Virtual Consumer Experiences – The Future of Shopping in the Metaverse

METAVERSE › VIRTUAL COMMERCE › VIRTUAL SHOPPING › MIXED REALITY ›
EXTENDED REALITY › AUGMENTED REALITY › VIRTUAL REALITY ›
VIRTUAL PRODUCTS

FROM ACADEMIC RESEARCH TO PRACTICAL USE

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NIM Marketing Intelligence Review

The Journal of the Nuremberg Institute for Market Decisions

The NIM Marketing Intelligence Review is directed at managers and all decision-makers who are interested in new research findings, ⟩ current marketing topics and emerging marketing trends.

The journal is published twice a year and is designed as a themed issue. Each issue features a current topic in marketing and market decision-making. The articles present ⟩ academic research and findings that are translated for practical use. They provide marketing knowledge and impulses from top international experts for the marketing business – also with the aim of improving market decisions.

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Editorial

Virtually exploring new worlds, traveling through space and time, flying and diving in the deep ocean – whatever you can imagine, what was once considered science fiction is now becoming a reality. The ''metaverse'' is generating a lot of excitement, and augmented reality (AR) and virtual reality (VR) technologies are hot topics as they provide access to a reimagined version of the Internet. Although the development of virtual experience technologies has been in progress for several decades, in recent years, there has been a surge in development. Head-mounted displays, a crucial technology for immersive virtual experiences, are now available in the market at affordable prices and excellent quality. The latest addition to this category is the Apple Vision Pro, which was unveiled in June 2023 and is gradually being introduced to the market. Whether it will have as significant an impact on our lives as the iPhone did in the past decade remains to be seen.

In any case, this new reality has already made its way into various domains, including gaming, leisure and retail. Consumers now have the opportunity to experience virtual products such as digital twins, conduct virtual real estate tours and utilize numerous AR applications for try-ons, product demos and navigation assistance. Companies are experimenting in virtual spaces, some quite successfully. Nonetheless, there are still many unanswered questions: What is currently possible? What will be possible in the future? Which approaches are effective, and which are merely gimmicks?

This edition of the *NIM Marketing Intelligence Review* addresses precisely these questions. Top researchers from various fields discuss the numerous opportunities that AR and VR present in marketing and retail. The research projects' diverse findings demonstrate how AR, VR and mixed realities influence consumer decisions. We explore the sensory aspects of virtual experiences and how the new technologies can be utilized to gain a deeper understanding of our customers.

Obtain the latest insights into the metaverse beyond the hype and develop a clearer understanding of the opportunities and challenges that virtual consumer experiences bring to your own business.

Enjoy reading!

Jella Pfeiffer

Jella Pfeiffer

Giessen, Germany, July 2023

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Contents

Executive Summaries

From E-Commerce to Virtual Commerce: The Exciting Opportunities of Virtual Shopping

Jella Pfeiffer

Virtual commerce has the potential to transform the shopping experience. It is highly interactive and can create immersive experiences when consumers wear head-mounted displays. Benefits include increased telepresence, better size and proportion judgment, customizable shopping environments, highly personalized decision support and social interaction opportunities. Technological advances in VR hardware, such as improved display resolution and reduced motion sickness, contribute to a more seamless and enjoyable shopping experience. These benefits can lead to higher purchase rates. However, there are also privacy concerns due to the many ways in which data can be collected. While the future of VR shopping is difficult to predict, AR applications are already well established. Tech giants, research institutions and startups will play a critical role in shaping the future of virtual commerce.

→ page 10

In Search of a Head Start: Marketing Opportunities in the Metaverse

Yogesh Dwivedi and Laurie Hughes

The concept of the metaverse, a virtual world with immersive 3-D environments, has gained significant attention and is expected to affect how we interact and communicate. While there is no consensus on its future, many brands are preparing for its potential. The metaverse offers unique marketing opportunities, enabling brands to provide offerings that are impossible in the real world. It can serve as a third space for retailing, where brands can create immersive experiences and overcome physical limitations. Metaverse advertising should be interactive and immersive to maximize its potential, while brand communities and events in the metaverse offer new avenues for engagement. The metaverse also allows companies to unlock new revenue streams through virtual products, NFT collections and digital twins. However, the metaverse brings challenges, including technical issues, privacy concerns, avatar misbehavior and the need for virtual and real coexistence. Brands must navigate these challenges and conduct further research to understand and maximize the benefits while minimizing risks in the metaverse.

→ page 18

Boosting Brands with Augmented Reality: Why and When it Works

Philipp A. Rauschnabel

Augmented Reality (AR) is gaining recognition among executives as a powerful marketing tool. Unlike virtual reality, AR integrates virtual content into the real world, providing consumers with interactive experiences. AR applications like IKEA Place and Dulux Visualizer allow users to visualize furniture or paint colors in their homes, while AR games like Pokémon Go generate new revenue streams. The increasing availability of AR capabilities in smartphones and the creation of efficient developer tools have contributed to its breakthrough. AR offers various levels of local presence, ranging from simple overlays to highly immersive mixed-reality experiences. The potential of AR extends beyond virtual reality, as it can create a new form of integrated three-dimensional Internet. AR marketing can enhance brand evaluations and emotional consumer-brand relationships, particularly through inspiration and closeness. Companies should consider AR as a tool for branding, as it has shown positive effects on brand attitudes, product evaluations, purchase intentions and word-of-mouth. Managers are encouraged to experiment with AR to understand its potential and stay competitive in the evolving digital landscape.

Closing the Customer Imagination Gap with Augmented and Virtual Reality

Tim Hilken, Jonas Heller and Dominik Mahr

The "imagination gap" is experienced by customers when they struggle to envision product benefits or service outcomes. It continues to be a significant challenge across industries. This gap often leads to delayed or abandoned purchases, resulting in substantial revenue losses for companies. Businesses are increasingly turning to extended reality technologies such as augmented reality (AR) and virtual reality (VR) to address this issue. AR projects digital content into physical environments, allowing customers to visualize products in their surroundings and make more informed purchase decisions. VR, on the other hand, transports users to digital environments, creating immersive experiences that enhance learning, healthcare and other applications. Both AR and VR technologies have the potential to bridge the imagination gap and provide value to businesses and consumers. Strategic considerations include assessing the bottom-line impact of purchasing decisions, selecting the appropriate technology for specific objectives, deciding at what stages of the customer journey to deploy AR and VR and addressing privacy and falsity concerns. Looking ahead, neuro-enhanced reality, enabled by brain-computer interfaces, holds the promise of even more immersive experiences.

The Homunculus in the Metaverse: Is Virtual Reality Prepared for Our Seven Senses?

Thies Pfeiffer

Sensing in the physical world differs from sensing in virtual worlds. As visualized in Penfield's homunculus, touch and taste play a big role in physical surroundings. In contrast, the ''Homunculus Metaversensis'' for virtual reality would look different, reflecting the dominance of visual and auditory perception in virtual experiences facilitated by technologies like head-mounted displays. To create truly immersive experiences, touch, balance, movement, smell and taste are all relevant. While some progress has been made in haptic feedback and olfactory stimulation, advancement in these fields is still limited. Therefore, augmented reality, which combines physical and digital experiences, may be a more viable option for satisfying multiple senses in the present. However, future breakthroughs in virtual reality technology could enhance sensory experiences in the metaverse.

Neuroscience Goes Virtual: How to Measure Consumers' Responses in Extended Realities

Enrique Bigné

The metaverse and extended realities offer new avenues for studying consumer behavior. Consumer neuroscience tools are being utilized to understand interactions in these virtual spaces. The 3S framework (Stimuli, Sensors and Signals) provides a foundation for applying these tools. Stimuli can be manipulated to study brand choices, and sensors capture physiological responses such as heart rate and facial expressions. Different interface devices like monitors, smartphones and head-mounted displays offer varying immersion levels and sensor compatibility. Augmented reality requires minimal additional technology, while virtual reality allows detailed tracking of user interactions. Mixed reality combines both. Applications of extended realities in consumer research include pretesting products and designs, virtual try-on experiences and analyzing the impact of virtual presences. The available technology and ongoing advancements present exciting opportunities for understanding consumer behavior in virtual and augmented spaces.

Eye Contact Matters for Consumer Trust – Even with Robots

Carolin Kaiser, René Schallner and Vladimir Manewitsch

The integration of AI into consumer services is transforming the way people make decisions. AI is becoming more human-like, with chatbots, voice assistants and robots adopting human features and behavior. Consumers react differently to assistants with a human-like appearance than to advice from a web page, and the behavior of AI advisors influences consumer trust and decision-making. The results of an experiment comparing human advisors, robotic advisors with and without eye contact, and text-based services show that human advisors are trusted the most, but robotic advisors are preferred over text-based services. Human-like advisors increase trust and satisfaction. Extended human features like eye contact are essential for establishing trust and positive consumer responses. Companies should consider using humanoid advisors and incorporating eye contact to enhance customer experience. Consumers should be aware of the influence of human-like AI and stay informed about AI developments.

Diving into a New Reality: How Immersive Experiences along the Customer Journey Succeed

Interview with Julian Weiss, CEO and founder of headraft

Brand communication is entering a new era. Immersive technologies such as AR (augmented reality) and VR (virtual reality) enable memorable experiences along the entire customer journey as the combination of real and virtual elements creates innovative forms of consumer-brand interaction. Read in our interview how to implement successful immersive campaigns that people care about and share on social media. Julian Weiss, co-founder and CEO of Hamburg-based agency headraft, expects many more XR (extended reality) applications as "retailing will increasingly become an experience space." He sees their greatest potential in a symbiosis of real and virtual elements.

From E-Commerce to Virtual Commerce: The Exciting Opportunities of Virtual Shopping

THE AUTHOR

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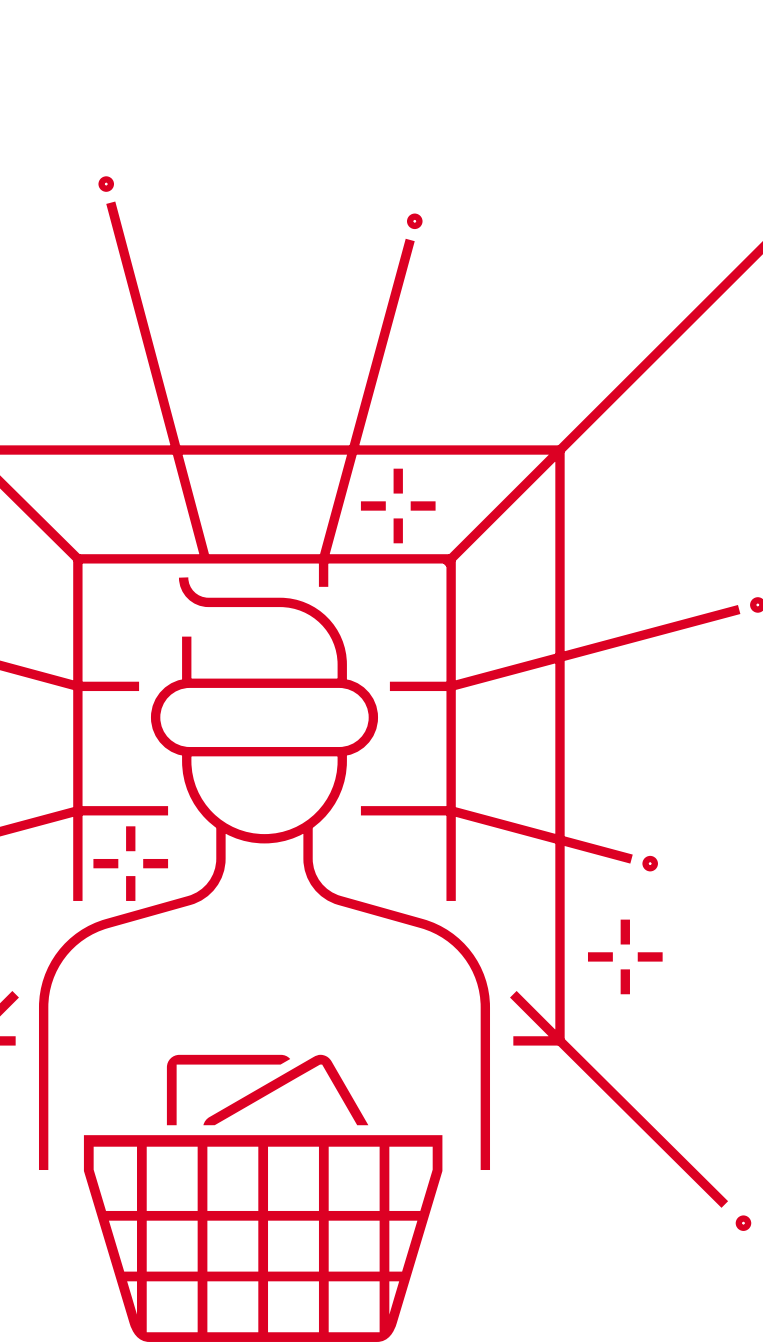Professor of Business Administration and
Information Systems
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E-commerce has already been revolutionary ✕ Developments in e-commerce have revolutionized the way consumer experiences can be designed. Social media, influencers and streaming platforms create a social presence, and sophisticated recommendation systems create the desire for even niche products. Personalized interfaces coupled with highly personalized advertising have raised expectations that the shopping environment is tailored to one's needs. Mobile devices and the proliferation of smartphones have made e-commerce even more accessible and available 24/7. In addition, conversational agents make consumers feel that not only technology but also human(like) contact persons can assist them with their decisions. What comes next?

The next revolution is at least announced ✕ In July 2021, Mark Zuckerberg revealed that his empire Facebook would rename itself Meta, and the term "metaverse" has become a buzzword. Yet, similar ideas had been on the table decades ago, as early as 1984 with William Gibson's novel *Neuromancer* or 1992 with Neil Stephenson's book *Snow Crash*. An idea formerly held only by visionary authors now seems about to become real due to technological progress, namely, the creation of a highly immersive, embodied form of the Internet in which users can experience a sense of presence in a virtual place with other people rather than being mere spectators. The metaverse should be interoperable, allowing us to take our identities and digital possessions with us to different virtual spaces. The metaverse should be further decentralized to ensure that users still own their virtual goods when a platform no longer exists. Moreover, changes created by users should be visible to others and persist permanently. Among all these features of the envisioned metaverse, one feature is the most central: a 3D space where you can move around. Consumers enter via x-reality (XR) technologies – applications to experience virtual reality (VR), augmented reality (AR) and mixed reality (MR) – such as head-mounted displays. The vision of extended reality goes beyond what we can imagine today and could have major implications for socializing, sports, work, education and other activities and experiences. It could certainly change the way we shop: will we soon have virtual commerce instead of e-commerce?

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Virtual commerce holds the potential to transform the shopping experience by offering several benefits.

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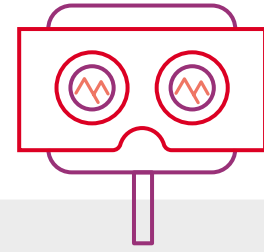
A brief history of virtual reality

It all started with the first attempts to create three-dimensional images, as with the stereoscope in the 19th century. The first VR goggles and interactive systems, such as Morton Heilig's Sensorama, emerged in the 1960s. The Sensorama was a mechanical multimodal machine that played a stereoscopic 3D movie from a first-person perspective. A vibrating handlebar, a shaking seat and stereo sound offered viewers an immersive experience. But it failed to take off because the device was too bulky and error-prone, and production costs were too high. Another example of an early VR device was Ivan Sutherland's 1965 Sword of Damocles, which was so heavy that Sutherland had to mount it to the ceiling. VR then experienced hype in the 1980s and 1990s with innovative projects such as those of VPL Research by Jaron Lanier and Virtuality by W Industries. They developed the first helmets, gloves, goggles and other body-mounted devices to transmit actions into VR space. Initial applications were found

Stereoscope – as developed in the 19th century to enable 3D vision

primarily in the gaming industry but also in the arts and for astronauts on behalf of NASA. But again, the technology was bulky, heavy and too expensive. In particular, graphics acceleration capabilities were not advanced enough. Since the 2010s, VR has experienced a new boom, especially in the gaming sector, with more powerful and affordable devices like Oculus Rift, HTC Vive and PlayStation VR. In a way, technology now seems mature and affordable, but it still lacks strong platforms with a variety of interesting applications. An open standard for apps and their distribution could make this building block of the metaverse a reality.

The first VR stores struggle with technical hurdles ✕ VR stores already exist but have yet to make a major breakthrough. Back in 2017, virtual SATURN, an established electronics retailer, went live, making it one of the first VR stores in German-speaking countries. Interested customers could go shopping in virtual reality in a loft or on the planet Saturn. However, it remained a demo app. Also, not much has been heard since Taobao's 2016 attempt to let consumers shop in a virtual version of Macy's New York store. One of our studies using 2018 technology, the HTC Vive, points to technical hurdles, such as the HTC Vive's resolution of ''only'' 2160 x 1200 pixels, which was insufficient to accurately read product details on packaging. In our study, these limitations meant that with some headsets, products could not be evaluated

as well in VR as in e-commerce. In addition, problems such as cybersickness surfaced (see Box 2).

Technological advances are rapidly reducing limitations such as small display resolution, heavy headsets and cybersickness. Newer generations of headsets come with such high resolutions that every detail can be seen very clearly, even in VR, as with the Apple Vision Pro, Valve Index, Oculus Quest Pro and Varjo VR 3. In addition, image delays and tracking errors have become less frequent. The latest headsets, such as the PlayStation VR2, are particularly efficient because they only show the focal point of attention in high resolution while the periphery of the field of view is rendered in a reduced and thus more efficient way using ''foveated rendering.'' This requires the integration of an eye tracker.

Cybersickness: Better technologies against discomfort in virtual environments

Quite a few visitors to virtual worlds complain about cybersickness – nausea, dizziness, fatigue, headaches. These states arise from sensory conflicts. Essentially, the information our eyes receive in VR doesn't always match what our bodies perceive in terms of balance and spatial orientation. It originates from hardware issues, such as mismatched headsets with regard to interpupillary distance. This problem is often experienced by people with smaller interpupillary distances, such as women. Additional triggers are image delays or tracking errors, which lead to unintentional movements of the VR environment. Another relevant trigger of cybersickness is the experienced scenario. A virtual flight causes more cybersickness than a shopping trip due to sometimes unpredictable movements. In our research in virtual supermarkets, between one and two percent of the subjects complained about moderate cybersickness symptoms and about 10% noted mild symptoms.

In Figure 1, the yellow dot shows the consumer's gaze point, which is determined by the eye-tracker.

In addition to hardware-specific advances, Web VR also removes software-specific hurdles. Whereas previously, a separate app had to be created for each device, there is now a single interface for many. It is similar to the availability of many applications in a web browser, such as Zoom or Microsoft 365, which can be used independently of the type of hardware.

FIGURE 1 > Virtual detergent shopping showing the gaze point with a yellow dot

Advantages of a virtual commerce environment ⨯ The technological challenges are increasingly being solved, but what are the benefits of a virtual commerce shopping experience for consumers and businesses?

> **More fun through high telepresence** ⨯ Higher telepresence means that consumers are more immersed in the VR store than in an e-commerce store and forget about the world around them more easily. This leads primarily to hedonistic effects, such as experiencing more fun while shopping online. We were able to confirm such effects in a study that compared VR shopping to shopping on a desktop. The additional fun results, in particular, from the interaction possibilities with 3D products and from the inclusive field of view through the head-mounted display, which hides the physical world.

> **Dimensions are easier to estimate** ⨯ Perhaps you've tried to assess a camping tent online or purchase your new car on a digital platform. If so, you may have noticed that it's difficult to correctly assess sizes and positions on the limited space of a 2D screen. Visiting a physical store is often necessary to make accurate judgments. Now, a virtual walk into a tent or a driving simulation in a virtual car cockpit can make visiting a physical store obsolete. The usefulness of these technologies is clearly demonstrated by the proliferation of virtual 3D tours in the real estate market and the availability of VR and AR apps in the furniture industry for furnishing one's own home.

The benefits of making certain products tangible and experienceable in real size are enormous, and the XR apps from Ikea and car manufacturers are pioneers in this field. The imagination gap of consumers can thus be reduced by XR technologies, as Tim Hilken and his co-authors discuss more deeply in their article (p. 30).

> **Higher willingness to buy** ⨯ Current studies show further interesting benefits for suppliers, such as a positive influence of the virtual commerce experience on brand recall, which in turn leads to a higher willingness to buy. Our studies with virtual supermarket shelves further show lower price sensitivity for fast-moving consumer goods and a wider product variety in the shopping cart in comparison with buying via desktop. However, the wider product variety could also lead to lower brand affinity. The effects have not yet been sufficiently explored, as few study participants can be described as experienced VR users. Therefore, the novelty of the shopping environment could also lead to greater curiosity. Similar research exists for AR environments. Philipp Rauschnabel discusses in his article that AR also inspires consumers more and that this inspiration has a positive effect on brand attitude (p. 24).

> **High personalization of the shopping environment** ⨯ The shopping atmosphere – smell, ceiling heights, lighting, music, etc. – has a major impact on customer behavior. While virtual realities can only inadequately address the senses of smell and taste at present, as Thies
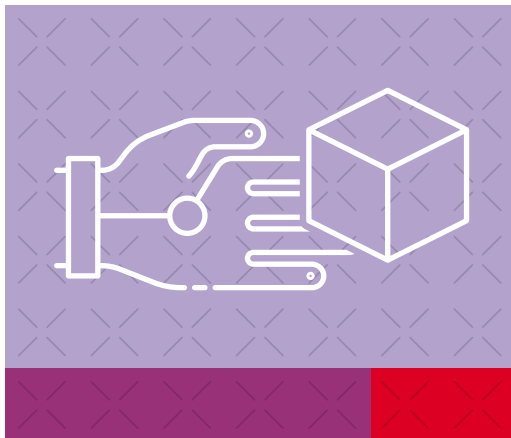
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The benefits of making certain products tangible and experienceable in real size are enormous.

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FIGURE 2 > Example of a system that assists consumers in the cognitively challenging task of comparing ingredients

Pfeiffer creatively demonstrates in his article on the metaverse homunculus (p.36), the other factors can be varied quite easily in virtual realities. Ceiling heights in physical shopping stores, for example, are very difficult to change. In virtual reality, in contrast, only a slight adjustment in the representation of the 3D environment is required. Rearranging products on a shelf is also very easy to do virtually, as the 3D models can be rearranged by hand or algorithm without much effort, and there is enough space even for large assortments. In addition, the VR environment can be personalized very easily. For example, in VR, one could reduce the cognitive workload of consumers by adjusting the store layout, the information presentation or the virtual shopping atmosphere. If the cognitive load is high, the retailer could play soothing music, for example.

> **Reducing cognitive load through personalized assistance systems** ✕ In our ongoing research, we examine virtual scenarios in which a salesperson shows up when consumers needed assistance. Two exciting options for assistance emerge. On the one hand, it is possible to assess the cognitive load of shoppers based on eye movements and take this as an indicator of when help is needed. This is done automatically by machine learning, without consumers having to activate the shopping assistance themselves or a human observer needing to access it for them. Figure 2 shows an example of an assistance system from our research that offers a product comparison matrix at the time of high cognitive load. In this, ingredients can be easily compared with each other. The table ''floats'' in space so that it is easily accessible and can be filled with products without restricting the field of view.

On the other hand, sales consultants could also be connected to a kind of dashboard that displays the information they need to provide high-quality advice based on the consumer's gaze and interaction data. Such a salesperson-dashboard could contain customer-specific information on the viewing time of individual products or attention to price tags and advertising messages. It would

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The VR environment can be personalized very easily.

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FIGURE 3 > Will VR shopping soon become mainstream?

Pros

> More fun due to high telepresence
> Product presentation in realistic dimensions and 3D
> Interaction with products is possible
> Automated assistance in cases of high cognitive load
> Higher brand recall, willingness to buy and lower price sensitivity
> Interaction with salespersons and others is possible
> The shopping environment can be personalized
> No space restrictions when presenting large assortments
> + All the advantages of traditional e-commerce, such as 24/7 availability, savings in warehouse space, etc.

Cons

> Additional, often expensive hardware equipment required
> Technical challenges, e.g., too low graphical resolution or interface problems
> Difficulties with motion control
> Discomfort and cyber-sickness due to sensory conflicts
> High effort for programming the 3D environment
> Privacy and data security challenges
> Energy consumption for servers and line capacities

enable salespeople to better assess customer preferences, even if they do not continuously observe the consumption situation. If we take this scenario further, with progress in intelligent assistance systems and generative language models such as ChatGPT, a human-controlled salesperson avatar could even be replaced by an algorithmically controlled avatar. Customers would still perceive the consultation situation as human-like, which we know from numerous research findings on ''computers as social actors'' and anthropomorphism research. However, the choice of the situation in which a digital assistant appears should be planned carefully: In one VR study, virtual subjects were naked in a dressing room while observed by an avatar. This setup generated emotions, but they were negative: shame and discomfort.

> **Social interaction possibilities** ✕ The example of personalized assistance systems is just one idea of how social interaction can be designed in virtual environments. In fact, many studies in human-machine interaction deal with the design of avatars that can recognize and show emotions, as well as enable a particularly human-like interaction. In VR, avatars can be designed to be particularly human-like, for example, by being able to make and hold eye contact. The topic of virtual eye contact with robots

is addressed in more detail in our article by Carolin Kaiser and her co-authors (p. 48). Further, the shopping experience with your best friend 500 miles away could soon feel very human and close, almost like shopping together in a pedestrian zone. And the next gift you select with your friend for another friend or your sweetheart might then be a chic and unique digital asset, as described by Yogesh Dwivedi and his co-author in their article on marketing opportunities in the metaverse (p. 18).

VR commerce as the El Dorado of data collection ✕ All of these insights into consumer behavior in virtual consumption situations and the personalization opportunities of shopping experiences are based on the abundance of data that can and, in some cases, must be collected in VR. Many of the sensors in head-mounted displays are required technically to create an immersive experience. Tracking motions and head positions, for example, is necessary to adapt the virtual world to user actions. Some available headsets already include eye trackers due to the ''foveated rendering'' mentioned above. Other recent models include biometric measurements such as electroencephalography (EEG) and electromyography (EMG). In this issue, Enrique Bigné (p. 42) looks at how these technologies can be used to elicit consumer responses, such as current cognitive load or stress.

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Personalization opportunities of shopping experiences are based on the abundance of data that can and, in some cases, must be collected in VR.

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Although such sensors are more of an add-on than a necessity, and synchronizing different sensors is challenging, their data can reveal user preferences based on, for example, distances between shoppers and products and interaction patterns with products and their components. For example, in one of our studies, we were able to use eye-tracking data and machine learning to estimate whether a purchase was exploratory or goal-directed after only 10 to 15 seconds in a shopping situation. In another study, we were able to predict brand and taste preferences quite accurately from 20 seconds of data.

Data security is a sensitive issue ⨯ Of course, this very ''El Dorado'' also harbors risks, especially relating to data protection and privacy, but also issues of potential discrimination, insults and fakes. From a legal and political perspective, the challenge is VR regulation and the implementation of the GDPR in VR. Ethically questionable matters should be prevented while innovation should still be possible and encouraged. The same issues need to be handled in the current debates about the EU AI Act, which regulates the use of artificial intelligence algorithms. Another fascinating field is technical approaches in the area of ''privacy computing.'' For example, data can be intentionally distorted in order to protect privacy, provided, of course, that the gain in knowledge is only marginally diminished by the distortion. Another example is machine learning, where some of the collected data can be processed locally, i.e., directly at the consumer, without sending it to central servers. Of course, the enormous data streams and their complex processing, especially for graphical representation, require resources and energy, and these negative consequences should be considered during implementation. Retailers should be aware of these sensitive issues and plan their approaches very carefully so that the potential of virtual shopping experiences can be used in beneficial ways for our society.

The future of virtual commerce ⨯ According to our interview partner and XR expert Julian Weiss (interview p. 54), AR applications are already well established in marketing and retail. But will virtual commerce also soon become more

established? The answer to this question is still open. Figure 3 summarizes what speaks in favor of and against the rapid spread of virtual commerce.

Ultimately, the answer to the question will heavily depend on the visions and investments of the tech giants, which have also driven past major developments such as e-commerce platforms (Amazon), mobile communication (Apple), Internet search and personalized advertising (Google) and social networks (Facebook). But it's not just the tech giants that play a crucial role in the future of the metaverse and other developments in the virtual realm. Research and startups are also making significant contributions to further development. It will be up to all of us to shape the future of virtual worlds and their commercialization opportunities in a responsible and beneficial way. ⨯

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FURTHER READING

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In Search of a Head Start: Marketing Opportunities in the Metaverse

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The metaverse in the beginning ✕ When we talk about the metaverse, we think of a virtual world with an immersive 3D environment where we can experience life in parallel to the real world. We access this environment via technical devices such as virtual reality (VR) goggles and use avatars to interact with other avatars, agents and objects. Indeed, it may be more appropriate to refer to metaverses in the plural, as there is not a single metaverse platform, and this is not expected to change in the near future. Much of the metaverse enthusiasm has stemmed from Mark Zuckerberg's vision of the metaverse, potentially changing key aspects of how we interact and communicate, underlined by the renaming of Facebook as Meta. However, as of yet, there is no metaverse with activities to occupy much of our lives. There is no consensus on how the metaverse will evolve and whether it will become the multi-billion-dollar business that some foresee, but many brands want to be prepared.

Integrating the metaverse into marketing strategies ✕ The metaverse, with its various features and tools, will empower brands to deliver offerings that are impossible in the real world. As the laws of nature do not apply to the virtual world, marketers can be highly imaginative and creative to provide unique distribution channels, products and experiences. Figure 1 shows an overview of metaverse marketing opportunities and challenges.

» *The metaverse will empower brands to deliver products and services that are impossible in the real world.* «

FIGURE 1 > Marketing in the metaverse

Metaverse
> Virtual
> Immersive
> Boundless

Marketing
> Retailing – third space
> Brand communication
> Virtual products

Challenges
> Access – technologies
> Privacy, data security, fraud
> Governance and avatar misbehavior
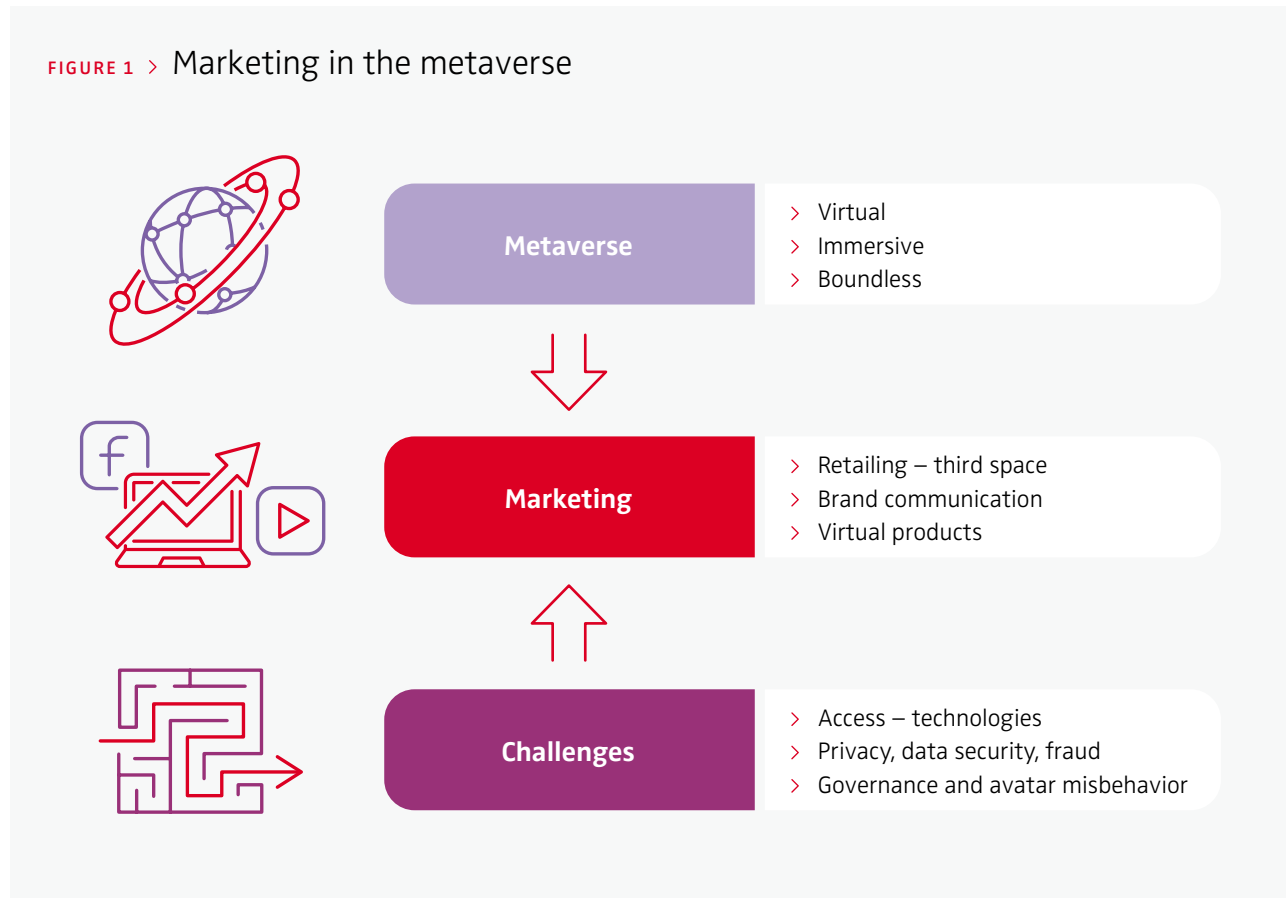
> **Metaverse as a third space for retailing** ⚹ It is expected that, at first, metaverse-based retail spaces would co-exist with other online and offline channels, such as web-based electronic shops or brick-and-mortar ones, adding a third space. The metaverse will provide new opportunities to reach existing and potential customers and offer them an immersive experience. Therefore, marketers should develop an overarching and comprehensive strategy for the three different spaces. The virtual world enables brand experiences beyond physical shopping, and brands can create new meaningful and inclusive interactions. The high level of immersion and interactivity can also bring benefits to physical stores. For example, small brick-and-mortar retailers can overcome their limited store size and create additional digital store space in the metaverse to effectively showcase their whole range of products. Users can enter this store for a more personalized experience and try out the products right from home. IKEA, for example, has launched augmented reality (AR) concepts that allow shoppers to see how a lamp will look in their room.

Dyson has also begun to develop its own virtual reality by allowing customers to test their products in an immersive online environment.

> **Metaverse brand communication** ⚹ Advertising in the metaverse must be created and planned to be interactive and immersive to maximize its potential. Though some users might choose to skip the interaction, others might want to interact with the messages and products. Metaverse advertising will need to be prepared for that moment because the virtual environment induces the perception of presence. When users feel as if they are present in the virtual world, they can feel more connected to the product and process the message more effectively. Beyond advertising, brand communities in the metaverse are another promising area for marketers. Building brand loyalty is crucial for brands' long-term success, and the metaverse will allow brand community members to connect more effectively than on Internet blogs or chatrooms and offers excellent communication tools. Furthermore,
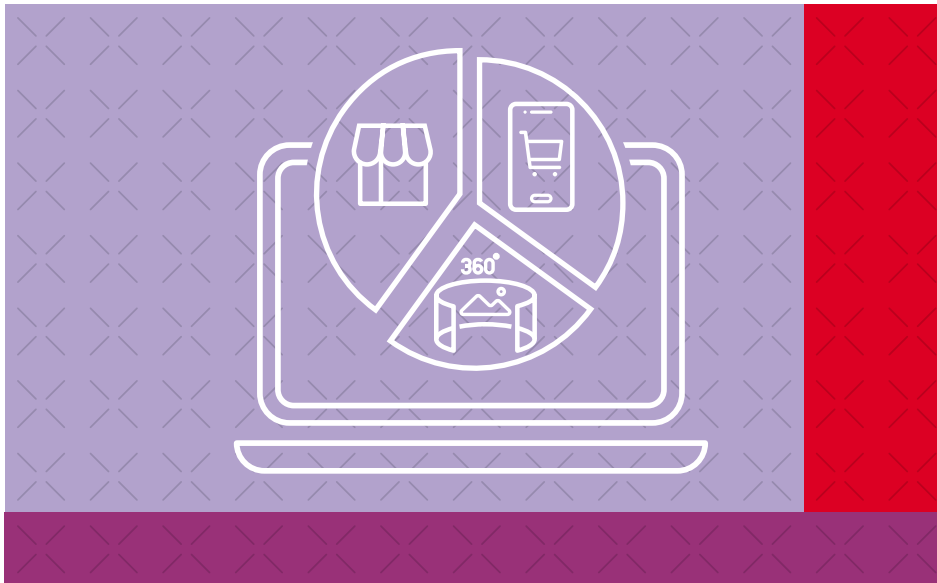
events and competitions in the metaverse can be orga-nized like real life, providing more options for brands to engage with their customers.

› **Virtual products and digital twins to unlock new rev-enue streams** ⨉ The metaverse presents an opportunity for companies to generate additional income by selling products, creating a parallel economy where virtual brand-ing and sales complement physical product sales. Brands can launch NFT (non-fungible token) collections, such as Adidas virtual wearables and Lamborghini artworks, to monetize themselves in the metaverse and open up another revenue stream. The metaverse also provides a platform to sell digital twins – digital replicas of real-world objects that can be used by consumers' avatars. For exam-ple, Forever 21 has recently teamed up with the gaming platform Roblox to offer users the ability to build their own virtual Forever 21 shops. There, they can sell and buy virtual versions of products that are also available as

physical equivalents on the website. Some luxury fashion houses are also exploring the metaverse (see Box 1).

Challenges of metaverse engagement ⨉ Despite the ex-citement and new opportunities brought by the metaverse, it also brings challenges and new risks to individuals and society. To build a successful metaverse marketing strategy, marketers need to be aware of these risks and consider them in their decision-making.

› **Technical issues** ⨉ Brands and platform companies must address many infrastructural and technical issues as the metaverse develops. The interface should be easy to use and consider users' social and cultural factors while creating a multicultural metaverse. Improved hardware and software are essential enablers of the metaverse. The lack of affordable and accessible VR or AR headsets and other accessories may affect user participation and ex-perience and hinder brands' ambitions in the metaverse.

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Marketers should develop an overarching and comprehensive retailing strategy for online, offline and virtual spaces.

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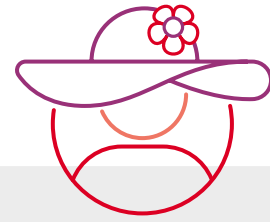
BOX 1

Fashion Houses: Forerunners in the metaverse

Many consumers are willing to pay extensively to outfit their avatars with luxury digital goods, as the avatars represent their personalities. Gucci, for example, recently sold a Roblox handbag for over USD 4115, which is more than the physical bag's USD 3400 retail price (The Fashion Law, 2022). According to Business Insider (2022), Morgan Stanley reported that the market for virtual luxury goods will reach USD 56 billion by 2030. Luxury brands are thus taking this seriously by capitalizing on the opportunity to sell digital assets such as clothing and accessories in limited quantities. Brands such as Prada, Louis Vuitton, Tommy Hilfiger, Vans, Ralph Lauren and Gucci have started to invest heavily in the metaverse. Recently, Urban Outfitters and Abercrombie and Fitch also detailed their intention to open their virtual stores.
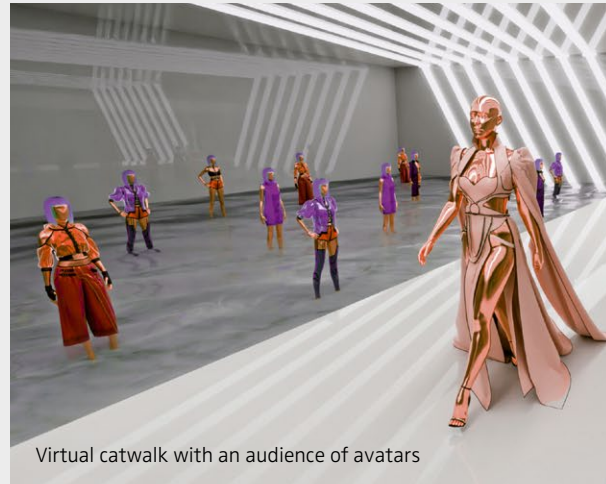
Virtual catwalk with an audience of avatars

The Fabricant Studio is a digital fashion house that focuses only on digital clothing created by leading designers and other fashion labels. A user can co-create the digital clothing by choosing their garment, fabric and colors. Other fashion brands, such as Nike, Adidas, etc., have also started to sell virtual sneakers and apparel. Gap has also recently launched its own collectible Gap hoodie in collaboration with Brandon Sines. Avatars need more than clothing: virtual land, housing and art are also available on different metaverse platforms. Companies like Walmart appear to be venturing into the metaverse by offering virtual items such as personal care products, electronics, household decorations, toys, sporting goods, etc.

How it works: ✕ Users who purchase virtual items receive an NFT as a virtual ownership certificate, which serves as a form of authentication. NFTs (non-fungible tokens) are smart contracts on the blockchain which allow their owners to claim the ownership of crypto assets such as wearables or to trade them anytime and anywhere in the marketplace.

Moreover, the technology is far from perfect in terms of the quality of experience and requires significant technological advancements.

› **Privacy issues and data security** ✕ Information privacy remains a big challenge as large amounts of information will be collected from participating individuals and their interactions in the metaverse. Apart from the users' passwords, email addresses, etc., metaverse platforms can also track the behavior of users via biometric data and interactions with users' avatars within the metaverse. Retailers can monitor users' physiological responses, vocal inflections and facial movements in real time through multiple channels, such as microphones and wearable devices, providing organizations with a wealth of information for targeted advertising and profiling. The information can be leveraged to create individualized products and services based on the user's expectations. Given this valuable information, users could be prone to hackers who may steal the new rich sources of personal data. There are also issues related to identity theft in the metaverse, where bots or imposters can easily mimic a user's style, data and personality and thus cause mistrust among potential consumers. Questions remain as to how a consumer can verify if the avatars are trustworthy and legit. The challenge of building trust among consumers

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Advertising in the metaverse must be created and planned to be interactive and immersive to maximize its potential.

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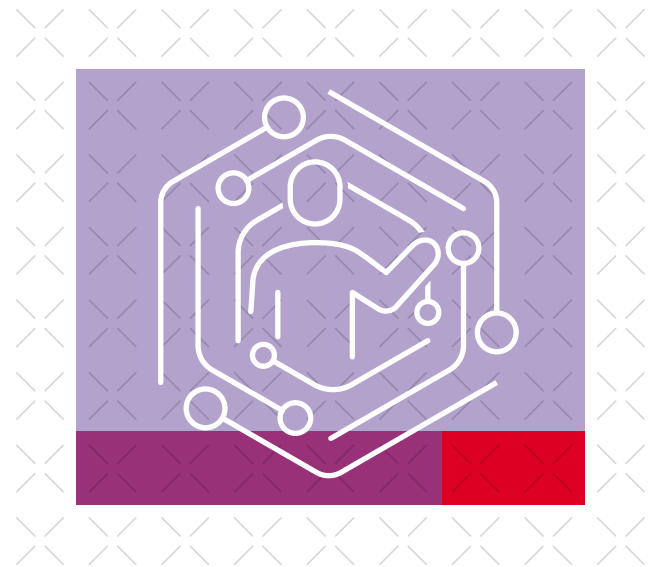
lies in the possibility of developing biometric identification in the near future. Data security and potential fraud, likewise, are major challenges.

› **Avatar misbehavior** ⨯ There are a growing number of reported cases of harassment, sexual abuse, bullying, hate speech, racism, unchecked gambling and various forms of deviant behaviors within metaverse-like platforms. In December 2021, a woman in the UK wrote in a blog post that she was verbally and sexually harassed by three to four male avatars within 60 seconds of joining the virtual game Horizon Worlds developed by Meta. There are several reasons why deviant behaviors are common in the metaverse. Online disinhibition, a psychological state in which individuals feel more relaxed and willing to engage in certain behaviors in the online environment, appears to be a major factor leading to the occurrence of deviant behaviors in the metaverse. Brands should take governance seriously and be vigilant, as such misbehavior might damage the reputation and image they have built in the real world.

Virtual and real coexistence will be challenging ⨯ Branding in the metaverse must be aligned with brand philosophy and brands need to understand whether users are equipped with the necessary resources, skills, capabilities, technology and monetary means. This may vary across sociocultural contexts and age groups. Managers must also solve technical and infrastructural issues, ensure ethical conduct is practiced and follow regulatory policies. Professor Giampaolo Viglia, Editor in Chief of the Journal of Psychology & Marketing, further summarizes the current state of metaverse research

and emphasizes the need for more research: "The metaverse is still in its infancy but there are many future applications that would offer a quantum leap benefit to customers. Importantly, the metaverse comes also with a dark side, as it might increase consumer vulnerability. Therefore, we need high-quality research on the topic to understand how to maximize the benefits of the metaverse to minimize the risks." Scalability, interoperability and the overall metaverse business environment are still vague, but anyone who wants to be part of the game should familiarize themselves with the new world. How do organizations prepare for the metaverse? Take a look at the popular gaming and social interaction platforms, such as Roblox, Decentraland, Sandbox and Second Life, and try to visualize how your brands could be part of this new environment to interact with your consumers.   ⨯

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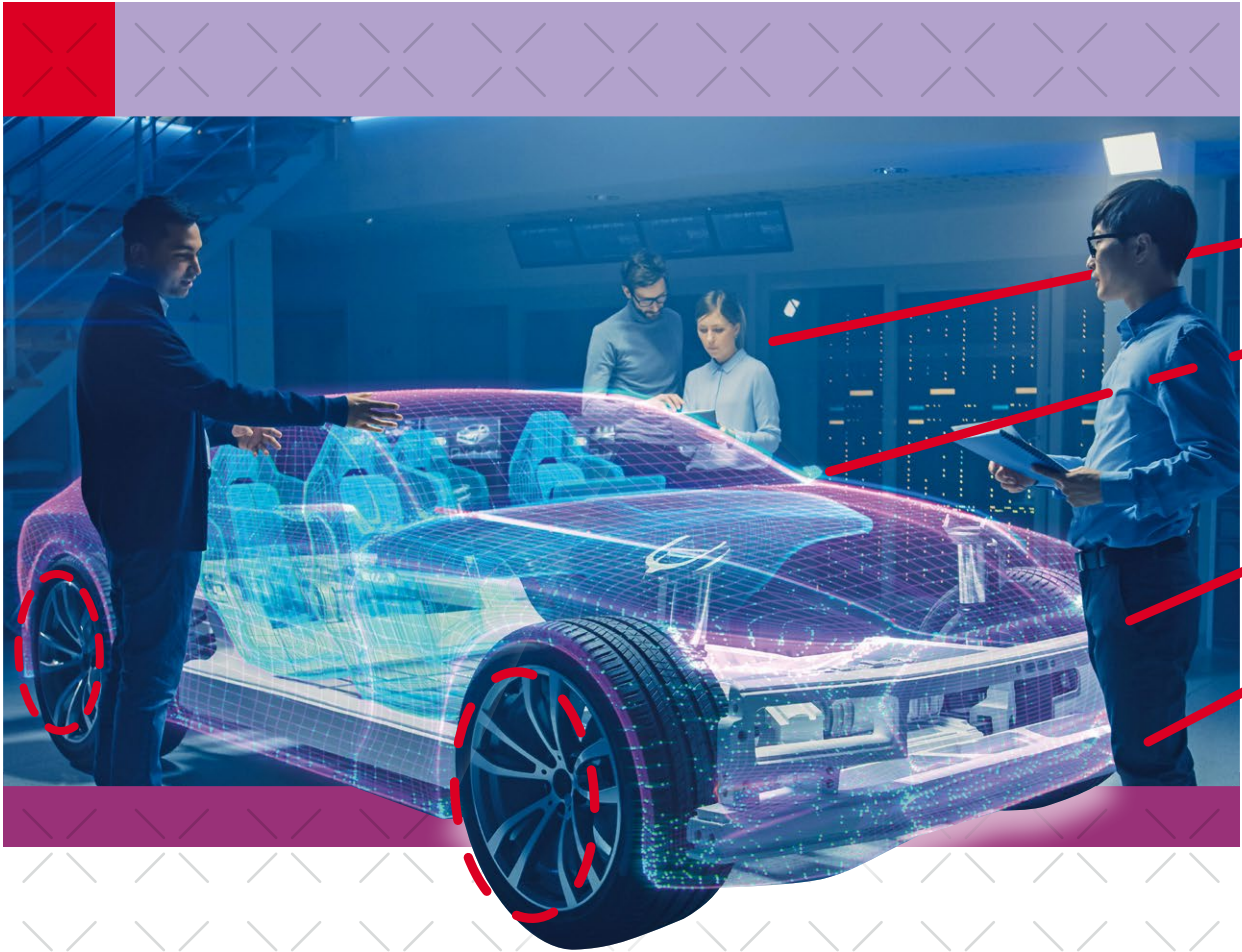
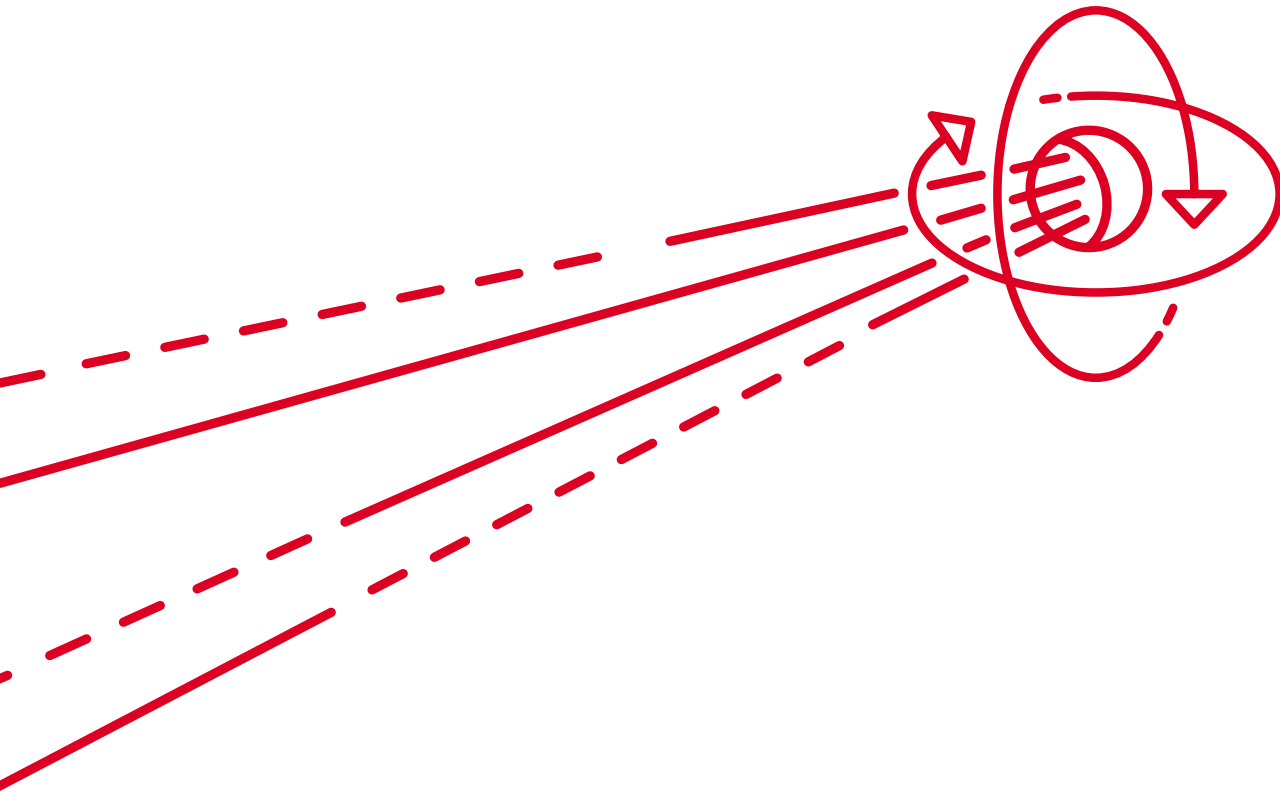# Boosting Brands with Augmented Reality: Why and When it Works

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KEYWORDS

Augmented Reality, Mixed Reality, Inspiration, Enjoyment, Local Presence
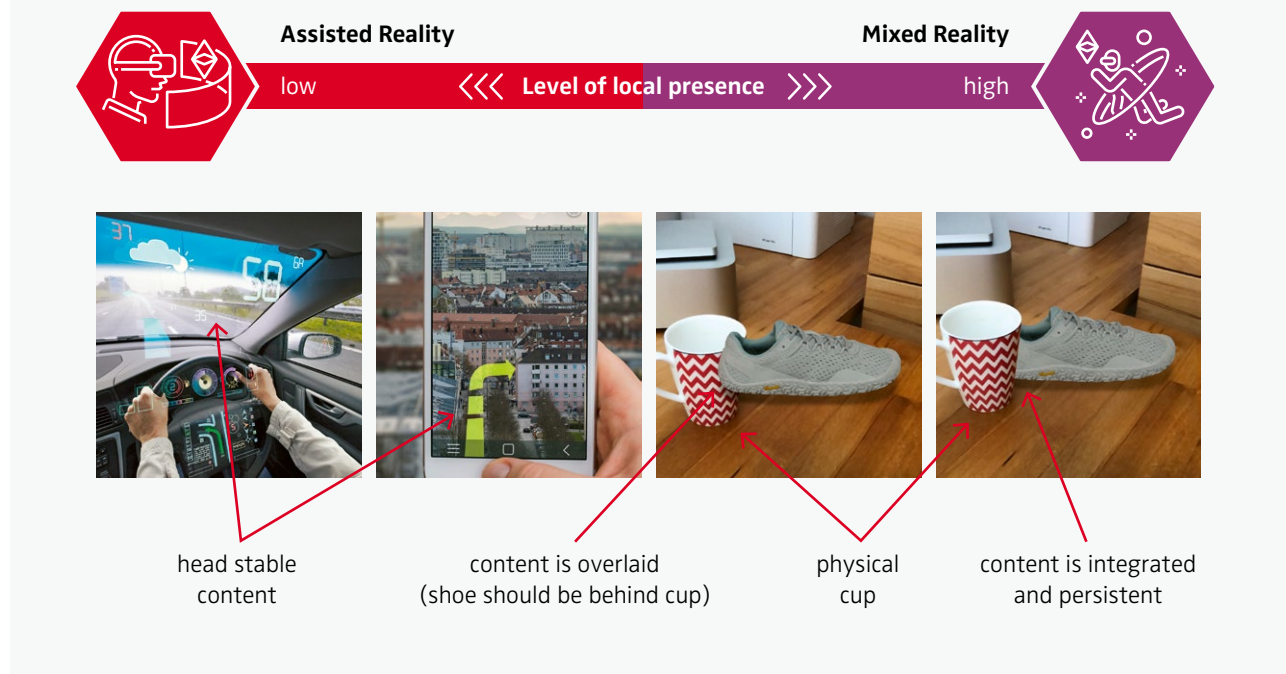
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The metaverse as a purely virtual world is still a vision, but brands can already benefit from AR applications today.

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Augmented Reality (AR) can add value to products and brands ✕ Over the last few years, executives have begun to realize the tremendous potential of augmented reality (AR) as part of their marketing strategies. Unlike virtual reality (VR), which immerses users in a virtual world through a headset, AR integrates virtual content into a consumer's physical environment. IKEA Place and Dulux Visualizer are prominent examples of AR applications that allow consumers to try out virtual pieces of furniture or paint colors in their homes. AR games such as Pokémon Go can generate new revenue streams as part of the product mix, and Lego's AR features for its toys show that AR can be a value-added feature for traditional physical products. Although AR is not new per se, it is currently experiencing a breakthrough. Almost all of today's smartphones have built-in AR capabilities. Cameras and LiDAR scanners can create stunning scans of a customer's environment, and algorithms can interpret objects in real time. New developer tools allow companies to create AR experiences much more efficiently than just a few years ago. In the near future, we can expect to see fashionable and ergonomic AR glasses that consumers can wear all day.

The different forms of AR ✕ AR differs in its level of "local presence," that is, the degree to which users perceive virtual content as actually present in their local, physical environment. Figure 1 shows potential AR applications with varying levels of local presence. In "assisted reality" situations, like the navigation systems shown on the left, the local presence

FIGURE 1 › The level of local presence in various types of AR

Assisted Reality   **Mixed Reality**

low   ‹‹‹ **Level of local presence** ›››   high

head stable
content

content is overlaid
(shoe should be behind cup)

physical
cup

content is integrated
and persistent

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*AR can be a value-added feature for traditional
physical products.*

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of AR is low, and consumers can clearly distinguish virtual objects from real ones. Even such a low local presence can be very helpful. In some use cases, such as assembly instructions for a newly purchased product or a navigation system in a shopping mall, simplified AR features that are clearly identified as artificial and not actually "there" may even be preferred. However, advances in rendering, tracking and content quality allow developers to push local presence to higher and higher levels of "mixed reality," as in the two applications on the right side of Figure 1.

While much of the current enthusiasm for new reality formats relates to virtual reality and visions of a metaverse as a purely virtual world, more potential may actually lie in AR.

For example, an AR layer on top of the real world could be filled with virtual content by consumers and brands alike, enabling a new form of three-dimensional Internet that is well integrated into the physical world. While the development of such scenarios is a top priority for technology companies, they remain a futuristic vision. However, today's AR capabilities, if effectively implemented, can already create actual value in marketing. Recent academic studies and industry cases have shown effects such as increases in sales or a positive impact on brands.

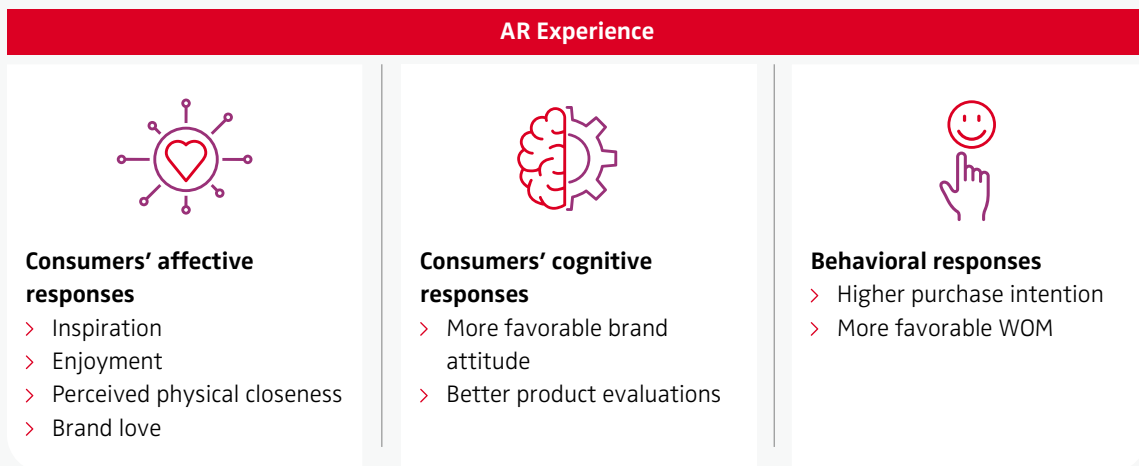**How AR helps build brands** ⨯ Surveys of executives indicate that branding is the top priority for AR marketing,
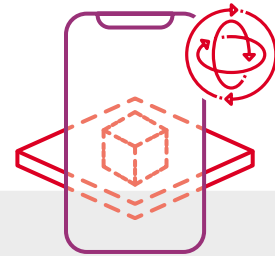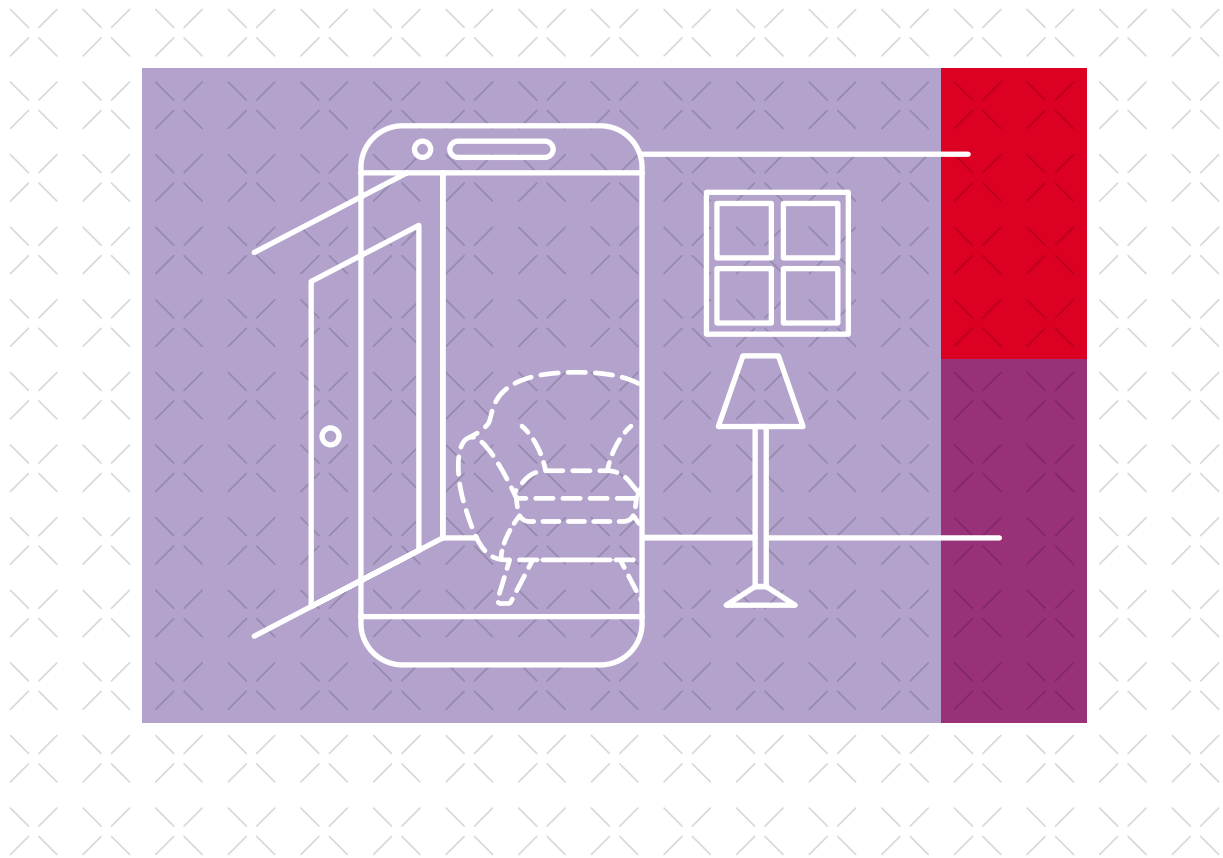
Research projects on consumer reactions to AR

In two research projects, we investigated whether consumers who feel inspired change their existing brand attitudes in positive ways. In each study, we surveyed more than 200 consumers and measured brand attitudes using established survey measures before and after using an AR app and assessed the changes. Specifically, consumers answered questions about how ''good or bad'' a particular brand was or how ''favorably or unfavorably'' they perceived it. Further, we asked consumers how inspired they felt when using an AR app, in addition to more generic questions, such as how much they liked an app or how useful they found it. The changes in brand attitude were about four times higher for the highly inspired consumers. Beyond brand attitude, we also found positive effects of inspiration on other relevant key performance indicators, including product evaluations, purchase intentions and word-of-mouth.

Additional research showed that AR also has the potential to increase brand love by fostering a perceived physical closeness between a consumer and a brand. In further studies, we asked consumers to experience AR content either in AR or non-AR using a tablet computer. The physical distance between a consumer and the branded content was the same in both groups – the distance from their eyes to the surface of the tablet. However, respondents in the AR condition were significantly more likely to report that they perceived the brand as physically close to them than those in the non-AR condition. This perceived physical closeness triggered brand love. In a replication study, we asked female consumers who had tried a commercial AR makeup app how much they felt the virtual makeup was actually on their skin (''local presence''), which somehow represents the ''quality'' of the AR experience. Note that we also measured brand love about a week before the main data collection and controlled for this; the effects remained. Figure 2 summarizes the effects.

FIGURE 2 > Simplified summary of consumer reactions to AR applications

AR Experience		
Consumers' affective responses	**Consumers' cognitive responses**	**Behavioral responses**
> Inspiration	> More favorable brand attitude	> Higher purchase intention
> Enjoyment	> Better product evaluations	> More favorable WOM
> Perceived physical closeness		
> Brand love		

while financial objectives are more likely to be considered as future goals. Although many brands are already using and likely benefiting from AR, managers also report an interest in understanding why and how AR works. We will focus on two important mechanisms that explain the effectiveness of AR in branding, namely inspiration and closeness. We will also discuss how they influence brand evaluations and emotional consumer-brand relationships, two critical key performance indicators in branding.

› **AR inspires consumers and makes them like brands**
✕ Liking a brand means having a positive attitude toward it. Such brand attitudes result from the associations consumers have with a brand. If these associations are mostly positive, like high quality, a fair price or a good design, brand attitudes are usually also positive and tend to remain relatively stable over time. Our daily work with AR has consistently shown that AR has a huge potential to inspire consumers by allowing them to playfully explore

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Inspiration seems to be a highly relevant metric that marketers should consider when evaluating AR apps.

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AR can create actual value in marketing
if implemented effectively.

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and manipulate their environment. To validate this observation empirically, we conducted several studies (see Box 1) which confirmed that AR-inspired consumers tend to have more favorable attitudes toward brands than less inspired or uninspired consumers. Inspiration seems to be a highly relevant metric that marketers should consider when evaluating AR apps. Our studies also showed that inspiration is particularly high when AR apps are designed to be fun and playful and when the content is realistically integrated into the consumer's physical environment. These effects were positive for most of the apps we tested, but boring and unprofessionally developed AR content might backfire on brands. We did not find such positive effects for more established measures, such as overall app ratings, that many marketers tend to focus on.

› **AR makes consumers even love a brand** ⤬ Although loving and liking a brand are conceptually related, they are different. While liking is more of a pragmatic evaluation, brand love is a specific form of consumer-brand relationship. Brand love is a complex and multidimensional construct that ranges from very low to very high, although consumers may actually use the term ''love'' in everyday conversation only if they have very high levels of brand love. However, even small increases in brand love at lower levels – well below the threshold where consumers would actually use the term ''love'' – can lead to significant improvements in word-of-mouth and purchases. In fact, a recent meta-analysis showed that brand love is the most powerful type of consumer-brand relationship in shaping a company's profits. We found that AR had a positive effect on physical closeness and, subsequently, on brand love. However, the brand love effect was stronger for brands with higher levels of familiarity, suggesting that brands with stronger associations may benefit even more from AR in creating emotional bonds with consumers.

It's time to consider AR as a branding tool ⤬ Managers often express doubts about whether AR is ''ready'' or if it's a good fit for their brand. Usually, this is because they don't know much about AR and haven't tried it out for themselves. While the ''true'' metaverse as the next Internet is still a vision, brands can already benefit from AR applications today. Playful, useful and well-developed applications can lead to measurable positive impacts on brands. Creating simple AR prototypes has become much easier and cheaper due to advancements in technology. We suggest that managers experiment with AR in a fun and playful way to gain hands-on experience. This will help them understand how AR can benefit their brand and keep up with competitors who are already using AR. The experience can also help them take further steps toward a future metaverse. ⤬

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Closing the Customer Imagination Gap with Augmented and Virtual Reality

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KEYWORDS
**Customer Experience,
Imagination Gap, Augmented Reality,
Virtual Reality**

Customers hesitate to buy when they cannot imagine product benefits ✕ Imagining in advance how a product will perform when used or what benefits a service will provide when consumed is a ubiquitous pain point for customers. This difficulty to imagine is often referred to as an ''imagination gap'' that can lead to the delaying or postponement of purchases. Despite today's media-rich marketplace, imagination gaps continue to disrupt customer experiences across industries, costing companies billions in lost revenue. Online retail is perhaps the most afflicted business, where customers often abandon their virtual shopping carts because they cannot accurately anticipate whether, for example, a furniture item will fit their home. But imagination gaps also occur in other contexts, where they can even harm personal well-being. Take, for example, the case of retirement investments that many young people put off because they find it hard to envision their future self being better off from setting aside money every month in the present.
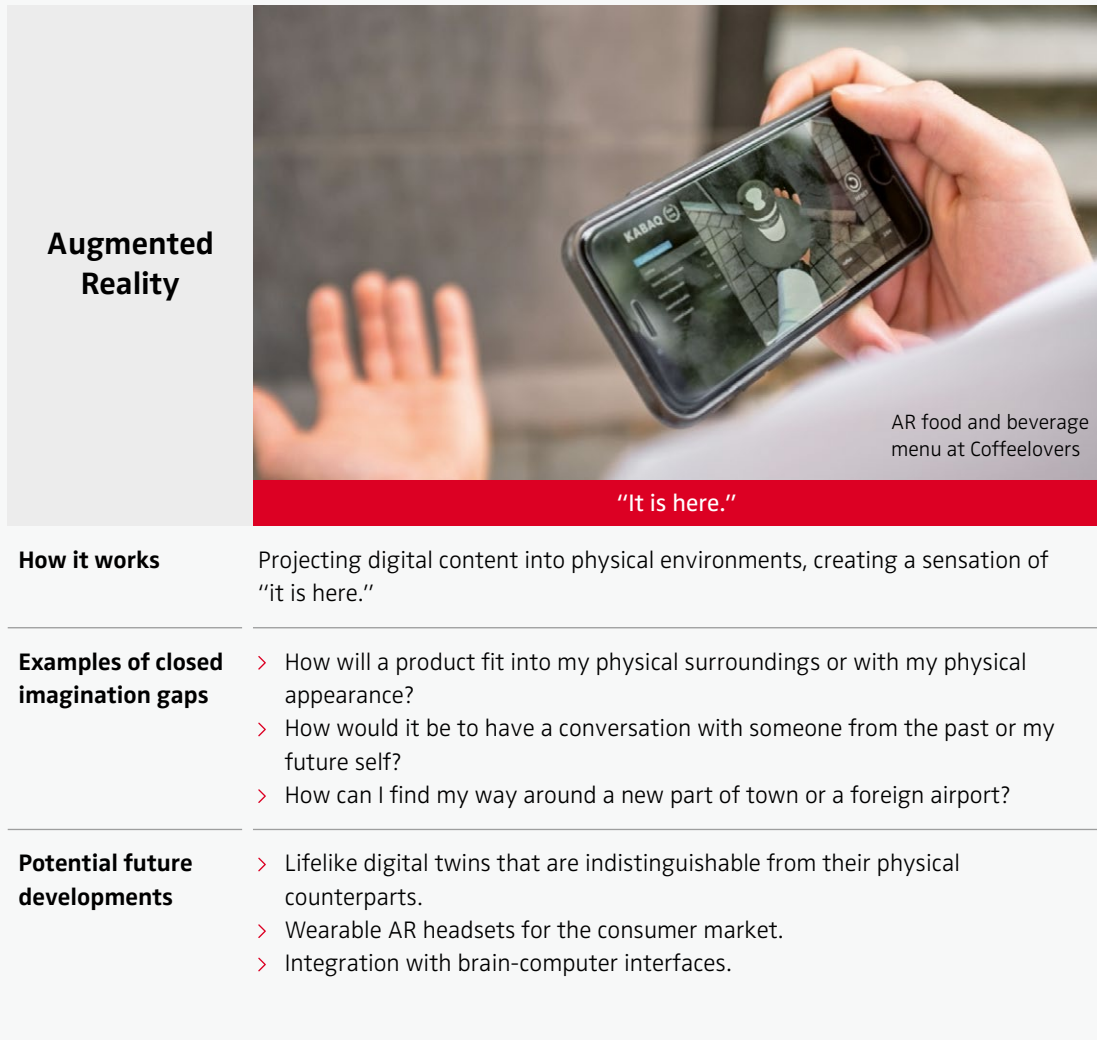
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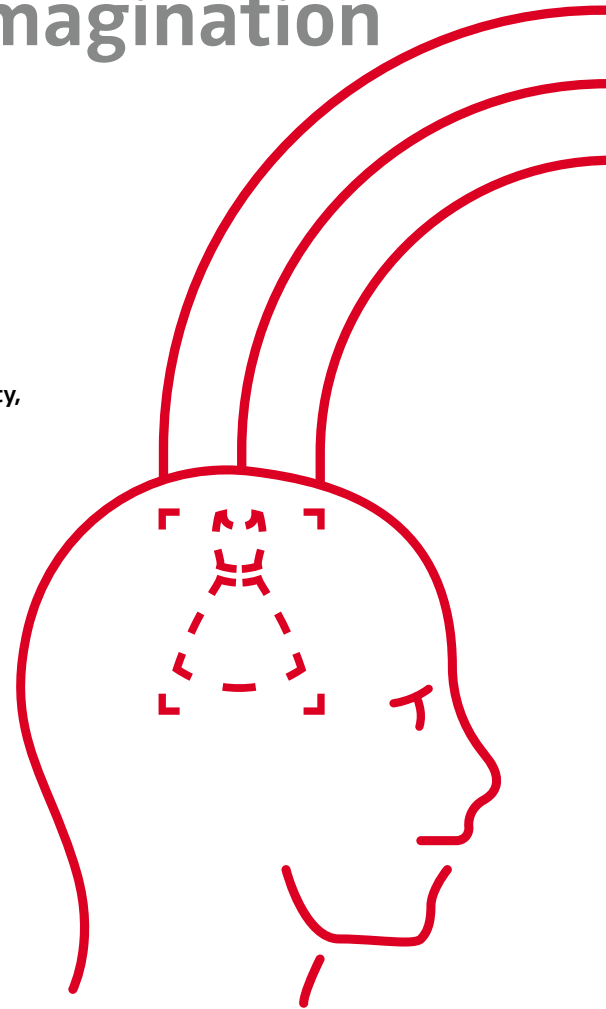
Many companies have turned to offering extended reality applications to help customers imagine product benefits.

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FIGURE 1 › Closing the customer imagination gap with augmented reality

Augmented
Reality

AR food and beverage
menu at Coffeelovers

"It is here."

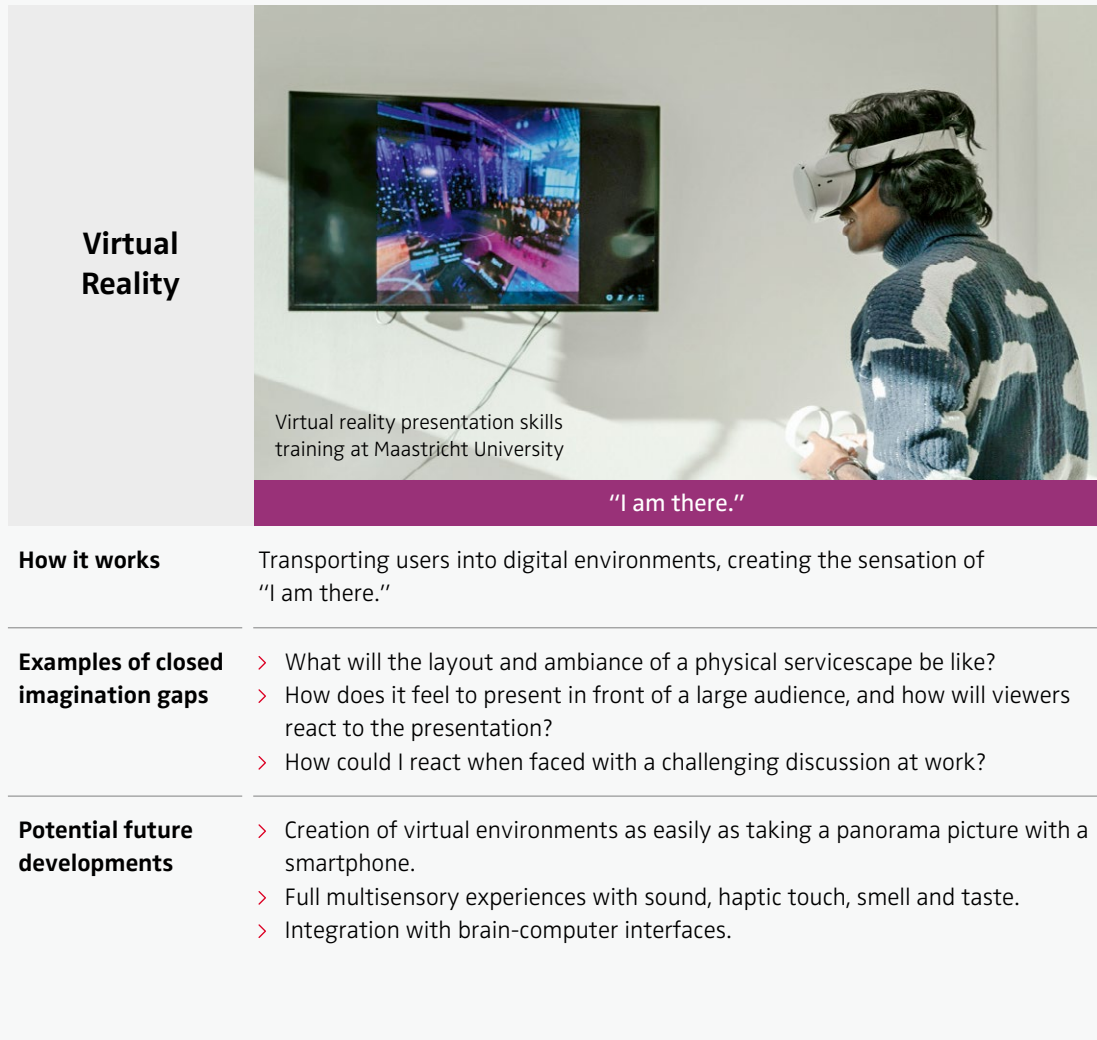|	
How it works	Projecting digital content into physical environments, creating a sensation of "it is here."
Examples of closed imagination gaps	› How will a product fit into my physical surroundings or with my physical appearance? › How would it be to have a conversation with someone from the past or my future self? › How can I find my way around a new part of town or a foreign airport?
Potential future developments	› Lifelike digital twins that are indistinguishable from their physical counterparts. › Wearable AR headsets for the consumer market. › Integration with brain-computer interfaces.

Augmented and virtual reality can close the imagination gap ✕ To help customers bridge these gaps, many companies have turned to extended reality, also referred to as x-reality, including augmented reality (AR) and virtual reality (VR), as well as mixed realities. AR and VR are the main representatives of this new class of technology, and they offer vast opportunities for creating value for businesses and consumers. While AR projects digital content into

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AR seems more suited for increasing product purchase intentions, whereas VR is more adept at building overall brand attitude.

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FIGURE 2 › Closing the customer imagination gap with virtual reality

Virtual
Reality

Virtual reality presentation skills
training at Maastricht University

"I am there."

How it works	Transporting users into digital environments, creating the sensation of "I am there."
Examples of closed imagination gaps	› What will the layout and ambiance of a physical servicescape be like? › How does it feel to present in front of a large audience, and how will viewers react to the presentation? › How could I react when faced with a challenging discussion at work?
Potential future developments	› Creation of virtual environments as easily as taking a panorama picture with a smartphone. › Full multisensory experiences with sound, haptic touch, smell and taste. › Integration with brain-computer interfaces.

physical environments and creates a sense of "it is here," VR transports users into digital environments and gives them an "I am there" sensation. Figures 1 and 2 summarize how AR and VR applications work, provide examples of closed imagination gaps and offer an outlook on future developments.

Projecting digital into physical with AR ✕ "Wait a minute, is this for real?" is a common response when customers first use AR to virtually preview products such as furniture at IKEA, Ray-Ban sunglasses, L'Oreal makeup or the food and beverages on the menu at the Dutch café chain Coffeelovers (see Figure 1). AR creates a unique "it is here" experience by making digital content magically appear in the physical

environment, in most cases, with the help of a smartphone camera. The failure of Google Glass still casts a long shadow over wearable AR headsets, though Apple's gradual launch of its Vision Pro might change this in the near future. Nonetheless, current research offers remarkably consistent support for AR's superiority over traditional media like pictures and videos in closing imagination gaps about products. This gives customers the necessary confidence and comfort to make a purchase. Beyond selling products, AR also helps to close imagination gaps when navigating a complex physical space like London Gatwick Airport or remembering important historical events. For example, in the Illinois Holocaust Museum, visitors can have a conversation with AI-powered AR holograms of Holocaust survivors that will "live on" and
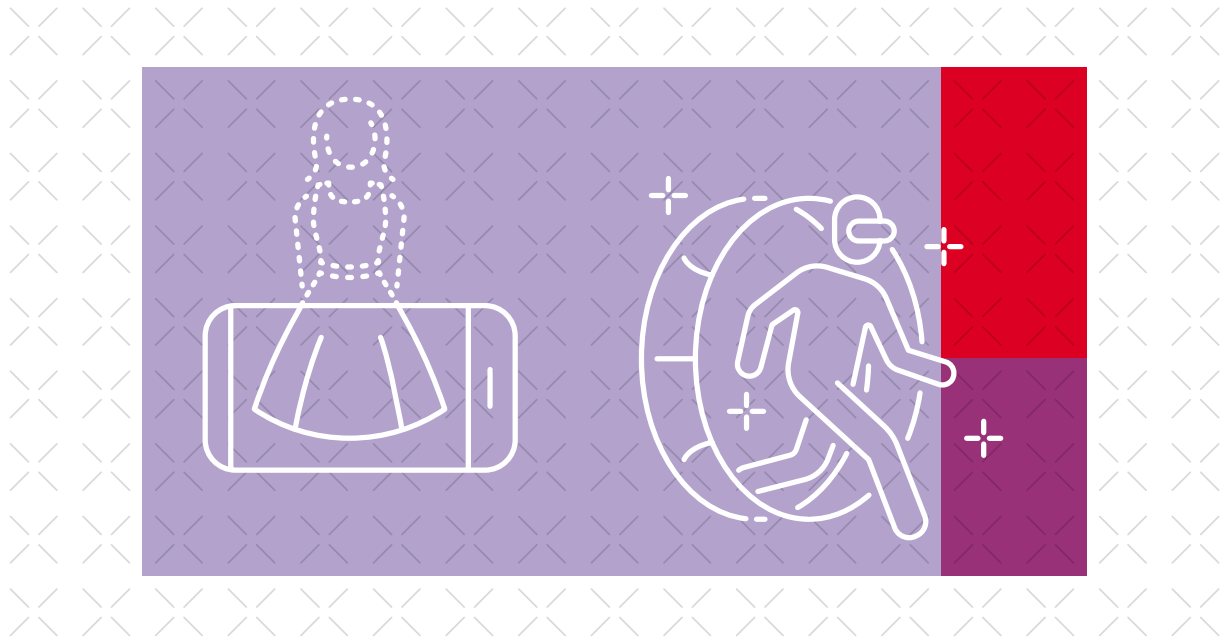
tell their story for generations to come, even after the real "Zeitzeugen" have passed away.

Transporting physical into digital with VR ✕ "Is this going to make me feel sick?" was initially a common concern amongst first-time VR users. Fortunately, the days in which customers needed to place their smartphone in a cardboard box to experience VR, only to be overcome by motion sickness, are over. Advanced and affordable headsets like the Oculus Quest series let customers immerse into a different space (and time), giving them a unique sense of "I am there." In this way, VR opens opportunities for not only improving existing customer experiences but also delivering new value propositions. For example, the Dutch startup Psylaris offers VR experiences aimed at helping patients in mental health-care to process trauma, resulting in significantly decreased subjective distress. VR is also used to enhance the learning experience in higher education, where students often find it difficult to practice crucial soft skills. At Maastricht University, for example, "practicing in the mirror" is rapidly becoming a thing of the past, as presentation skills training in VR lets students immerse themselves into a lecture hall with a seemingly real audience that reacts to what is presented and how it is presented (see Figure 2).

Research insights and managerial guidelines ✕ Based on the above information, it is not hard to imagine how AR and VR might create value for your business. However, effectively leveraging these technologies requires clear strategizing. In our research, we shed light on important strategic considerations and offer advice to managers along the following guidelines.

› **Check the bottom-line impact of using extended realities** ✕ In a series of field studies that we conducted at the Dutch café chain Coffeelovers, we document improved sales from using AR food menus, particularly when these are used to sell bundles of food and beverages. When these AR menus were used for in-store promotion, customers were seven times more likely to buy a product bundle; and when they were used for out-of-store promotion, we found them to drive customers to the store, achieving a 26% conversion rate plus an increased likelihood of purchasing a bundle.

› **AR or VR? Select the right type of technology for your objectives** ✕ There will be situations in which one technology is better suited for achieving a certain marketing objective than the other. In a recent study, we focused on experiential retailing, where companies sell physical products but also leverage the design and atmosphere at the physical point of sale. Here we find some indication that AR seems more suited for increasing product purchase intentions, whereas VR is more adept at building

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It is important to align the deployment of AR and VR with customer needs at specific stages of their purchase journeys.

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overall brand attitude. We attribute this to different types of imagination that are stimulated by the technologies: product-focused imagination, like specific product attributes, can be better stimulated with AR, whereas VR works better for context-focused imagination, like the ambiance in a store.

› **Employ AR and VR at different stages along the customer journey** ⨯ It is important to align the deployment of AR and VR with customer needs at specific stages of their purchase journeys. That is, when moving from awareness and interest to a decision and action, different types of imagination gaps will arise that might be addressed with AR and/or VR. This also offers opportunities for combining both technologies along the customer journey. In the case of online-to-offline journeys, we find benefits in first deploying AR to help customers determine what to buy and then offering VR to support them in imagining the experience of buying and consuming the products when in-store.

› **Take customers' privacy and falsity concerns seriously** ⨯ In our research, we discovered that customers have developed novel concerns about AR and VR. For example, they are concerned about the new ways in which AR and VR collect potentially sensitive, contextual data, such as how customers decorate their homes with AR or how they move and interact within VR spaces. Furthermore, customers seem particularly worried that AR face filters might create a false sense of reality and associated self-perceptions. Current guidelines for the ethical use of AR and VR are limited, so there is an opportunity for companies to lead by example and take a responsible business approach, such as that taken by Pinterest, which does not permit any skin smoothing in their AR filters to combat body dysmorphia.

Taking it even further: neuro-enhanced reality. ⨯ Looking beyond AR and VR, the next frontier technology is already looming on the horizon. Brain-computer interfaces (BCIs) are increasingly integrated with consumer devices such as headphones by Neurable or baseball caps by NextMind that can read brain activity and transform these signals into commands for a digital device. This paves the way for a neuro-enhanced reality (NeR) based on a new way of experiencing AR and VR – namely, without physically controlling a device. For example, during a VR shopping experience, customers can simply think about where to go next or which products should appear. In the longer term, NeR might even eliminate imagination gaps altogether with BCIs that not only read brain activity but actively stimulate brain regions through implants, such as that being developed by Neuralink. Though futuristic, it is possible to imagine everyday use scenarios: when customers use VR to tour a holiday resort before booking, NeR lets them not only see what the hotel or beach looks like but also ''smell'' or ''taste'' the food at the restaurant or ''feel'' the ocean breeze on their skin. ⨯

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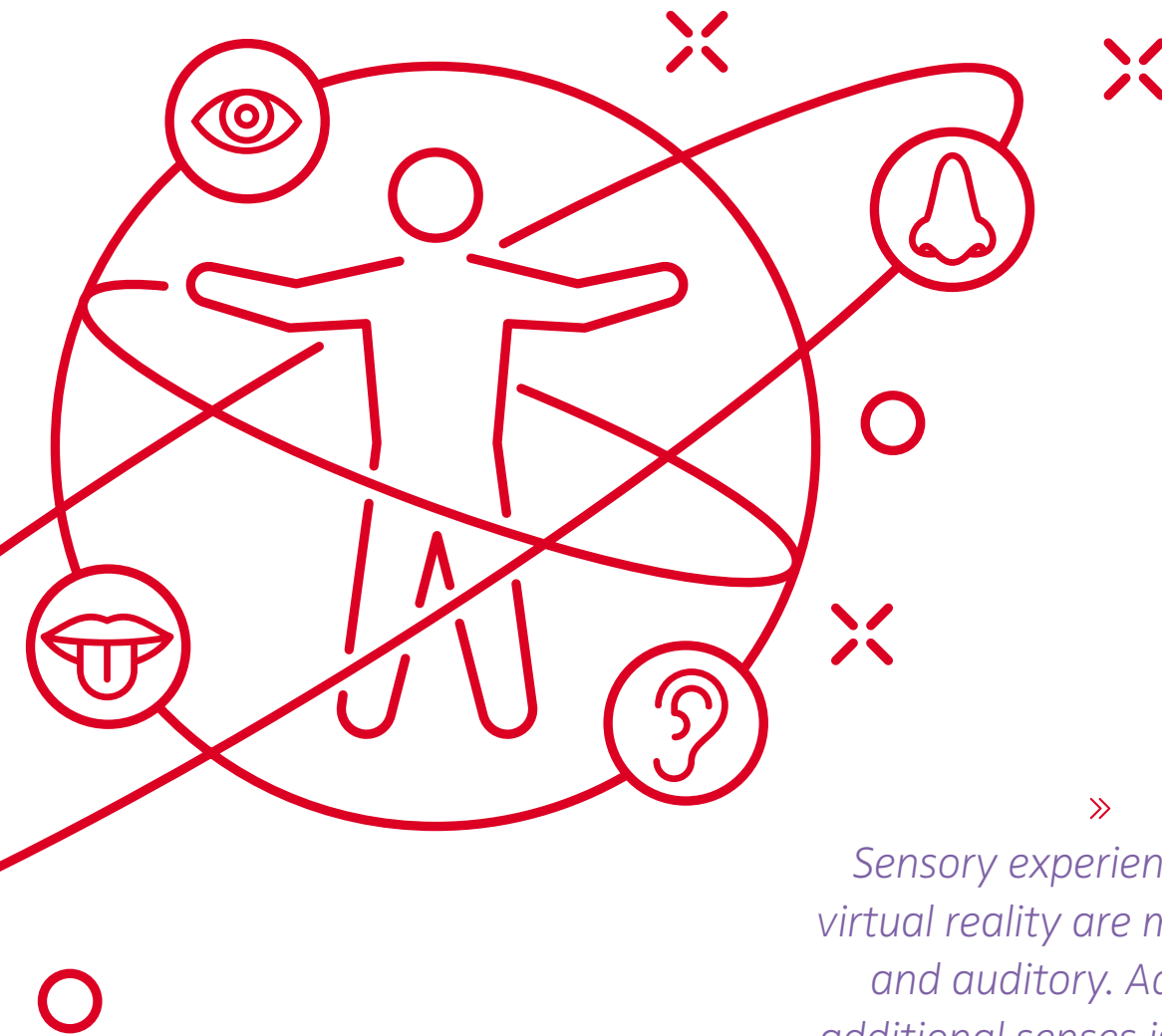# The Homunculus in the Metaverse: Is Virtual Reality Prepared for Our Seven Senses?

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Sensory experiences within virtual reality are mostly visual and auditory. Addressing additional senses is technically challenging.

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Sensing in the physical world ✕ Over millions of years, evolution has shaped our human bodies and brains for sensing, acting and thinking in the physical or actual world. To probe, handle and assess food – a necessity for survival – hands and lips played a key role in tactile sensing. The highest density of receptors can be found in our lips and fingertips, despite their small physical size. Consequently, the proportion of the brain dedicated to tactile sensing is relatively large. As a thought experiment, let's assume that the relevance of our individual senses for acting in the actual world corresponded to the proportions of the brain dedicated to their processing. What if we could visualize these proportions in an intuitively accessible way? Meet Penfield's homunculus, a deformed human shape in which the size of body parts is changed to match those proportions (Box 1 and Figure 1). It seems evolution has prepared us well for the physical world – but how so for the metaverse?

Sensing in virtual worlds ✕ More and more people will likely commute into virtual worlds on a regular basis with the increasing availability of virtual reality devices in consumer markets. However, for the time being, virtual environments only deliver sensory stimulation to a very small subset of human sensory capabilities. The virtual experiences provided today are predominantly visual. If you are lucky, they may be spiced up with some acoustic events. No olfactory, no gustatory and hardly any tactile or kinesthetic stimuli are provided in a systematic manner. If we were to design a homunculus that depicts the adaptation required for the metaverse, it would be quite different from Penfield's homunculus. In fact, our "Homunculus Metaversensis" for virtual reality could look like the one depicted in Figure 2.

Let´s take a closer look at the current "sensory" state of the metaverse and the technologies that stimulate our senses in virtual environments.

The sensory homunculus: If the size of body parts matched the relative brain capacity

In the 1940s and 1950s, the American-Canadian neurosurgeon Dr. Wilder Penfield and his colleagues came up with the idea of creating a map between different functional regions of the brain and a bodily representation. The so-called homunculus shows a gestalt in which the relative sizes of body regions correspond to the relative sizes of the matching functional regions in the primary somatosensory cortex. Figure 1 shows a newer digital version of the homunculus created by us. It can easily be seen that the brain dedicates large parts of its sensory resources to the hands. While the shapes of these body parts do not reflect those of their actual-world counterparts, they do tell us something about their necessity for us to be able to live and act in the physical world.
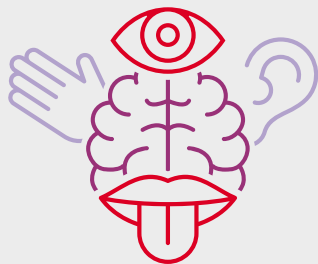
FIGURE 1 > Sensory homunculus

The sensory homunculus represents the relevance of body parts for our life in the physical world.

> **Sight and sound – the observing homunculus** ✕ While the direct perception of tactile stimuli and our own body posture is essential for our acting in the actual world, our information society is driven by visual and auditory perception. It is thus no wonder that media technology has focused on delivering stimuli to our visual and auditory systems from past to present as part of communication media. Virtual and augmented reality technologies such as head-mounted displays like the Varjo XR-3 and the Valve Index, which often combine visual and auditory displays, are ready to continue this success story into the future and are the stepping stones of the metaverse. Advances in computing technology, in particular graphical processing units, together with advanced display technologies embedded in current state-of-the-art head-mounted displays, allow us to experience photorealistic digital worlds at resolutions in which individual pixels are no longer distinguishable by human eyes.

FIGURE 2 › The ''Homunculus Metaversensis'': Current state-of-the-art virtual reality has a visual and auditive focus

> Today's metaverse is designed for the eyes and ears.

> It allows us to interact with and make sense of spatial information.

> There is little to explore for fingers, lips and other tactile sensors.

> Smell, taste and gustatory senses have been mostly neglected and are challenging to address.

The ''Homunculus Metaversensis'' with information processing capacity in the brain adapted to the sensory input provided by virtual reality.

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For the time being, virtual environments only deliver sensory stimulation to a very small subset of human sensory capabilities.

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Virtual reality is not yet ready for all our senses, but maybe research will eventually provide us with breakthrough technologies.

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> **Balance and movement – the experiencing homunculus** ⨯ The fundamental difference between virtual and augmented reality and other types of media is the immersion of the human into the digitally generated world, both in terms of both sensory functions and motor functions. Different tracking technologies allow us to translate the movements of our heads and hands into movements in the digital world. It is no longer about us merely shifting digital information on a confined 2D screen; instead, we now navigate within the digital realm, and the information responds directly to our actions.

Imagine a couple visiting an architect to review the first draft of their new home. Now imagine them trying to navigate a 3D model using a CAD program on the 2D screen of a graphic workstation versus them walking through and around a life-sized 3D model using virtual reality. The latter experience will be easier to navigate, and it will be easier for them to draw insights and conclusions. They can relate the experience to their bodies as a known frame of reference, and it will be easier for them to express their ideas and expectations. Once the basic use of virtual reality technology is understood, the interaction with virtual digital content can be easier and of a higher quality than with traditional digital media.

> **Touch – caressing the homunculus** ⨯ The large hands of the homunculus tell us that tactile feedback is highly important. Consequently, research on haptics and tactile stimulation is far more active than that on olfactory or gustatory stimulation. However, artificial tactile stimulation for the hands is typically quite basic and faces several problems. In the physical world, stimulating the skin by exploring the surface structures of a piece of furniture or assessing the ripeness of a fruit while turning it between our fingers involves some forces while the fingers are pressing against the surface. The artificial generation of forces is, however, difficult to scale to general use cases. Advanced solutions require complex exoskeletons and

are, for example, being assessed for the teleoperation of robots in space – which tells us something about their price tag and the return on investment. There are some affordable tactile solutions for the consumer market, such as tactile vests. Yet, looking at the marketing material, manufacturers apparently did not have new social interactions such as telehugging in their minds but were focusing on more violent encounters. The newly released Sony PlayStation VR2 system at least embraces haptic feedback in the headset as well as on the controllers and the trigger.

> **Smell and taste – feeding the homunculus** ⨯ In the movie The Matrix, the character Cypher decides to betray reality and his friends to stay in the Matrix with the words: "I know this steak does not exist. I know that when I put it in my mouth, the Matrix is telling my brain that it is juicy and delicious [...] <enjoying the bite> Ignorance is bliss!" If he were around today, Cypher would stay with his pals in the physical world. So-called taste display technologies are rather awkward devices that, for example, use physiological effects such as galvanic taste stimulation or chemical substances to elicit responses to basic tastes in our gustatory sensors. An early device called Food Simulator was specifically designed to provide a haptic interface for biting force simulation. The researchers claimed: "Taste is the last frontier of virtual reality" and demoed their system at a virtual reality conference in 2003. Their device was a complex mechanical construct. Users had to put it into their mouths to experience biting on cheese crackers. It simulated the teeth entering softly into the cheese, making contact with the hard surface of the cracker, and biting down more firmly until, in a sudden and satisfying moment, the cracker broke, and the tension resolved. The system was combined with an injection pump delivering a mix of chemical substances to stimulate the basic tastes like sweet or umami and attempted to provide comprehensive sensory coverage for a very particular sensation.

While several such technological approaches exist, even 20 years later, they are still far away from the fidelity of general-purpose display devices available for the visual or auditory domains.

> **The human brain is flexible – the adaptive homunculus** ✕ The good news is that we will adapt to the metaverse quite quickly. The mapping of brain functions evolved in and for the physical world may adapt to the new sensory offerings provided by the metaverse. Lanier, one of the VR pioneers of the 1980s, reported on early work in virtual reality, in which people were given the weirdest bodies to control as their avatars. Much to their surprise, people were able to adapt quickly to new body schemas and were, for example, able to smoothly walk virtual worlds lobster-style.

The idea of an adaptive homunculus and brain plasticity – the ability of the brain to modify its connections or re-wire itself – is reassuring but also raises questions. It is reassuring because flexibility helps people overcome the shortcomings and glitches of current interaction technologies, for example, learning to cope with the loss of limbs or senses in the actual world. They will quickly learn to map their actions to the capabilities offered by technology, and – assuming human-computer-interaction designers do their jobs properly – the technology itself will soon fade into the background of their conscious minds. But can we afford to have this strong focus on vision and sound in the long run? Might augmented reality be a better option for now?

Reconsidering augmented and virtual worlds ✕ Virtual reality is a highly interesting medium for many industries. Its major benefits are realized when the products or services being sold have a manifestation in the physical world that can be visually inspected and explored. If the traditional ways of selling products incorporated showrooms or brick-and-mortar stores in the past, virtual reality will be an important stepstone in the digital transformation of the customer journey.

However, if consumers' decisions depend on other senses as well, augmented reality seems a viable alternative. It works in combination with physical objects so that no simulation of taste, smell or touch is required. If the scent of the interior of new cars or fresh bread will still push consumers over any decision threshold, augmented reality will be the better choice today. From the perspective of our sensory homunculus, there is a clear preference as well: augmenting
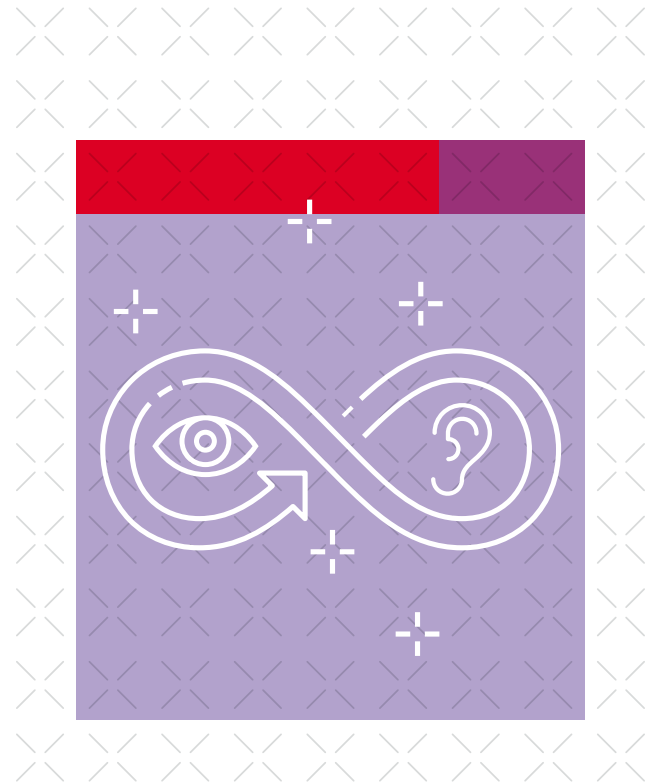
the smell and touch of a juicy orange with visual information about the sustainability of its supply chain on an augmented reality device would satisfy the developed senses and the striving for more information in a consistent manner.

Consequently, virtual reality is not yet ready for all our senses, but maybe research will eventually provide us with breakthrough technologies. Currently, mixed reality applications that combine physical with digital experiences are the better choice to satisfy more sophisticated sensory expectations.   ✕

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Neuroscience Goes Virtual: How to Measure Consumers' Responses in Extended Realities

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A new environment for consumer behavior ⨯ The metaverse is attracting renewed interest due to fascinating possibilities in virtual spaces. While its boundaries are yet to be defined, the main types of foreseen actions in the metaspace are clear. People will interact with others, including simulated people and avatars, in an advanced form of social media. People will also interact with objects such as products. These interactions will take place in any virtual or augmented space that mimics a natural or invented environment. Transporting people to such an environment requires an interface that can evoke a sense of physical presence in the space. This can be delivered through three device types: computer monitors, small and portable screens such as smartphones and head-mounted display (HMD) glasses. Each type creates different levels of immersion into the environment, and technological advancements are increasingly fueling the development of lighter and more powerful devices for virtual reality.

Even as extended realities open up new spaces, little is known about how consumers behave in such environments. Consumer neuroscience tools are a promising way to learn more about the interactions between people and objects.

Figure 1 visualizes how consumers access extended reality where they interact. It also shows the physiobiological responses such as heart rate, eye movements and brain response that can be tracked.

Exploring how consumers behave in virtual spaces ⨯ Pinpointing customer responses has always been challenging for marketers and academic researchers. Attempts to measure consumer reactions through means other than employing questionnaires are becoming popular. Big data is characterized by a massive dataset of input that is short in length and is not conditioned by a closed question. In addition, neuroscience delivers microdata, which represents signals that are more detailed, deeper and collected over time. Neuroscience tools have two main benefits: they capture unconscious and emotional reactions and continuously measure the subject's responses. Since the metaverse embraces human-to-human and human-to-object interactions through computers, smartphones and HMDs, it seems sensible to adopt a deeper measure for capturing users' emotions and unconscious responses.
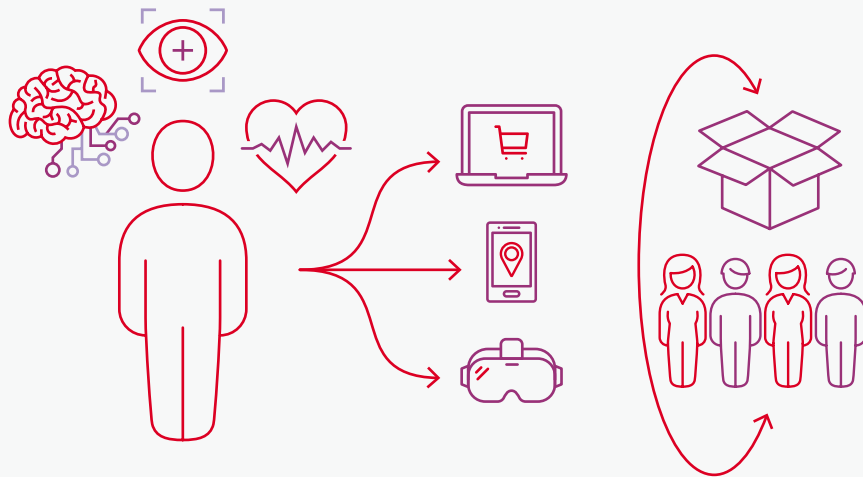
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The multiple applications of extended reality in consumer research are ubiquitous and promising.

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FIGURE 1 › Consumers in virtual spaces: access, interactions and neurophysiological responses

Using neuroscience in extended realities ⤬ While the use of neuroscience tools is becoming popular in marketing research, applying these tools to extended realities is challenging for two main reasons. First, technological developments in extended reality must address the artifacts' signals by integrating them or making them compatible. Second, isolated neuroscience measurements must be synchronized into a single data source.

Further, integrating data from diverse neuroscience signals, behavioral interactions and self-reports is challenging. The essence of this new kind of rich-quality data environment is based on what we call the 3S framework. 3S stands for Stimuli, Sensors and Signals (see Figure 2).

› **Stimuli** ⤬ The influence of individual stimuli on brand choices constitutes essential insight for redefining products, launching new brands and selecting advertising appeals. In an extended reality environment, stimuli can comprise static elements like a door or landscape, dynamic content like 2D or 360° videos and content that changes with different user interactions (e.g., layouts and shapes). Each type of stimulus is a rich source of infor-

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The use of neuroscience tools is becoming popular in marketing research, but applying these tools to extended realities is challenging.

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**FIGURE 2** › The 3S framework for applying consumer neuroscience tools in extended reality
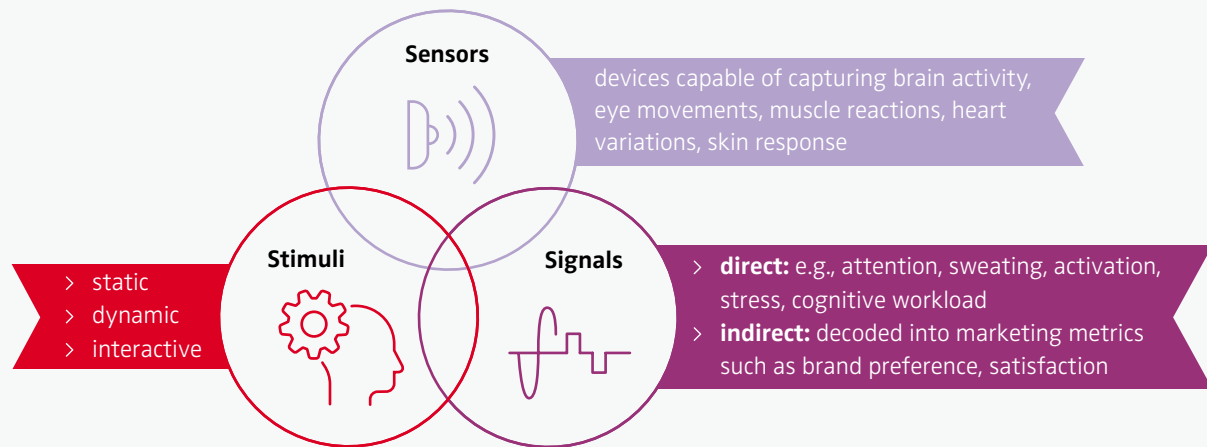
mation for the researcher and can be manipulated as an experimental research instrument. For example, on a shelf, the size, color, position and number of products can be changed according to the objectives. Other stimuli, such as offers, promotional gadgets, advertising formats and store layouts, as well as sensory stimuli, such as music and noise, can be easily modified in a virtual reality setting. Furthermore, try-on or smart mirrors also expand the array of stimuli in virtual spaces.

› **Sensors** ╳ In the neuroscience domain, sensors refer to any device capable of capturing a signal from the central and peripheral nervous systems, including the autonomic and somatic nervous systems. It is possible to track electrical and blood variations in brain areas as well as movements, muscle activity, heart rate variations and skin response. Figure 3 shows that many sensors can be integrated into or connected with interface devices.

› **Signals** ╳ Ultimately, signals refer to any physiological or brain response that indicates a reaction, including attention, sweating, activation, stress, cognitive work-

load or withdrawal. These signals, called direct signals, must be decoded into meaningful marketing metrics or indirect signals, such as brand preference, satisfaction, or positive/negative consumer emotions. Collaborative scientific research should, thus, continue to search for links between direct and indirect signals. While new developments are being made, however, marketing researchers already have available tools to make such research feasible.

Neuroscience tools in different types of extended realities ╳ The three types of interface paths depicted in Figure 1 determine not only the level of user immersion but also the variety of sensors available for capturing users' unconscious reactions. Figure 3 shows which sensors can be used with different interface devices, where the sensors can be attached and the signals they can capture. All sensors work with monitors and smartphones. The sensors can also be used with HMDs, except those for face reading and fMRi. Ongoing developments will allow us to measure emotions through electromyographs attached to VR helmets.

FIGURE 3 › Sensors, key signals and location of interface devices and sensors
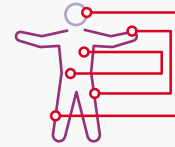
Sensors	Key signal	Location of interface device/sensor
Heart rate	Stress	Wrist
Galvanic skin conductance	Arousal	Hand
Facial expression reader	Emotions	Camera*
Facial electromyography (EMG)	Emotions	Face
Eye tracker	Attention	Stick to device
Voice analyzer	Emotions	Speaker
Motion and reaction time	Interactions	Tracking
Electroencephalography (EEG)	Cognitive	Head
Functional magnetic resonance imaging (fMRI)	Activations	Adapted device*
Functional near-infrared spectroscopy (fNIRS)	Activations	Head

*not possible with HMDs

> **Neuroscience in augmented reality** ✕ Since augmented reality superimposes virtual objects onto a live environment, applying neuroscience tools to users does not demand additional technology. An array of equipment is already available on the market, and costs are affordable. Retail solutions such as fitting rooms, try-ons and large video walls require specific sensors because of the type of screen. However, visualizations through current PC monitors or smartphones are easy to implement. On the other hand, a wearable screen, such as a smartphone, may struggle to capture homogenous signals due to changes in viewing angles.

> **Neuroscience in virtual reality environments** ✕ In virtual stores, museums and restaurants, user interactions with products through their body and hand movements,

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Extended reality can be used to facilitate pretesting and purchase tests, modulating ambient conditions for research purposes.

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stops and revisits can be tracked and analyzed. Tracking provides a valuable opportunity for linking consumer neuroscience tools with behavior in specific situations, such as visiting a virtual store or measuring deliberated versus impulsive buying processes. Again, using PC monitors to apply neuroscience tools to virtual reality environments is relatively easy and affordable to implement. Existing technology can also be utilized with HMDs. Some suppliers embed sensors into their glasses that could be used for data collection. For instance, eye tracking is possible with HTC or Varjo glasses. Further, wearable devices embedded into the human body are becoming common and could overcome the technical barriers of static devices. However, facial readers are not feasible with HMDs as most of these devices limit the visible parts of a face. Still, facial electromyography could be used, and new technological integrations of sensors are emerging in many glasses, e.g., those from Varjo and Galea solutions and from emteq labs. EEG and fNIRS have been successfully applied to humans wearing HMDs; however, the combination of fMRI and HMDs needs further development in the consumer field.

〉 **Neuroscience in mixed reality** ✕ Mixed reality combines augmented and virtual reality and also uses glasses. Therefore, most of the points mentioned earlier on HMDs also apply to mixed reality. For instance, HoloLens 2 provides eye tracking through two infrared cameras and head tracking through four light cameras. However, since this technology is more recent, the costs are still high.

Consumer research applications in extended realities

✕ The multiple applications of extended reality in consumer research are ubiquitous and promising. Regardless of type – augmented, virtual or mixed – they open a fascinating window for research in multiple directions. Extended reality can be used to facilitate pretesting and purchase tests. Pretests include new products or interior designs. In-body product

preference can be tested through makeup, glasses or sneakers virtual try-on apps. Moreover, purchase tests within a product category are possible by displaying the product range on a virtual shelf where a researcher may analyze the assortment, price differences and packaging options. Marketing research can also focus on the virtual presence of other persons like friends, salespeople, experts or influencers that might change consumer decisions. In contrast to conducting such tests in physical space, virtual worlds also have the advantage of being able to modulate ambient conditions like lighting, time of day, townscapes or weather conditions. To summarize, the ingredients for conducting consumer neuroscience-based research on augmented reality and metaverse users are already available, and technological developments are fueling continuous improvements. ✕

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Eye Contact Matters for Consumer Trust – Even with Robots
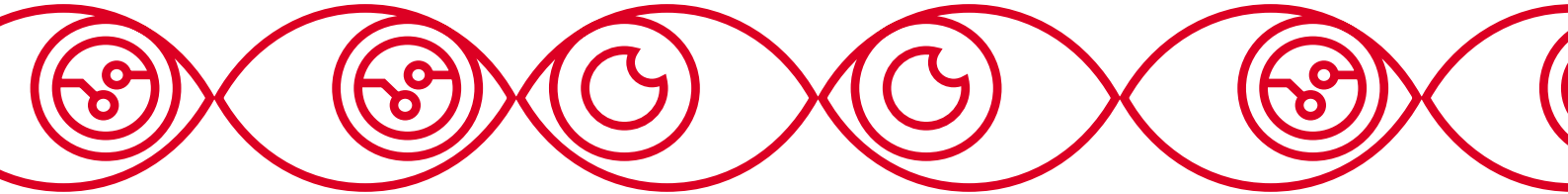
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KEYWORDS

Consumer Trust, Consumer Behavior, Consumer Decisions, Human-Computer-Interaction, Robot, Eye Contact, Human-Likeness, Robo-Advisors

A step into the future: Human-like AI is guiding consumer decisions ⤬ From your daily web searches to personalized email offers and investment advice, AI is no longer wishful thinking but an integral part of the consumer world. Now, AI is becoming even more human by the day. Chatbots can type, voice assistants can talk and some robots can even make eye contact. Robo-advisors have also been making waves in the finance world as new digital asset management tools. They offer convenience, reduced human intervention and high availability to investors in search of online investment services. Most robo-advisors that are currently in use are text-based interfaces. They collect information about a customer's financial situation and objectives through an online survey, propose a suitable investment plan and perform it automatically. But despite the significant market growth of robo-advisors, some investors remain skeptical. It is still a challenge to gain consumers' trust. We investigated whether making virtual finance advisors more human-like leads to more trust. How does this growing ''human touch'' in AI advisory services shape consumer reactions? How do the human-like appearance and behavior of AI advisors affect consumers' trust and decision-making?

How consumers respond to humanoid robots ⤬ When we see machines with human-like features, like a face or a name, we often interact with them as if they were people.

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To enhance consumer trust and satisfaction, providers of humanoid robots should integrate eye contact and other non-verbal cues into their services.

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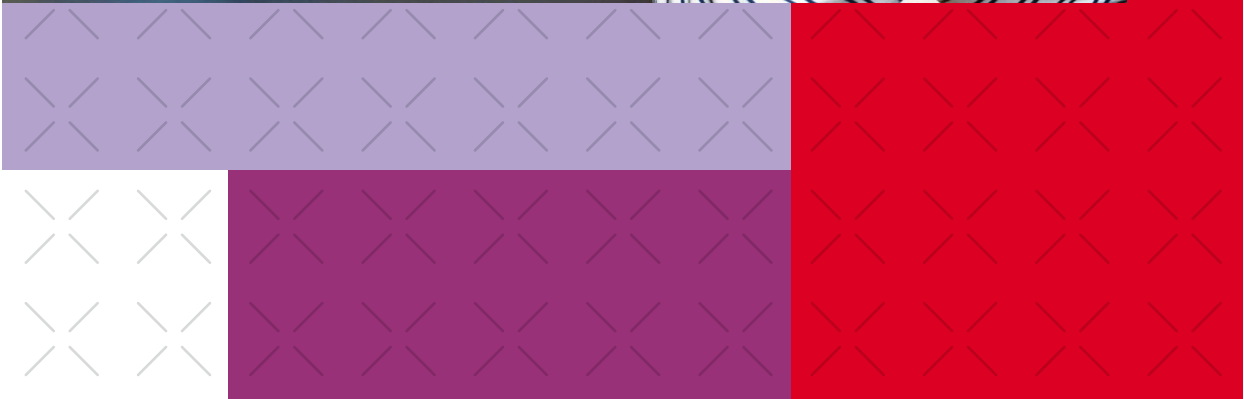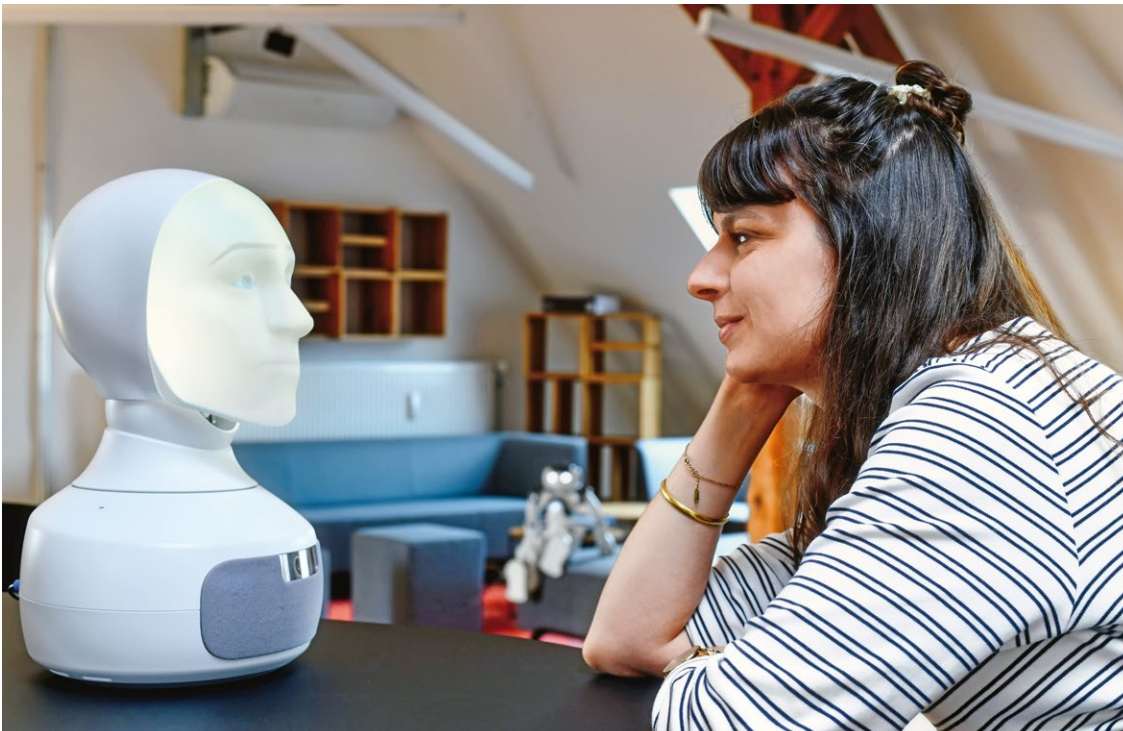
BOX 1

Experiment: Financial consultation with a human and a robo-advisor

To better understand how appearance, behavior, and in particular, the eye contact of a robo-advisor can affect people's investment decisions, we conducted an online experiment. We recruited 4,500 participants in the US, where robo-advisors have grown in popularity in recent years. We assigned the participants randomly to nine groups, each experiencing a different version of a financial advisor. These versions differed in terms of the advisor's appearance and behavior, ranging from human to various types of robots with and without eye contact with the participants and a website with text-based inquiry and advice. Figure 1 shows the different settings of the study.

FIGURE 1 > Nine experimental settings to test how consumers react to financial robo-advisors
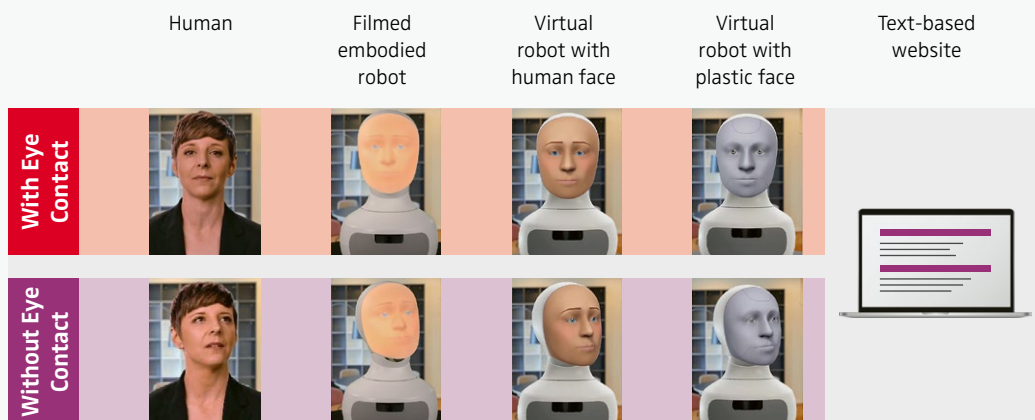
To create a realistic financial consultation scenario, we employed a professional actress to act as a human advisor and the fully programmable social robot "Furhat" as a robo-advisor in its different variations. To "train" the robot and the human, we recorded typical speaking segments and merged them into a virtual advisory dialogue.

We asked participants to imagine a scenario where they had a large sum of money and needed to invest it and invited them to get investment advice in a virtual session in one of our nine settings. After the session, participants had to decide on the amount they would like to invest and whether they preferred a human or a machine to manage their assets. To make the experiment more realistic, the selected investment was simulated based on their investment decisions and reflected in the compensation each participant received for taking part in the experiment. After the consultation, the participants filled out a questionnaire on the quality of the financial advice and on evaluation criteria such as trust, liking, decision satisfaction and willingness to recommend, as well as on their technical, financial and socio-demographic background.

The results showed that the human advisor was trusted most and that robots were preferred over the website version. They also indicated that eye contact matters even for robots – see Figure 2.

FIGURE 2 › Robots with eye contact are rated better by consumers than robots without eye contact
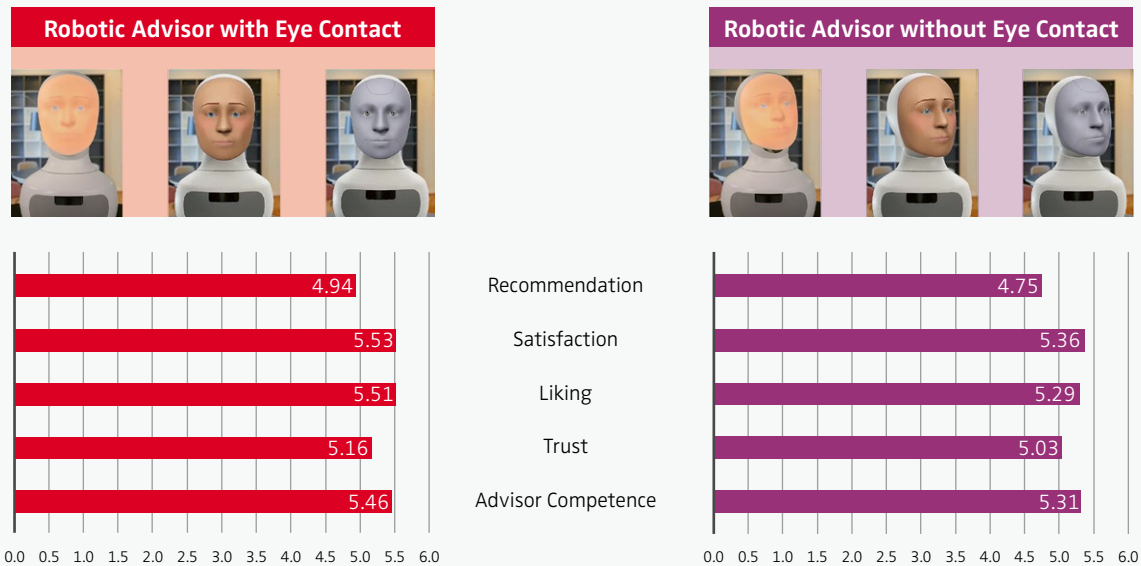

Evaluation on a 7-point Likert Scale

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People trusted human advisors more than robotic ones, but robotic advisors performed better than text-based websites.

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For example, in a voice shopping experiment, we found that a happy artificial voice can elicit similar positive emotions and consumer satisfaction as a happy human voice. The more human-like an artificial agent appears, the more likely we are to trust it. For example, people have higher trust in autonomous driving if the self-driving car has a name, gender and voice. On an e-commerce site, people find virtual shopping assistants more likable, appropriate and trustworthy when they look more like humans than like cartoons. However, there are many factors that make us human, such as gestures, facial expressions, speech and behavior.

In this study (see Box 1), we investigated how employing human-like agents as financial robo-advisors impacts consumer trust and investment decisions compared to human agents or text-based services. We further tested how eye contact, which is one of the most important non-verbal signals of social interaction between people (see Box 2), affects trust and investment decisions when it comes to robots.

Human-like advisors are preferred over text-based services ✕ People trusted human advisors more than robotic ones, but robotic advisors performed better than text-based
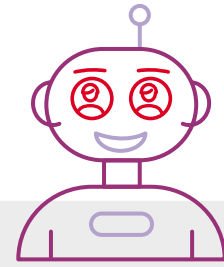
BOX 2

The importance of human eye contact

Eye contact is a fundamental aspect of human social interaction. During conversations, people tend to look at each other about 60% of the time, with half of that time being mutual. Eye contact signals turn-taking, expresses intimacy and exercises social control. Our brain has dedicated areas for interpreting eye contact, making it a critical non-verbal signal in social interactions. Even newborns react to eye contact, showing its importance in early development. Eye contact impacts cognitive processing, including attention, arousal, memory and trust. People who make eye contact are perceived as more likable, attractive and trustworthy than those who do not.

Eye contact is important not only in social interactions but also in marketing. Salespeople who make eye contact are viewed as more empathic, personal and trustworthy, and their sales presentations are perceived as more believable and interesting. Conversely, when frontline employees avoid eye contact, it can create a negative first impression and decrease consumers' satisfaction with the service. Additionally, consumers remember more information about products when presented by salespeople who maintain direct eye contact. Even in online advertising, models with directed eye gaze can increase consumer arousal. It's worth noting that the impact of eye contact can vary depending on cultural and gender differences. For instance, a study found that direct gaze in advertisements may shift male attention to the model's face and female attention to the brand name.

websites. Participants who had a consulting session with a robotic advisor were more satisfied with their decision and the overall service and found the recommendation more relevant than participants with a text-based website consulting session.

When deciding between machine- or human-managed assets, participants who consulted with a robotic advisor were more likely to choose the machine-managed assets than participants who consulted with a text-based website. This shows that the human-likeness of the consulting interface impacts not only peoples' attitude toward the consulting service but also their decision whom to entrust with the management of their assets – robot or human. The impact of the human-likeness of the interface is small but significant and should not be neglected. The human-like appearance of the advisor makes a difference – and if he behaves more like a human, it makes even more difference.

Eye contact is key even when consumers are dealing with robots ✕ Eye contact is important for pleasant and productive social interactions. Previous studies have shown that a robot that looks at you with its plastic eyes can evoke a similar response as human eye contact. People tend to react positively to robots making eye contact, perceiving them as more social and intelligent. Additionally, people tend to be more honest when in the presence of a robot making eye contact. Our study also reveals that eye contact with a robotic advisor has similar effects as eye contact with a human advisor and is essential for trust and satisfaction.

Human-likeness increases consumers' trust in robots ✕ The participants who had eye contact with the robotic advisor (see the red column in Figure 2) rated the advisor as more competent, trustworthy and likable and showed a higher overall satisfaction and willingness to recommend the service in contrast to participants who did not have eye

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*Eye contact with a robotic advisor has similar effects
as eye contact with a human advisor and is essential
for trust and satisfaction.*

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contact with the robotic advisor (see the purple column in Figure 2). The impact of eye contact is subtle and small but significant and should not be ignored. However, eye contact did not directly lead to higher investments. There was no significant difference in the amount of money invested between participants with and without eye contact with their robo-advisor. There is only a weak indirect connection between eye contact and the invested amount of money: Eye contact increases trust, and greater trust, together with increased risk affinity, goes hand in hand with higher investments.

Takeaways for companies and consumers

Service robots might be game-changers and are predicted to transform the service industry. They can provide many advantages, like being available 24/7 and high efficiency. But will people actually embrace them? In our study, we gained valuable insights that could help managers and consumers in their decision-making concerning service robots and other related AI advisory services.

› **Make artificial advisors human-like** ⤫ Companies have the chance to use humanoid robots to improve the quality of their advice and interactions with consumers beyond that of text-based websites. Online providers of financial services, in particular, should consider using humanoid advisors rather than text-based services to gain wider acceptance and make the consultancy experience more pleasant for their customers.

› **Ensure eye contact** ⤫ The findings of our study also suggest that eye contact is important not only between consumers and human advisors but also between consumers and robotic advisors. Providers of robotic services should incorporate eye contact at appropriate times and other non-verbal cues, such as nodding and smiling, in their services to enhance consumer trust and satisfaction.

› **Consider the influence of human-like AI** ⤫ Consumers should be aware that they tend to trust and follow the advice of human-like artificial intelligence more compared to more traditional forms of presentation and should consider this when making decisions. It is important to know that even tiny social cues, such as eye contact with a robot, may affect people's attitudes and potentially their decision-making.

› **Stay informed about AI developments** ⤫ Consumers should be aware of these effects and stay alert to developments and findings related to the effect of robotic services. This can help them make more informed decisions about whether to use these services and how to best interact with them.

Our findings have implications for society as well. Understanding the possibilities and limitations of how AI can influence consumer decisions is important for the discourse about the role of AI in society and the regulations this new field might require. ⤫

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FURTHER READING

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Kaiser, C., & Schallner, R. (2022). How artificial attention shapes human intentions. NIM Insights, 2022(2).

Kaiser, C., & Schallner, R. (2022). The impact of emotional voice assistants on consumers' shopping attitude and behavior. Wirtschaftsinformatik 2022 Proceedings, Nuremberg, Germany.

Diving into a New Reality: How Immersive Experiences along the Customer Journey Succeed

Interview with Julian Weiss, CEO and founder of headraft

Brand communication is entering a new era. Immersive technologies such as AR (augmented reality) and VR (virtual reality) enable memorable experiences along the entire customer journey as the combination of real and virtual elements creates innovative forms of consumer-brand interaction. Read in our interview how to implement successful immersive campaigns that people care about and share on social media. Julian Weiss, co-founder and CEO of Hamburg-based agency headraft, expects many more XR (extended reality) applications as "retailing will increasingly become an experience space." He sees their greatest potential in a symbiosis of real and virtual elements.

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Jella Pfeiffer ✕ *Your agency, headraft, is known for its expertise in creating interactive and immersive consumer experiences. Can you share some recent successful projects you've worked on?*

Julian Weiss ✕ Absolutely! We've had quite a diverse range of projects lately. For example, we developed an augmented reality (AR) tour app for the Berliner Ensemble, a hearing test experience in Roblox for the hearing aid manufacturer hear.com, and also worked on key visuals, an AR sales tool, and a mixed reality pitch experience for the Quest Pro, which is used by a Munich-based flight startup called Vaeridion. Additionally, we've been involved in social AR projects that span internationally, creating AR effects, lenses and filters for platforms like TikTok, Instagram and Snapchat.

The projects sound very interesting. How do you approach them?

We don't see AR and VR as one-time PR stunts. Instead, we consider them as comprehensive communication channels. Our goal is to create strategic solutions that provide long-term value to our clients and are adaptable to evolving technology trends. We want our projects to be interactive and impactful not just once but have lasting benefits over time.

Which projects have long-term success?

The projects that cover multiple touchpoints. Instead of focusing solely on out-of-home experiences, point-of-sale activations or trade show booths, successful projects connect

all these touchpoints in a holistic manner. With our real-time solutions, we can engage users individually and interactively, guiding them seamlessly across various touchpoints. These projects are enjoyable to work on and have the greatest impact because we don't have to create entirely new content for each channel. For example, it's common for us to create a compelling and unique on-site experience that is complemented by a web presence and social media content. We also might turn these experiences into dedicated sales tools, ensuring a consistent and impactful customer journey across different platforms.

So, in linked projects, consumers recognize that it's the same campaign, right? The content is similar but varies with touchpoints?

Yes, exactly. We executed such a project for Snipes and Nike in six European cities. During the lockdown, we used the store windows for an interactive game experience, essentially a high-score game. Users could play and participate in the contest 24/7, without entering the store, and compete against each other. From this content, we simply adapted a game for their Instagram channel. The style and branding were consistent, but the experience was tailored differently depending on the technology medium and the target audience. Interactive communication becomes very successful when the content is optimized for the technology medium and the audience.

How can we imagine branding being consistent but different?

There are various ways to communicate a brand in interactive media. We can effectively convey to users the brand world they are in without being too overt, boring or off-putting. For example, logos are perfectly normal on Instagram or TikTok, while on Roblox, they are often used more sparingly. The more virtual the experience, the more the brand's language and design become part of the world-building and storytelling.

Can different touchpoints be translated into the metaverse as well? Since interactions also happen there, could I play a game or see an ad while virtually strolling through the metaverse? Would directly transferring a concept to the metaverse be successful?

Not necessarily. At the beginning of the metaverse trend, many simply tried to replicate real-world experiences in a

← **JULIAN WEISS**

ABOUT JULIAN WEISS

Julian is the co-founder and CEO of headraft. He studied Film and Visual Effects at the Filmakademie Baden-Württemberg and has lived and worked in Berlin, London and Vancouver.

ABOUT HEADRAFT

headraft is a Hamburg-based agency specializing in immersive brand communication. It was founded in 2016 and uses augmented, mixed and virtual reality to develop interactive and sustainable consumer experiences along the entire customer journey. The agency currently has 24 employees, including interactive developers, designers and experts in strategy and communication who work together in interdisciplinary teams which develop all services in-house. Its clients include Kaldewei, Lufthansa, Sony Music, Channel 4, Netflix, Spotify, Gustavo Gusto and Brillux.

www.headraft.com

THE INTERVIEWER
The interview was conducted by Jella Pfeiffer in June 2023.
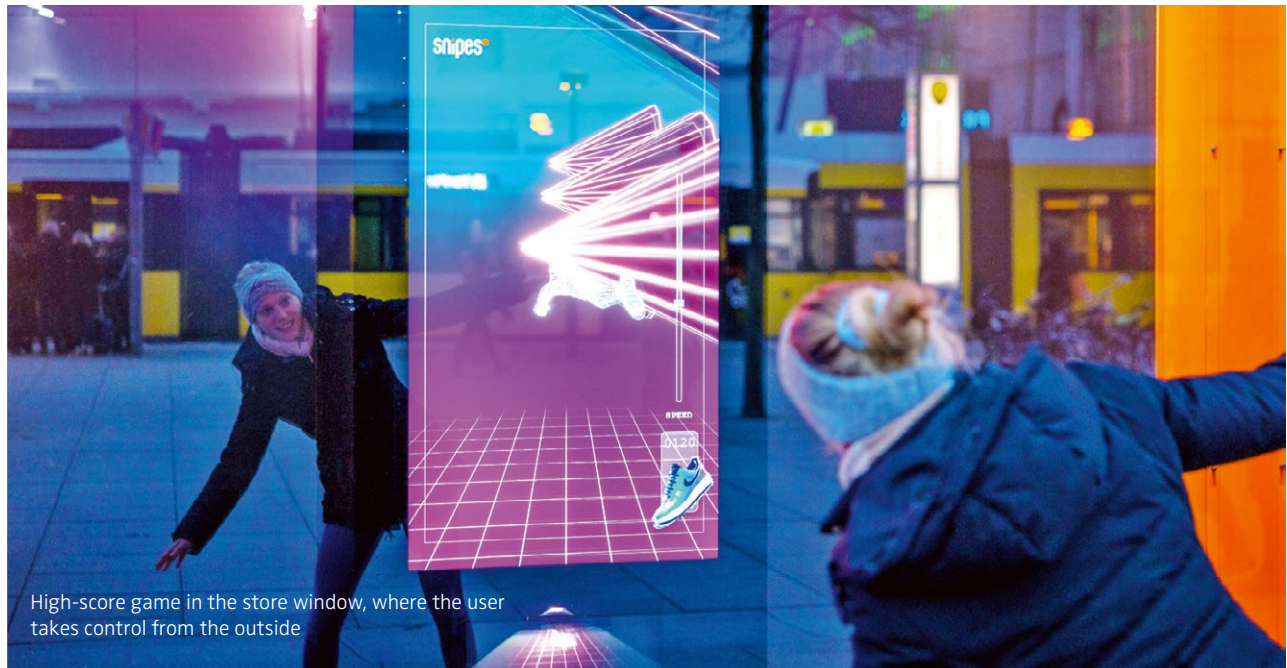
High-score game in the store window, where the user takes control from the outside

digital form, which was not always successful. You should never underestimate or overlook the interactive mechanics and technical possibilities of experience design. Different interaction points or content can be excellently and interestingly interconnected in a purely digital world.

Which approach would be more promising? What should be considered?

In the virtual space, I can walk, but do I always have to? I don't necessarily stroll 100 meters from point A to point B there; that often doesn't make sense. In experience design, we focus on quickly leading users to engaging and relevant information, and that's why the touchpoints need to be de-

signed appropriately. Initially, this aspect was often neglected. People simply tried to mimic reality, including branding and marketing, with overly overt methods.

So, the interaction forms are also different. Advertising needs a complete redesign, meaning it should be seamlessly integrated into the context?

Yes, exactly. Recently, we worked on a project for hear.com, a company that manufactures hearing aids. The client wanted to create more awareness among a young target audience about the risks of high-volume listening, encouraging people to be mindful of their headphone volume in daily life. We developed a virtual hearing test on Roblox that feels fun and

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Not every experience is award-winning; you have to experiment to learn more about your target audience.

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Screenshot from the Roblox gaming experience, which playfully tests and warns users against listening to music too loudly
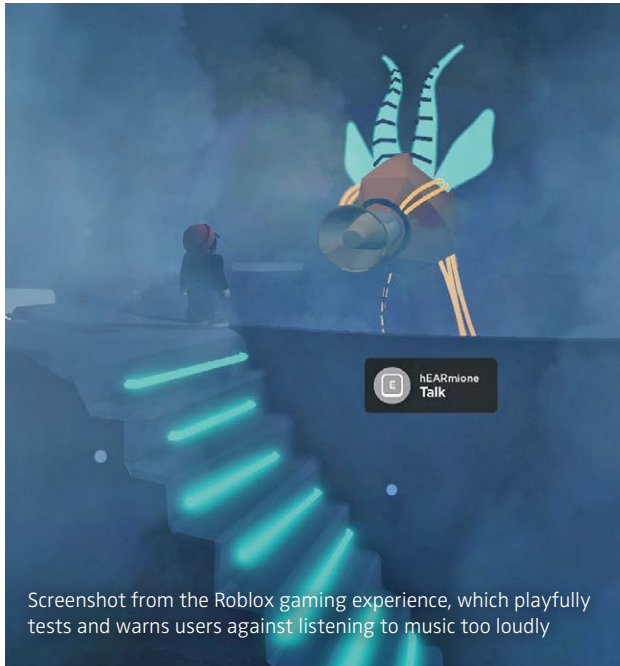
relevant to the target audience without imitating boring reality. The gaming experience subtly includes these hearing tests and communicates the brand, not overtly but rather between the lines within the experience. This is how branding and marketing should happen in these virtual worlds, commonly referred to as the metaverse.

One of the significant advantages of VR experiences is the seamless integration of brands into contexts like games. Do you also see any disadvantages?

VR experiences in marketing are still relatively rare as they often appeal to a limited number of people and are mainly suitable for very specific use cases. For instance, we worked on a project for a medical company that aimed to make the workings of a medication in the body come alive by demonstrating what happens inside a cell. It's fascinating to experience in VR and offers educational value, but such an experience cannot be scaled classically because the target audience with the required hardware is relatively small. The limited reach often doesn't justify the necessary investments. When we use VR on a larger scale, we almost always combine it with AR or web experiences that can be broadly distributed to all user groups.

So, in marketing, different channels are usually combined to make experiences accessible to a broader audience?

Yes, exactly. If we look at the sales funnel from our perspective, experiences on the awareness level are usually less scalable but more impactful. For example, in the medical case mentioned earlier, we can make connections tangible and demonstrate the drug's effects through playful interaction where users can "administer" a medication dosage themselves. As we move further in the funnel, experience formats become more scalable and diverse: Mixed reality experiences for a trade show, alongside that same content in AR on iPads for the sales team, and also easily accessible as a web experience for customers on their mobile phones. The advantage of individually tailored immersive communication strategies is that they can adapt to different user segments.

Would you say that AR has already established itself in marketing and is frequently requested?

Absolutely, especially when we consider social AR. In the areas of wearables, fashion and try-ons, AR has become very popular, closely followed by quizzes and games. Platforms like Instagram, Snapchat and TikTok are excellent at showcasing these experiences. Furthermore, the brand gains additional relevant information from the experience statistics, for example, which models and colors users find more exciting. These insights have a significant impact on marketing decisions and cannot be easily obtained through linear communication.

How do you measure the success of an AR implementation compared to a regular mobile application?

We look at both the view time and dwell time, which measures the time users actively spend in the experience, and the social context, which encompasses everything happening on social platforms and can have a massive impact. The experience should be excellent, playful and customizable, making it easy to share user-generated content (UGC). When this happens, UGC content and view time for AR experiences are often striking and lead to incredible scalability. This is evident in casual gaming experiences or try-ons that allow users to play with their personal preferences. Additionally, each experience helps us gather more information about our customers. In the B2B sector, the sales team can directly mirror the customer's feedback, as products or processes can be visualized interactively in AR during on-site meetings, making the conversation more engaging.

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When dealing with new technologies, it's essential to have a long-term strategy rather than just a one-off event.

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Are there specific AR experiences that work exceptionally well? What have been your experiences?

For social AR, we can answer that quite well: try-ons, randomizers, games and quizzes. Instagram and Snapchat are established partners for such experiences. TikTok, on the other hand, still has significant untapped potential. We have our own TikTok channel and are the first official German branded effects partner of TikTok in Germany. Through this, we publish our own branded effects. We have only 200 followers, but they have recorded more than 70,000 videos with our AR effects and reached a total of 113 million views – without paid media. This puts us in the top 1% of effect creators on TikTok. Brands can learn from this success and use it to their advantage. However, not every experience is award-winning; you have to experiment to learn more about your target audience. Armed with these insights, you can move forward and create more tailored experiences. When dealing with new technologies, it's essential to have a long-term strategy rather than just a one-off event; otherwise, you might miss out on significant potential.

So, in AR experiences, user-generated content plays a significant role, and people might not even realize that they are part of a marketing campaign. Do you just need to initiate the initial spark, and everything else unfolds on its own?
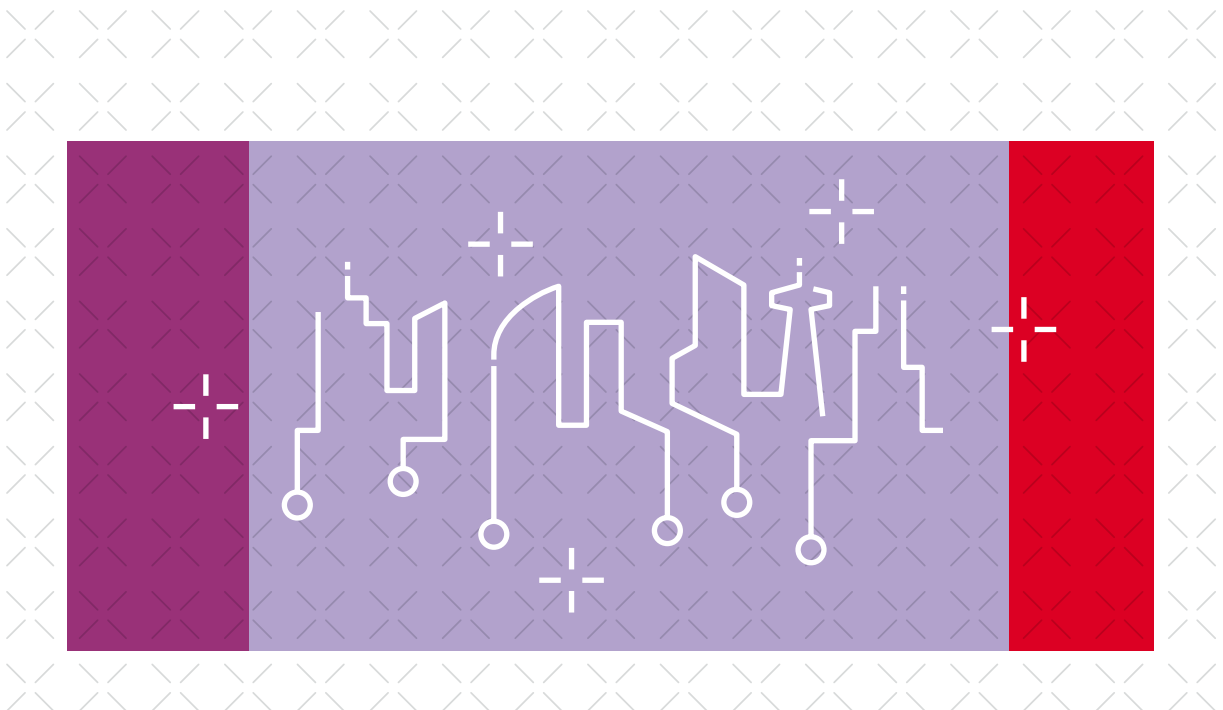
Almost. Users are encouraged to create AR challenges, looks or fun experiences and share them with their friends. This can become a powerful marketing multiplier within a specific target audience. However, even with these experiences, brands should avoid overwhelming users with their logos and excessive branding. A more subtle approach is often more effective. For example, on TikTok, fun and playful effects are well received, while the approach on Snapchat or Instagram might differ based on the audience's tone and preferences.

Meaning AR and VR achieve higher engagement compared to traditional media?

Yes, that's correct, but it's crucial to think beyond just one platform and extend the experience to other touchpoints. For instance, try-ons can be brought to the point of sale using virtual mirrors, where users can try products without requiring their own device. The content can also be showcased on the web or on a larger scale as a branded world in virtual space or the metaverse. The key to success is always seamless integration with the overall communication strategy.

Did the hype around the metaverse boost your business?

The metaverse hype initiated by Mark Zuckerberg created a lot of confusion, and many people were afraid of missing out. We had to explain a lot and clear up the media fog because, in reality, the metaverse doesn't fully exist yet. Brands have experimented with virtual multiplayer experiences, but it doesn't mean the metaverse will take off massively right away, and not everyone has to jump right in. Consequently, the impact on the number of our projects was manageable. Instead, we focused on how to sensibly and sustainably incorporate ideas from managers and their interest in the field without wasting resources on a short-lived PR case that loses interest after two months.

How is your team structured and organized?

We handle everything in-house, which is crucial for an effective creative-technical collaboration. The technological landscape is constantly changing, and to stay up-to-date, we need to integrate consulting, strategy and production as a unified team. All team fields are involved from the start, regardless of whether it's a small project or a large-scale campaign. This diversity in our projects allows everyone

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Stores will transform into brand spaces where the real world is enriched with virtual elements.

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to learn and enables us to assemble specialized teams for specific cases, ensuring the best fit for each project.

Finally, looking into the future, how do you envision e-commerce in ten years?

I believe retailing will increasingly become an experience space. Stores will transform into brand spaces where the real world is enriched with virtual elements. It will be a fantastic blend and an exciting symbiosis because people will always love the tactile experience, real-life interactions and human touch. Technology may not be able to fully compensate for that anytime soon, if at all. On the other hand, digital technologies offer much faster and more personalized experiences, insights and touchpoint interactions. The virtually created spaces can adapt much more to individual preferences, resulting in an incredible diversity in consumer engagement. Real and virtual worlds will undoubtedly merge, and we are only at the beginning of this journey.

Thank you for sharing insights into your experience studio and highlighting the opportunities that AR and VR offer in marketing and retailing. We look forward to discovering the new mixed experiences that await us. ✕

Editors

Jella Pfeiffer is a Professor of Business Administration and Information Systems at the University of Stuttgart. Previously, she worked as a professor at the Justus Liebig University in Giessen, a postdoctoral researcher and deputy professor at KIT and HEC Lausanne and as a visiting fellow at Harvard, among others. Her research focuses on intelligent assistance systems in e-commerce and virtual reality commerce, sustainability issues and the fairness of AI algorithms. Methodologically, she is an expert in experimental research, eye-tracking and data science. Her projects explore, for example, how the design of chatbots influences consumer behavior or what opportunities and risks data gathering in virtual reality poses to business and consumers. In her most recent studies, she uses gaze data to explore how intelligent assistance systems can identify consumer preferences and support needs during a virtual shopping experience and how to provide consumers with the best possible assistance. Her work has been published in leading journals such as *Information Systems Research,* the *Journal of Management Information Systems,* the *Journal of Operational Research* and the *Journal of Business Research.*

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