheless, he describes a successful campaign for Tiffany & Co that guided customers to a pop-up store during renovations, demonstrating the combination of AI and AR's ability to attract and engage customers. However, Kevin views AR and AI as supplementary tools in a highly competitive market, where multiple factors contribute to driving sales.

Kevin Laibson shares a broader vision of spatial computing, predicting that mixed reality will become the primary method of computing, seamlessly integrating with other technologies. He envisions a future where comfortable headsets replace smartphones, offering a more immersive and integrated user experience. However, Laibson ends his talk with "But I don't know how it's going to integrate with XR in any like particular ways other than I just think that it will be basically persistent everywhere".

Marijn Goossens highlights how AR can visualize real-time data from IoT devices, such as factory sensors or city infrastructure, directly in the user's field of view. This integration can enhance situational awareness and decision-making in various environments. Additionally, AI's capabilities in object detection and environment understanding can significantly improve the interactivity and realism of AR experiences. "So, we really see that the AI tools

that come up at a high speed now really help us improve our XR experiences” – Marijn Goossens. Additionally, Susheel Nath provides specific explains how AI and computer vision enhance XR interactions, such as hand tracking and voice commands in devices like the Apple Vision Pro. These technologies can improve user comfort and interaction quality, making XR experiences more accessible and enjoyable.

4.3.4. Threats

4.3.4.1. Rapid Technological Change

Despite the rapid advancements, the application of XR technology varies greatly with the consensus of the experts that VR and AR will have its benefits in certain use cases. Kevin Alderweireldt mentions: *“I see it as a something that will stay, but it will find it will find its place in a certain field”*, being confident that XR is not a mere trend but will become integral in specific fields where it provides substantial value. Both Kevin Alderweireldt and Matthew Marshall highlight the importance of aligning XR with specific business needs rather than adopting it for its novelty. Alderweireldt mentions successful use cases in training and logistics, such as AR glasses at Volvo and DHL, which demonstrate clear practical benefits. However, Kevin Alderweireldt repeated *“But it's probably on various very specific cases: I think before sale, what we do, VR has not an added value on that one. It's not a massive added value. During sale, I still don't believe that we will start buying products in VR. I don't believe in that”*.

Marijn Goossens and Susheel Nath discuss how certain XR applications may become enduring standards while others may quickly become outdated. Nath draws a parallel with past technological trends like blockchain, which, despite initial hype, found stable niche applications. Susheel mentions: *“So I suppose, the trend defines the domain, the popularity of the domain and obviously the marketability of that. The trendier it is, the more involved you are in that trend at the current period, the more money you can make with that, the more products you can sell, the more retention there is. But as soon as the trend dies, then it dies, right?”*. This suggests that companies must remain flexible and responsive to shifts in technological trends and market demands to sustain the relevance of XR.

Moreover, the experts agree that the success of XR technology lies in its ability to integrate seamlessly into existing business processes and customer experiences. Laibson mentions: *“I have no idea obviously like what the technology field might look like in five years. But I can confidently say that the people that are working in this field right now are thinking about it hard....”*, envisioning a future with streamlined, user-friendly XR tools, enabling creators to implement innovative ideas more easily.

4.3.4.2. Market Competition

A common theme among the experts is the critical need for continuous innovation and adaptation in advertising and user engagement strategies. Chan Grant points out that traditional methods of advertising are no longer effective in capturing the attention of modern consumers with shorter attention spans. He emphasizes the need for new techniques personalized to the immersive nature of XR, suggesting that the future will see more sophisticated and integrated advertising within these platforms. Kevin Laibson echoes this sentiment, stressing the importance of refining software pipelines and eliminating inefficiencies to enable developers and artists to implement new ideas seamlessly.

Marijn Goossens notes that while the initial hype around XR can capture attention temporarily, its long-term success depends on meaningful and practical applications. *“So, it's for sure not applicable in everything, but there are very specific use cases where XR or a certain component of XR works very well in a certain kind of business”*. He foresees certain use cases, like virtual real estate tours, becoming standard practices as the technology matures and demonstrates clear benefits.

Matthew Marshall underscores the need for companies to work together to develop industry standards and best practices. He argues that isolated efforts are insufficient, and a collective approach is necessary to leverage XR's full potential and ensure its effective use across various sectors. Additionally, he suggests that XR should address specific points of friction in the customer journey, only by doing that, will companies be able to keep

up with the increasing market competition and stay relevant. *“We like to say, I think it’s a good word, the points of friction on the consumer journey. So, as you think about awareness through to consideration, through to purchase, what are the parts of the journey where there’s friction for the shopper? And how can technology ease or eliminate that friction? That’s where the magic happens. So, you really see, if they know that spot, there is an opportunity to stay competitive let’s say and stay relevant”*.

4.3.4.3. Privacy Concerns

Chan Grant and Matthew Marshall both emphasize the importance of transparency and consumer control over their data. Grant suggests that companies build trust by being upfront about their data usage and allowing customers to control or delete their data, thus ensuring robust cybersecurity measures. Marshall agrees, noting that consumer trust in a brand is essential and can be maintained through positive, value-added interactions rather than intrusive marketing. Matthew mentions: *“The second I start to feel like you’re using it solely for your benefit as a brand, that’s when I’ve lost trust. And that’s when trust has been broken. And I think once a brand breaks a consumer’s trust, it’s gone”*, stressing that misuse of data can irreparably damage this trust.

On a regional level, Kevin Alderweireldt highlights the differences in privacy perspectives, noting that European regulations like GDPR impose strict standards, whereas Asia and the Middle East have more lenient data practices. This regional variance has a different impact on consumer trust, with Europeans being more cautious about data sharing. Alderweireldt questions the effectiveness of these regulations, suggesting that despite strict laws, many people still share their data freely.

From a societal and psychological standpoint, Marijn Goossens and Susheel Nath discuss how attitudes toward privacy evolve over time. Goossens notes that younger generations are more accepting of data sharing if it offers tangible advantages, whereas Nath emphasizes the need for individuals to evaluate the real impact of their shared data. Both suggest that if VR/AR technology provides clear benefits, consumers might be more willing

to accept privacy trade-offs. Kevin Laibson offers a pragmatic view, acknowledging his personal acceptance of reduced privacy for the convenience of data-driven services.

4.3.4.4. Global Threats

Only Kevin Alderweireldt mentioned a new threat around virtual and augmented reality (VR/AR). Kevin highlights the extensive use of AR in events for brands like Aston Martin and Tiffany & Co., noting its effectiveness in driving traffic and sales during these activations. However, he also points out that while AR remains popular, interest in VR has decreased since the COVID-19 pandemic due to resistance to use headsets and the lack of compelling new VR experiences. *"AR is still very successful but VR, since COVID, like really dropped down massively. People don't want to put headsets on. They don't want to use something that completely kills the other sphere of it".*

4.3.5. Experts' SWOT Overview

Table 4 presents the revised SWOT analysis, which incorporates the insights of the six XR experts. This updated analysis identifies a new weakness "User Acceptance" and a new threat labeled "Global Threats".

Table 4: Revised SWOT Analysis

Strengths	Weaknesses
Customer Engagement Personalization Data Collection Conversion Rates	High Costs Technological Limitations Physical Discomfort User Acceptance
Opportunities	Threats
User Experience Immersive Collaboration Integration with other Technologies	Rapid Technological Change Market Competition Privacy Concerns Global Threats

5. Experts' & Literature Insights

This chapter explores each phase of the customer journey (*Awareness, Consideration, Purchase, Retention and Advocacy*) (Durán et al., 2021), combining the theoretical insights with the practical insights from industry experts. By examining the contributions and implications of VR and AR at each stage, this study aims to provide a comprehensive understanding of how these technologies are influencing the customer journey (CJ).

5.1. Awareness

In the *Awareness* phase, VR/AR technologies influence how brands capture potential customers' attention and boost engagement (Farah et al., 2019). Immersive content like 360-degree videos and augmented reality applications can create captivating and memorable experiences that grab attention more effectively than traditional media (Orús et al., 2021). For instance, augmented reality (AR) is able to transform static advertisements into interactive stories, allowing customers to engage with the brand in a way that feels personal and exciting (Saccoccio, 2021). Experts agree that this immersive and interactive nature significantly boosts initial engagement. Kevin Laibson gave an example of Burberry where due to VR/AR experience potential customers can see what the clothes look like on themselves. Kevin Alderweireldt mentioned that XR technologies have a significant impact on *Pre-Purchase* scenarios. "*Pre-purchase is the strongest...we really invest a lot of money now before you purchased it already in the place and in use case where you will use it really is an extreme value*".

5.2. Consideration

As potential customers move into the *Consideration* phase, VR and AR technologies continue to play a crucial role (Ameen et al., 2022). Kevin Laibson believes that the *Consideration* phase will benefit the most from XR integration. "*The Consideration moment is key*". These technologies enable customers to visualize and interact with products in detailed and realistic ways (Hilmersson & Lindström, 2023), bridging the gap

between online research and physical inspection (Pitt, 2019). Expert Chan Grant gave the example of Ikea Place, an AR application allowing users to see how furniture would look like in their own homes, providing a practical and engaging way to consider a purchase (Inter IKEA, 2017). Personalization is another significant benefit, as VR/AR can personalize experiences to individual preferences based on detailed data collection from user interactions (Schweidel, et al., 2022). This level of customization helps customers make informed decisions more confidently (Simoni et al., 2022). The experts highlight that XR's ability to provide such immersive and personalized recommendations enhances the decision-making process, making it easier for customers to evaluate their options and choose the best product or service.

5.3. Purchase

Susheel Nath highlights: “*consideration and purchase go hand in hand*”. In the *Purchase* phase, VR and AR technologies can transform the buying experience by making it more engaging and seamless (Hilmersson & Lindström, 2023). The immersive nature of these technologies helps reduce hesitation and cart abandonment, two common issues that disrupt the purchasing process (Delinikolas et al., 2022). According to Kevin Laibson, offering an interactive and visually rich environment, customers feel more assured about their choices. Experts note that while the initial challenge lies in getting consumers to adopt XR technologies, once they do, the potential for increased purchases is significant. “*You need an environment where the consumer's willing to invest the time*” – Matthew Marshall.

Matthew Marshall gave an excellent example of the potential the personalize shopping experience: “*Driving personalization to eliminate everything I don't care about...today, when you're walking through a physical store, by default, you see everything that's there. Online, there's no excuse that I should be served up products or ads that aren't relevant to me...*”. He emphasized that using XR technology to filter out irrelevant information and present only the most pertinent products to the consumer could significantly enhance the shopping experience and drive more effective purchasing decisions.

5.4. Retention

Retention is all about building long-term relationships with customers (IoDigital, sd), and VR/AR can significantly enhance this phase by providing continuous and personalized engagement (Yazici et al., 2024). The experts emphasize that positive, memorable post-purchase experiences facilitated by XR can keep customers engaged and more likely to stay loyal to the brand. Post-purchase, XR technologies can offer ongoing support and interactive customer service, which helps maintain satisfaction and loyalty (Yazici et al., 2024). An example given by Matthew Marshall, virtual reality (VR) can be used for immersive tutorials or troubleshooting sessions, ensuring customers feel supported and valued. However, Susheel Nath further explains "*While awareness and consideration are being addressed, retention and advocacy remain underdeveloped due to the early stage of VR/AR technologies*".

5.5. Advocacy

Finally, in the *Advocacy* phase, VR/AR technologies can turn satisfied customers into passionate brand advocates (Bialkova & Bigné, 2019). Susheel Nath observes that while retention may be challenging for standalone products, advocacy often follows naturally. When talking about the implementation of VR and AR into the phases of the customer journey (CJ), he states: "*Retention and advocacy obviously are still in baby steps right now. But again, once you purchase, retention may or may not happen... but advocacy definitely happens*". Positive customer experiences that are immersive and memorable are more likely to be shared with others, leveraging the power of word-of-mouth marketing (Hayes, 2022; Hamilton, 2024). Kevin Laibson also discussed the importance of advocacy in the customer journey (CJ). In his niche field of theatrical virtual performance, creating awareness and community post-show are crucial touchpoints. He pointed out the difficulty of selling VR experiences due to the need for potential customers to first understand the medium, which is still relatively novel to many.

6. Discussion

This study combined literature with a qualitative approach of interviewing six XR experts to gather detailed insights on the influence of VR/AR on the customer journey (CJ). However, the small sample size is a notable limitation. Moreover, the lack of diversity among participants, all of whom were male, may have influenced the findings. The study's geographical focus is another limitation. It centers on experts and applications within Belgium, the United States, and the United Arab Emirates, which may not fully represent global perspectives on XR technology. Based on these limitations, the study's ability to generalize its findings is limited.

Both literature and the insights of XR experts agree that virtual reality (VR) and augmented reality (AR) are able to significantly influence the whole customer journey (CJ). This aligns with the findings of Wieland et al. (2024), which highlights how integrating VR and AR into the CJ can enhance customer experiences at various stages, from initial engagement to post-purchase support (Wieland et al., 2024).

This research adds to the current knowledge about how VR/AR affects the customer journey. Unlike earlier studies, it includes extended reality (XR) experts' insights to look at the impact on each phase of the customer journey (CJ).

An important note is that this study provides a snapshot of the current state and potential of XR technologies but does not validate their long-term effects on customer journeys (CJs). Longitudinal studies are needed to assess how XR influences evolve over time and how businesses and consumers adjust to these changes.

7. Conclusion

The central research question of this study is, "How can Virtual Reality (VR) and Augmented Reality (AR) influence the customer journey?" This research tried to bridge theoretical insights from literature with practical perspectives from XR experts to determine how VR and AR technologies impact the customer journey.

The findings indicate that VR and AR can significantly enhance various stages of the customer journey. During the *Awareness* and *Consideration* phases, these technologies captivate potential customers through immersive experiences and detailed product visualizations. In the *Purchase* phase, they facilitate confident decision-making by providing interactive and engaging buying experiences. *Post-Purchase*, VR and AR can enhance customer satisfaction and loyalty through personalized support and immersive brand interactions.

However, challenges such as high costs, physical discomfort, technological limitations, and privacy concerns hinder widespread adoption. Addressing these issues is crucial for broader acceptance and effective implementation of XR technologies.

In conclusion, VR and AR have the potential to transform the entire customer journey, offering significant benefits across all stages. Businesses must overcome practical challenges to fully leverage these technologies, enhancing customer experiences and achieving better outcome.

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9. Appendix

9.1. Interview Templates

- 9.1.1. Appendix 1: Interview Template Structure
- 9.1.2. Appendix 2: Kevin Alderweireldt (Template)
- 9.1.3. Appendix 3: Marijn Goossens (Template)
- 9.1.4. Appendix 4: Chan Grant (Template)
- 9.1.5. Appendix 5: Kevin Laibson (Template)
- 9.1.6. Appendix 6: Matthew Marshall (Template)
- 9.1.7. Appendix 7: Susheel Nath (Template)

9.2. Full Interview Transcripts

- 9.2.1. Appendix 8: Kevin Alderweireldt (Transcript)
- 9.2.2. Appendix 9: Marijn Goossens (Transcript)
- 9.2.3. Appendix 10: Chan Grant (Transcript)
- 9.2.4. Appendix 11: Kevin Laibson (Transcript)
- 9.2.5. Appendix 12: Matthew Marshall (Transcript)
- 9.2.6. Appendix 13: Susheel Nath (Transcript)