

A REVIEW OF THE IMPACTS AND IMPLICATIONS OF WEBAR ON THE 4PS

Kishokanth JEGANATHAN

Poznan University of Economics and Business; kishokanth.jeganathan@phd.ue.poznan.pl,
ORCID: 0000-0002-0681-1117

Purpose: The rapid ascent of digital technology has consistently altered the landscape of traditional marketing, presenting both novel challenges and opportunities. This review endeavors to dissect and elucidate the intricate relationship between Web-based Augmented Reality (WebAR) and the cornerstone of marketing strategy: the 4Ps – Product, Price, Place, and Promotion.

Design/methodology/approach: Drawing on a comprehensive analysis of existing scholarly works, industry reports, and case studies, the article illuminates the current manifestations of WebAR within the 4Ps framework, demonstrating its transformative capacity in areas such as product visualization, dynamic pricing displays, virtual storefronts, and augmented promotional campaigns.

Findings: Through the synthesis, the article underscores the imperative for marketers to understand, adapt, and innovate in the face of an increasingly augmented digital landscape, even in the absence of quantitative metrics.

Originality/value: The findings serve as both a foundational resource for scholars and a strategic guide for practitioners seeking to navigate the confluence of WebAR and modern marketing.

Keywords: Augmented Reality, Web Augmented Reality, Marketing Mix, Review.

Category of the paper: Literature review.

1. Introduction

In an age dominated by rapid technological advancements, staying ahead of the curve is not just beneficial but often necessary for survival in the cutthroat world of business (Ahlstrom et al., 2020). New technologies often bring about shifts in consumer behaviour, demands, and expectations. Companies that are early adopters and adept at integrating these innovations into their operations or offerings are often better positioned to capitalize on new market opportunities, enhance their brand value, and secure customer loyalty (Chanyasak, Koseoglu, King, Aladag, 2022). Leveraging new technologies can also foster internal efficiencies, drive

down operational costs, and open avenues for new revenue streams (Sjödín, Parida, Palmié, Wincent, 2021). Competitive operating environments also requires organizations to explore new capabilities and exploit current capabilities for sustained innovation (Wang, Hsu, 2014) with Radicic and Petković (2023) positing that the sustained success of SMEs is directly related to their ability to adopt emerging technologies. However, for all the benefits, it's equally critical to understand the implications of these technologies on existing business models and strategies. This is where the exploration of the impacts of technologies like WebAR on established frameworks like the 4Ps becomes invaluable.

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Web-based Augmented Reality, commonly known as WebAR, is an innovative technology that allows users to experience augmented reality (AR) directly through web browsers, without the need for specialized apps or software (Jeganathan, Szymkowiak, 2023). By merging the physical and digital worlds, WebAR provides enriched and immersive experiences that are easily accessible to a wide range of users. The advantages of WebAR over traditional AR are numerous. Firstly, by eliminating the need for app downloads, WebAR removes barriers to entry, making AR experiences more inclusive and instantly available (Baruah, 2021). This immediacy is pivotal in a world where consumers expect seamless interactions. Secondly, given its browser-based nature, WebAR ensures wider compatibility across devices, ensuring a more extensive reach (Krasko, 2021). Finally, from a business perspective, the ease of sharing WebAR experiences (via simple web links) can significantly enhance viral marketing potentials and consumer engagement.

While the advantages and potential applications of WebAR are evident and has seen usage by many brands, its implications and impacts on the traditional 4Ps of marketing are less explored in literature. Given the profound ways in which technology has reshaped business paradigms in the past, it's reasonable to postulate that WebAR could redefine how products are

developed, priced, placed, and promoted. Yet, comprehensive analysis in this specific context remains scarce. The aim of this research therefore is to undertake a comprehensive review of the impacts and implications of WebAR on the 4Ps of modern organisations today. We consider this pivotal as WebAR emerges as a potent force in the confluence of technology and business, and understanding its impacts on established frameworks are important for business improvements. This research aims to shine a spotlight on this critical area, providing valuable insights for scholars and business leaders alike.

This research seeks to make pivotal contributions both to the academic realm and the world of business. From a scientific perspective, it aims to extend the literature on the interplay between emerging technologies and traditional marketing frameworks. By offering a comprehensive analysis of WebAR's effects on the 4Ps, it will provide scholars with a foundational understanding, paving the way for further research into the nuances of WebAR's implications across various industries and contexts. For businesses, this research offers actionable insights that can guide strategy formulation and execution in a WebAR-augmented world. By understanding the potential shifts and disruptions caused by WebAR on the 4Ps, businesses can better anticipate challenges, harness opportunities, and fine-tune their strategies to align with the evolving landscape. This, in turn, can lead to enhanced customer engagement, optimized marketing efforts, and improved bottom-line results.

2. A review of the Impacts and Implications of AR on the 4Ps

The 4Ps—Product, Price, Place, and Promotion—serve as the bedrock of marketing strategy, collectively shaping the way companies position and sell their offerings in the marketplace (Al Badi, 2018; Festa, Cuomo, Metallo, Festa, 2016). The "Product" element embodies the solutions businesses provide, be it physical goods or intangible services, tailored to address specific consumer needs or desires (Armstrong, 2009). "Price" not only refers to the monetary cost but also represents the perceived value, determining the balance between attractiveness to consumers and profitability for businesses. "Place" emphasizes the importance of optimal distribution channels, ensuring that products are available where and when consumers want them. Lastly, "Promotion" encapsulates the myriad communication strategies and tools used to create awareness, generate interest, and drive purchase decisions. In the modern business era, where competition is rife and consumers are empowered with more information and choices than ever, merely understanding and implementing the 4Ps is not enough. To truly thrive and surpass competitors, businesses must perpetually innovate within these parameters (Am, Furstenthal, Jorge, Roth, 2020). This might involve reimagining products to cater to emerging consumer trends (Arora, Dahlström, Hazan, Khan, Khanna, 2020), recalibrating pricing strategies in light of global economic shifts, leveraging technology

to redefine distribution methods (Singireddy, Daim, 2018), or harnessing novel promotional techniques like digital and influencer marketing (Campbell, Farrell, 2020). In essence, the 4Ps, while foundational, are not static. They demand continuous evolution in response to both market dynamics and competitive pressures. Companies that proactively seek to innovate and optimize their 4Ps positioning are better equipped to distinguish themselves in the marketplace, thereby achieving not just relevance but also a definitive competitive advantage.

Augmented Reality (AR) has carved its niche as one of the most transformative technologies of the 21st century. By superimposing digital data onto the real world, AR provides an immersive experience that blurs the boundary between the physical and the virtual, thereby enhancing users' perception and interaction with their surroundings (Hilken, De Ruyter, Chylinski, Mahr, Keeling, 2017). From gaming and entertainment to healthcare and education, AR has found multifaceted applications, reshaping the way we understand and interact with technology (Gatter, Hüttl-Maack, Rauschnabel, 2022). A noteworthy iteration of this technology is WebAR, which brings the wonders of augmented reality directly to web browsers without the need for dedicated applications (Frangoudis, 2020). It stands at the intersection of digital innovation and user experience, enabling augmented reality experiences directly through web browsers without the need for specialized apps (Jeganathan, Szymkowiak, 2023). By merging digital elements with the physical environment, WebAR provides users with a unique, immersive interaction that's easily accessible. This technological breakthrough has profound implications for the traditional 4Ps of marketing—Product, Price, Place, and Promotion. By integrating WebAR, businesses can enhance and reimagine these marketing pillars, making their strategies more dynamic, interactive, and tailored to the contemporary consumer. The overarching potential of WebAR lies in its ability to amplify the effectiveness of the 4Ps, offering enriched consumer experiences, broader accessibility, and more engaging promotional tactics. As the digital landscape continually evolves, leveraging tools like WebAR becomes pivotal for businesses aiming to stay ahead of the curve and fortify their marketing strategies in an increasingly competitive market.

When comparing traditional AR with WebAR in table 1, several key differences emerge. Firstly, WebAR democratizes the AR experience, eliminating the barriers of app installations and downloads. It leverages the ubiquity of internet browsers, making AR experiences instantly accessible to a larger audience across various devices (Jeganathan, Szymkowiak, 2023). This immediate accessibility offers brands and developers a wider reach. Secondly, updates to WebAR experiences can be made in real-time without necessitating users to download updates, as is often the case with standalone AR apps (Klavins, 2022). However, it's worth noting that the depth and complexity of WebAR experiences might currently be limited compared to dedicated AR apps due to browser and internet limitations. Yet, with the rapid advancements in web technologies, this gap is expected to narrow, making WebAR an increasingly attractive medium for delivering augmented experiences. In the coming section, the paper will discuss WebAR's potential for improving the marketing mix as shown in figure 1, based on extant academic literature on AR as well as that of practitioner literature.

Table 1.
Comparison of WebAR against the traditional AR

Factor	Traditional mobile app AR	WebAR
Cost of development for organizations	High as the mobile app needs to be deployed across both iOS and Android operating systems and this requires specialized engineers	Low as there are software as a service (SAAS) model organization's that allow businesses to create custom AR experiences at a fraction of the cost of a traditional AR app
Download requirements	Requires users to download the app, taking up storage space on the device	Users do not need to download an app as the AR experience is via the web. All that is required is to visit a website
Device compatibility issues	Developers need to be concerned with releasing a mobile app functioning well on both iOS and Android operating systems across many devices	Less reliance on device compatibility as the AR experience is served via the web
Storage limitations	Downloading the app requires users to expend storage space	No storage demands
Ease of accessibility for users	Requires users to download an app onto a mobile device, which increase barriers to entry	High accessibility as a user only needs to access a website
Ease of maintenance and pushing content updates for organization's	Organizations would be required to expend resources for maintenance as these updates would need to be released and the users would need to download said update. Such updates can end up taking more storage space	Pushing updates is a convenient process as the user would only see the most up to date content as they are accessing the AR experience via the web

Source: Author developed (2023).

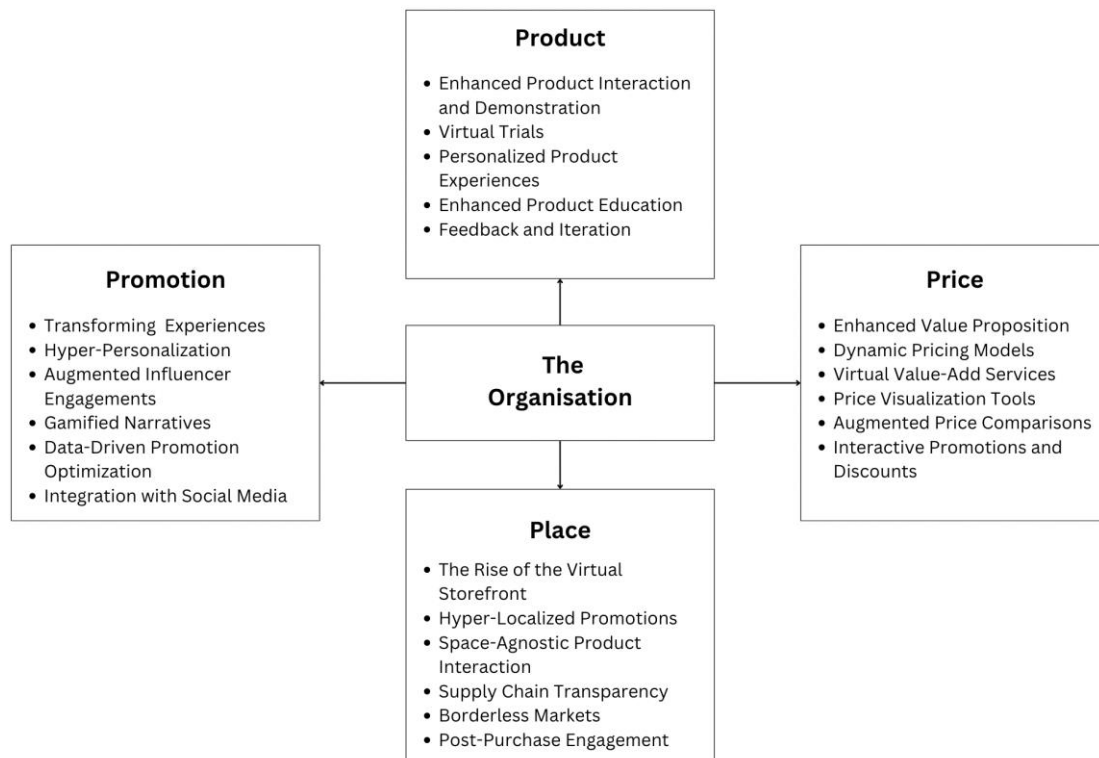


Figure 1. Summary of WebAR's implications on the 4Ps. Author developed (2023).

2.1. Product

In the intricate world of product development and positioning, the integration of WebAR offers transformative possibilities, making the "Product" aspect of the 4Ps more dynamic and experientially rich. The first possibility we see is in enhanced product interaction and demonstration as traditional product displays, whether in physical stores or online catalogues, offer a passive experience (Poushneh, Vasquez-Parraga, 2017). WebAR elevates this by allowing consumers to interact with products in a virtual space. For instance, furniture retailers can employ WebAR to let consumers visualize how a particular piece would look in their own living space (Alves, Luís Reis, 2020). This not only aids in informed decision-making but also reduces potential post-purchase dissonance (Pantano, Rese, Baier, 2017). Particularly relevant for complex products, WebAR can be a game-changer in such product demonstrations. Consider a new gadget infused with a myriad of features. Rather than reading a manual or watching a video, consumers can use WebAR for a hands-on, interactive exploration, understanding features and benefits in a more immersive and intuitive manner. The second is in industries such as fashion and cosmetics who can benefit immensely from WebAR by offering virtual try-ons (Baytar, Chung, Shin, 2020). Consumers can see how a clothing item fits or how a shade of lipstick looks on them without physically trying them on. This immersive experience can lead to increased confidence in product selection, potentially boosting sales and reducing return rates (Kowalczyk, Siepmann, Adler, 2021). These experiences can be further improved as WebAR can be tailored to offer personalized experiences based on user preferences or past behaviours. For instance, a consumer exploring a car can be shown features and customizations tailored to their preferences, enhancing the product's appeal by making the exploration feel unique to them.

We also credit WebAR with the possibilities to enhance product education as complex products, especially in the tech and electronics sectors, can sometimes be challenging for consumers to grasp. WebAR can break down these complexities, offering layered, interactive product tutorials. Consumers can explore products layer by layer, gaining a deeper understanding and appreciation of the product's value propositions. Another possible usage of WebAR lies in its utility as a feedback tool. By observing how consumers interact with products in a virtual space, businesses can gather insights into product strengths and areas of improvement. This real-time feedback can be invaluable in iterative product development, ensuring offerings are more closely aligned with consumer desires and expectations. Incorporating WebAR into the product facet of the marketing mix not only enriches the consumer experience but also provides businesses with tools to refine and enhance their offerings continually. As the lines between the digital and physical worlds continue to blur, WebAR emerges as a pivotal asset in product presentation, exploration, and evolution (Jeganathan, Szymkowiak, 2023).

2.2. Price

The pricing strategy in marketing has always been a delicate balance of perceived value, costs, competition, and demand. With the advent of WebAR, new dimensions are introduced that can influence pricing decisions and consumers' perceptions of value. WebAR can elevate the perceived value of a product by providing an enriched pre-purchase experience (Alimamy, Al-Imamy, 2022). For example, a consumer can use WebAR to get a comprehensive understanding of a product's features and benefits. This in-depth exploration can justify a higher price point due to the augmented experience and detailed knowledge the consumer gains before making a purchase. Another impact of WebAR is its ability to introduce interactive pricing scenarios where consumers can customize products and see the price changes in real-time. Think of a car buyer adding features to their vehicle and watching the price adjust with each addition. Such dynamic pricing models can lead to consumers better understanding the value of individual features, potentially leading to increased upsells. Brands can also incorporate WebAR experiences as value-add services, which can command a premium. For instance, an online training program can use WebAR for immersive lessons (Kaplan et al., 2021), and because of this enhanced mode of delivery, it can be priced higher than traditional online courses.

Another use case of WebAR lies in its ability to serve as a tool to help consumers visualize the long-term value or costs associated with a product. For instance, a consumer considering an energy-efficient appliance can use WebAR to visualize projected savings over time, making the higher initial price more palatable. WebAR can also potentially be used for augmented price comparison shopping. A consumer could scan a product in a physical store and immediately view comparable products, features, reviews, and prices from various online sources. This transparent and immediate comparison can pressure businesses to offer competitive pricing or differentiate their offerings more clearly. Another opportunity is WebAR's potential to revolutionize promotional strategies. Imagine a consumer pointing their device at an empty space in their living room and being presented with a virtual furniture sale as in the case of IKEA (Ozturkcan, 2021), where they can view items in AR and access limited-time discounts. Such immersive promotions can stimulate impulse purchases and allow brands to adjust prices based on real-time demand. Incorporating WebAR into pricing strategies offers brands a dual opportunity: to enhance the perceived value of their offerings and to engage consumers in novel, interactive pricing scenarios. As the lines between the physical and virtual shopping experience continue to meld, WebAR's influence on the price component of the 4Ps promises to be both profound and multifaceted (Daiker, Ariyachandra, Frolick, 2017).

2.3. Place

"Place" in marketing has traditionally been anchored to physical locations—a store, a showroom, or any retail outlet. But as digital transformations have reshaped commerce, "Place" is now not just about 'where' products are sold, but 'how' they are presented and accessed. WebAR is at the forefront of this evolution. Traditional online shopping provides consumers with a list or grid of products. WebAR elevates this by creating a spatial, interactive environment (Jeganathan, Szymkowiak, 2023). Instead of scrolling through images, a consumer might walk through a virtual store, selecting products off virtual shelves. This immersive experience replicates the sensory richness of physical shopping, merging the convenience of online shopping with the tangibility of offline retail. Such virtual experiences can be especially beneficial for businesses that don't have widespread physical retail presence, offering them a levelled playing field against retail giants. One way to boost the above capability is pairing geolocation with WebAR (Wang, Tekler, Cheah, Herremans, Blessing, 2021) to craft uniquely personalized shopping experiences. As consumers navigate urban landscapes, WebAR can provide them with promotions or product information relevant to their exact location. For instance, pointing a device at a vacant plot or a QR code (Kan, Teng, Chen, 2011) might reveal a virtual pop-up store for a limited-time sale or showcase an upcoming real estate development with pricing and booking options.

Products, especially ones requiring spatial context like furniture, can be a challenge to select online (Kowalczyk et al., 2021). WebAR diminishes this barrier. A consumer considering a new sofa can see how it looks in their living room, adjusting its position, orientation, and even colour. This not only aids the buying decision but can drastically reduce return rates, as consumers have a clearer expectation of the product fit within their spaces. Another potential use case is in supply chain transparency as consumers often seek ethical and sustainable products. WebAR can visualize a product's journey, from its origins to the shelf. By scanning a product, one might see where its materials were sourced, how it was manufactured, and the logistics behind its distribution. This transparent storytelling can be a significant differentiator in markets where provenance and sustainability are valuable selling points.

WebAR's universal accessibility means that product launches or showcases aren't limited to physical locations or select audiences. A brand launching a product can create a global WebAR event, inviting consumers from around the world to experience the product virtually, breaking geographical constraints and tapping into a broader audience base. The role of Place doesn't end post-purchase. Traditionally, any after-sales service required visits to service centres. With WebAR, consumers can get virtual tutorials, maintenance guides, or even diagnostic services. For instance, a consumer having trouble with a home appliance can use WebAR to get a virtual technician's guidance, making the service aspect more immediate and user-friendly. In essence, WebAR is dismantling traditional notions of Place. By weaving the virtual and physical realms, it offers brands unparalleled flexibility in how they present

products, engage consumers, and provide post-purchase support. As this technology becomes more mainstream, its influence on the Place dimension of marketing will be profound, reshaping strategies and consumer expectations alike.

2.4. Promotion

The realm of promotion has always been about establishing connections between brands and their audience. WebAR, with its augmented capabilities, deepens this connection, turning passive recipients of messages into active participants in promotional narratives. One of WebAR's key potential here lies in its ability to transform static ads into dynamic experiences (Hopp, Gangadharbatla, 2016). Print ads have been a promotional staple for decades. But imagine a world where a magazine or billboard advertisement becomes a portal to an immersive experience. With WebAR, consumers can use their devices to activate static ads, unveiling 3D product models, interactive stories, or even virtual testimonials. Such enhanced interactivity keeps consumers engaged longer (McLean, Wilson, 2019), ensuring that promotional messages are not just seen but deeply felt and experienced. Another opportunity lies in the ability to hyper personalise promotional content as one-size-fits-all promotions are becoming less effective in a world craving personalization. WebAR, leveraging AI and data analytics, can customize promotional experiences in real-time. For example, a user with a history of buying eco-friendly products might encounter a WebAR ad that emphasizes a product's sustainable attributes, with virtual demonstrations of its eco-friendly processes.

Traditional product launches or promotional events have geographical and logistical constraints. WebAR democratizes access, allowing consumers, regardless of their location, to join virtual product launches. Within this virtual space, users can interact with the product, ask questions in real-time, and even engage in virtual networking, replicating the richness of physical events. Influencers can also use WebAR to provide their audience with enhanced content. Beyond just showcasing a product, they could offer a WebAR experience where followers virtually use the product alongside them. This not only boosts the influencer's content quality but also enhances the user's ability to relate to and trust the promotional message.

Simple ads can be forgettable, but experiences, especially those that challenge and engage users, leave a lasting impression. Brands could design WebAR-based quests or challenges. For instance, a fashion brand might create a virtual wardrobe hunt, where users find and virtually try on outfits, earning rewards for their engagements. They can also be used for data driven optimisations, considering traditional promotions only offer limited post-campaign analytics. WebAR, being a digital medium, provides granular insights into user behaviour. Every interaction, be it time spent on an ad or areas of maximum engagement, can be tracked, allowing brands to refine their promotional strategies in real-time for maximum efficacy. All the above mentioned opportunities can also be hyper realised since WebAR also offers seamless integration with social media. The experiential nature of WebAR promotions makes

them prime content for sharing on social media. A user's unique interaction with a WebAR ad can be shared, allowing peers to not just view, but also engage with the promotional content. This user-generated promotion amplifies the brand's reach and lends an organic authenticity to the promotional message. In summary, WebAR doesn't just amplify the "Promotion" pillar of marketing; it revolutionizes it. By fostering active engagement, personalizing experiences, and blending the real and virtual seamlessly, WebAR is poised to set new standards in how brands communicate, engage, and persuade in the digital age.

3. State of current research and future research

WebAR has seen use in studies of how AR drives cognitive, affective and behavioural consumer responses (Jeganathan, Szymkowiak, 2023), in creating educational tools (Cortés Rodríguez, Dal Peraro, Abriata, 2022), for Scene Text Recognition, Visualization and Reading to Assist Visually Impaired People (Ouali, Halima, Wali, 2022) as well for Development of career guidance quests (Shepiliev et al., 2021). It also seems to have been used for assistance in learning intangible cultural heritage (Tan, Hills, Ji, Feng, 2020) as well for bridging knowledge between craftsman and learner in Chinese intangible cultural heritage (Tan, Ji, Hills, Fu, 2019). The technology also appears to have been used in creating Information Visual Tool (Tan et al., 2019), creating a traditional kite art platform based on human-computer interaction (Li et al., 2021) and even for the development of training system for dental treatment (Kudo, Okada, 2021). Other learning related uses of WebAR include creating platforms for traditional handicraft learning (Ji, Tan, Hills, 2020; Ji, Zhou, Tan, Fu, 2019). Practical usage of WebAR is visible in campaigns such #BringHalloweenHome from McDonalds (Williams, 2020), #Refreshwherevs from Coca-Cola (Murphy, 2023) and Jumanji (Bäckvall, 2022).

In concluding an article on utilizing WebAR for navigating organizational crises, there are multiple avenues for further research. The transformative potential of WebAR in reshaping the classical 4Ps of marketing — Product, Price, Place, and Promotion — is becoming increasingly apparent. Yet, as is customary with emergent technologies, there's a myriad of facets that necessitate deeper scholarly inquiry to unravel its all-encompassing implications. Preliminary insights into consumer interactions with WebAR, especially within promotional frameworks, are illuminating. However, a more exhaustive exploration is needed to discern nuanced behavioural patterns, engagement metrics, and the subtle shifts in decision-making processes that WebAR might induce. Equally compelling is the need to dissect WebAR's influence on pricing strategies. Does the immersive nature of WebAR alter a consumer's perception of value, or does it impact their willingness to pay? Can WebAR facilitate dynamic, real-time pricing models that recalibrate prices based on instantaneous demand or user engagement?

Moreover, as WebAR hints at redefining the 'Place' pillar of marketing, scholars ought to probe deeper. How might virtual storefronts or augmented showrooms stack up against the allure of traditional online shopping or the tactile experience of brick-and-mortar stores? And as brands navigate the intricate balance between global reach and local resonance, how can WebAR be harnessed to cater to both broad, universal campaigns and hyper-localized marketing thrusts? Furthermore, with digital frontiers expanding, ethical considerations loom large. WebAR's intersection with user privacy, data security, and broader ethical dilemmas demands rigorous academic scrutiny. Brands stand at the precipice of harnessing vast data troves via WebAR, but how can they strike the delicate balance between leveraging insights and respecting user privacy?

Beyond this, the convergence of WebAR with other avant-garde technologies — think AI, IoT, and blockchain — unveils a plethora of exhilarating prospects. The symbiotic relationships between these technologies and their collective impact on marketing paradigms are territories rife for exploration. And as organizations earmark substantial capital towards WebAR endeavours, the quest for precise metrics and definitive ROI frameworks intensifies. How can the efficacy of WebAR campaigns be quantified, and what benchmarks might define success? Lastly, the long arc of brand-building beckons investigation in the WebAR age. While early indications suggest WebAR's prowess in amplifying brand loyalty and equity, sustained studies spanning longer durations are imperative to cement these hypotheses.

4. Conclusion

The digital age continues to shape and influence the world of marketing, with WebAR emerging as a significant technological advancement. This review has critically assessed the profound impacts of WebAR across the foundational 4Ps of marketing: Product, Price, Place, and Promotion, as per its research aim. Through WebAR, products can be presented in immersive and interactive ways that were previously unattainable, offering customers a richer understanding of what they're purchasing. When it comes to pricing, WebAR has the potential to modify how customers perceive value, nudging brands to revisit and potentially innovate their pricing models. In addressing 'Place', WebAR offers an interesting shift, providing opportunities to reach broader audiences without the limitations of physical locations. As for 'Promotion', the technology stands as a potent medium, enabling brands to communicate more effectively and engage consumers in novel ways.

However, it's important for businesses to implement WebAR thoughtfully. Its integration should be aligned with a brand's overall marketing strategy, ensuring it adds value rather than complicating the user experience. Moreover, the ethical and privacy concerns associated with digital technologies, WebAR included, must be rigorously addressed. Brands need to

responsibly manage and utilize the data they gather, maintaining trust with their user base. While this review has provided a comprehensive overview, it's clear that the possibilities and implications of WebAR in marketing are vast and still evolving. Continuous research and exploration are essential to stay abreast of the technology's potential and challenges. In summary, WebAR represents a significant shift in the way brands can interact with their audiences. It's more than just a new tool—it's an opportunity to redefine and enhance the marketing mix for the digital age. Brands that strategically integrate WebAR into their approach will likely find themselves better equipped to meet the needs and expectations of modern consumers.

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