

Original Article

The Future of Customer Engagement in Retail Banking: Exploring the Potential of Augmented Reality and Immersive Technologies

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Abstract - Augmented reality is a technology that allows computer graphics to appear in the user's field of view. Brand logos, for example, can appear on a web page and look like they are sitting on a real desk. These are two great visualization applications of AR. The visualization power of AR has intrigued researchers and practitioners, and it is entering many industries. However, judging by the small number of AR applications in banking that we encountered in our review of the industry, it appears to have barely entered this sector. Retail banks might, therefore, be missing out on the opportunity to improve their customers' relationship management through an AR revolution. We asked what AR can do to generate excitement about consumer banking. We believe that AR can improve customer engagement in branch banking in a way that no other technology can, and we are not convinced that banks have yet made a compelling case for the economic viability of the majority of the virtual and augmented banking applications they claim to have developed. In direct contrast to the small number of AR banking applications we uncovered, we found that a large and ever-increasing number of virtual banking applications confirm that banks believe an immersive revolution in banking is imminent. However, our review showed that many VR claims made by financial services companies do not hold up to scrutiny. They are often either demonstrations only or poorly conceived. The companies that can string AR and VR buzzwords into at least ten separate sentences are rare. Among them, one bank has been heavily publicizing an M&A advisory software that emerged from a hackathon. Instead of being rather inward-focused as these applications were, we took a unique customer-focused approach. We stood with the person who does the most important job in the branch: the cashier or customer service advisor.

Keywords - Augmented reality, Immersive technologies, Customer engagement, Retail banking service marketing, Customer Engagement, Retail Banking, Augmented Reality (AR), Immersive Technologies, Digital Transformation, Financial Services Innovation, Virtual Banking Experience, AR in Banking, Customer Experience Enhancement, Interactive Banking Solutions, Personalized Banking Services, Technology-Driven Banking, Future of Banking, Digital Customer Interaction, Immersive Banking Technologies.

1. Introduction

The accelerating pace of change in retail banking is fundamentally a result of technology. During the last 20 years, two major and overlapping developments have occurred: the internet and mobile technology. Surprisingly, only in the last decade in the UK has the pattern of growth in internet usage as a communications medium increasingly resembled that of television, with sustained year-on-year growth in terms of hours spent and the number of unique users. Increasing penetration and declining technology costs mean existing channels decline as customers route to the market. The growing number of internet users brings sharp relief to the changing

way in which people choose to interact with others. This change is starting to be reflected in customer preference.

Finances have the potential to permeate everyday life. In the UK, we have become accustomed to the arrival of a National Lotto; news of the stock market is a regular feature on the national news and, increasingly, people are turning to the concept of share ownership. In the form of the internet, technology can deliver both information and the prospect of service to these and an increasing number of national characteristics. In the process, technology is rewriting the economics of the retail provision of financial services. Online banking is the catalyst of this change.



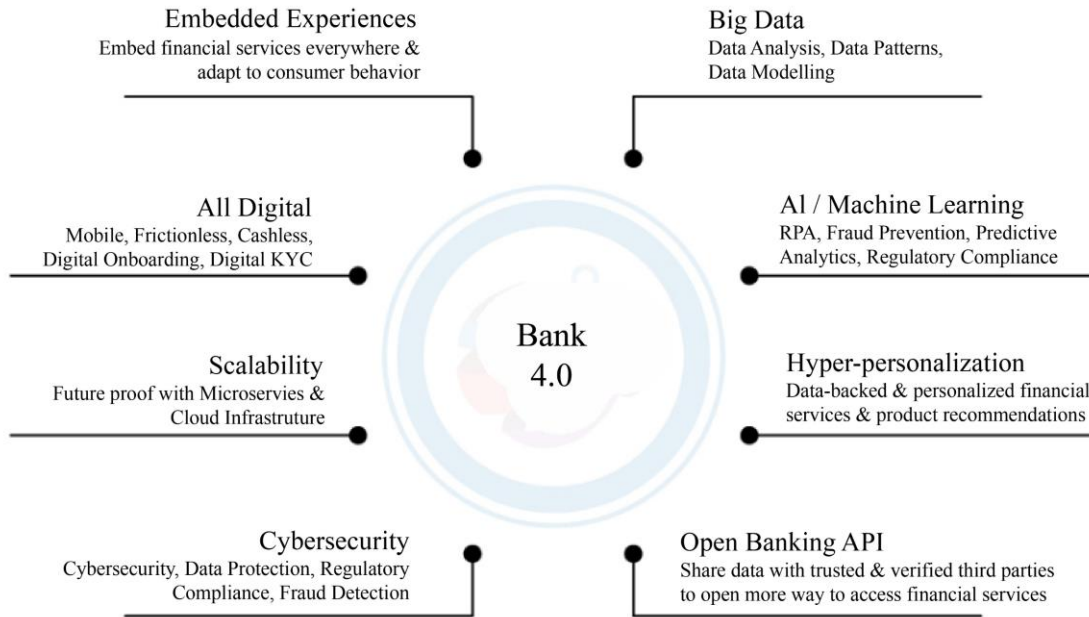


Fig. 1 Banking in the metaverse future of banking

1.1. Background of Customer Engagement in Retail Banking

Customer engagement is a concept widely used across many academic disciplines to describe a complex phenomenon related to how customers interact or bond with a brand. In the field of retail finance, the concept of engagement is increasingly used to describe how customers interact with providers of banking, investing, and insurance services. Customer engagement in retail banking is particularly interesting because financial products are considered ‘high-involvement’ products and require informed and repeated decisions over long periods of time from the part of the customer. In addition to this, contemporary retail banks face many challenges in an increasingly global, digital, and competitive financial services market. Opening up branches in new geographic markets, attracting new customers, increasing customer deposits, increasing the share of customer wallets, and fostering customer loyalty are all part of retail banks’ objectives. Using new immersive technologies to improve customer engagement can help retail banks achieve these aims. However, the topic is relatively under-researched, and the use of immersive technologies such as augmented reality and virtual reality in customer experience management has predominantly been studied in the context of omnichannel retail firms. This study summarizes and extends existing knowledge of these virtual technologies and provides an interpretation of the potential of augmented reality and virtual reality for customer engagement in retail banking.

Customer Retention

$$CR = \alpha_0 + \alpha_1 \cdot E + \alpha_2 \cdot S \quad (1)$$

Where

CR = Customer retention rate

E = Customer engagement level

S = Customer Satisfaction level

α_0 = Intercept (base level of retention)

α_1, α_2 = Coefficients for the effects of engagement and satisfaction

2. Current Trends in Customer Engagement

The current customer landscape is changing fast due to an increasing demand for engagement with digital and automated services, social media, interactive technologies, augmented reality, and immersive experiences. Therefore, new organizational learning, creativity, and intelligence are required to make these experiences efficient, effective, and fun.

This demand drives businesses and markets to create and use mobile, social, and analytics tools to understand, monitor, manage, and improve customer journeys and business moments. Engaging with customers through these digital channels is crucial for customer experience management and finding new services, products, and design insights. Moreover, customer engagement is essential for co-creation, co-innovation, and customer loyalty and advocacy.

Businesses recognize the importance of converting, integrating, and analyzing data from customer engagement activities to take advantage of digital loops and improve opinions and satisfaction that may be aggregated to loyalty data.

This information supports better strategic and tactical decisions for their activities. Indeed, understanding where to create and deliver value to customers, clients, partners, and society to achieve digital transformation is crucial for leaders.

If used effectively and combined with insights from a design thinking process, these smart, personalized, and timely engagement opportunities also enable competitive advantage and economies of scale.

The closer you are to the forefront of a field of action, the more future scenarios you can explore and choose properties and capabilities that allow you to focus your activities and become more efficient. In this way, you can combine speed, focus, and force, using niche business models, for example.



Fig. 2 Customer experience trends in banking

2.1. Digital Transformation in Retail Banking

The banking sector has been changing rapidly in recent years, driven mainly by technological advances. Since the introduction of the internet, banks have been trying to embrace information technology completely. The transformation of traditional activities led banks to establish extensive self-service networks and new distribution channels. Consequently, it changed the way services were delivered and the strategies put in place by the banks, with a significant reduction in their physical network. The digital generation and the Internet of Things make it increasingly easy and simple for customers to access the services they need in the various areas that concern them. This interaction also creates new customer demands with signals of an advanced search to reinvent the customer-bank relationship. The problem lies in finding digital models that can positively reinvent this paradigm. The advent of a combination of artificial intelligence, augmented reality, and virtual reality opens up new perspectives for banking, offering customers, at the same time, more personalized and effective banking and investment solutions.

by considering two different customer engagement contexts. The paper reviews the latest studies regarding AR and other related immersive technologies in a range of sectors and reflects on the potential value for retail banks. Active AR research has only emerged over the past decade, and despite seeing a substantial decline during certain years, interest has begun to soar. A large variety of sectors have explored AR advantages, but to date, the banking sector does not feature prominently.

Despite the limited research within the banking and retail banking sectors, this study draws generic economic benefits from across other sectors, including personalizing the banking experience, additional information access offered to the customer, shorter wait times, personal device tools, marketing service assistance, and increasing remote help services. These potential gains can streamline the retail bank customer banking experience, ultimately reducing costs. The study acknowledges that, given the current infancy of AR in banking, its business case is far from happening. Nevertheless, particularly given recent technology policy trends and the increasing volume of available evidence across sectors, it is felt that an exploration of the emerging retail banking AR era is timely.

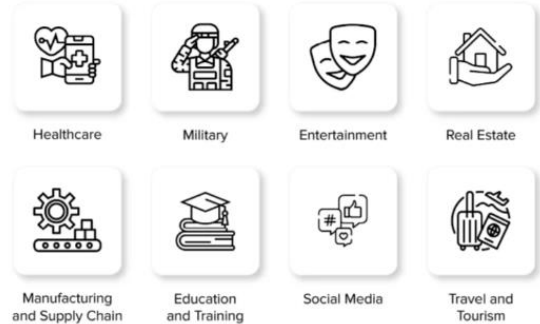


Fig. 3 Augmented reality in retail banking

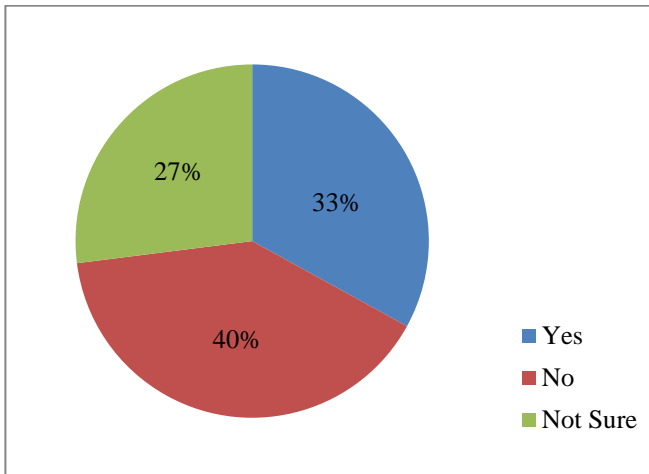


Fig. 3 Clear opportunity for banks and credit unions that prioritize customer engagement

3. Augmented Reality and Immersive Technologies in Retail Banking

This paper focuses on the potential of AR and its related immersive technologies in assisting with changing the way retail banks engage with their customers in a predominantly digital world. The extent of research on these latest technologies in a banking setting is extremely limited, and the present study addresses this gap

3.1. Definition and Overview

The article first defines Augmented Reality (AR) and immersive technologies before exploring recent applications of such technologies in marketing and advertising. In the context of retail banking, turmoil and challenges arising since the economic highs era about trust, innovation, and profitability are laid out. They minutely analyze AR and immersive technology's potential for retail banks to evolve customer engagement, providing a sound grasp and possibilities. They present two frameworks, both useful for reading this article effectively. A strategic barcode describing engagement vs. degree of immersiveness enables assessing business models and interaction modes in order to innovate with immersive technology, while a categorization of immersive virtual environments and common game mechanics provides examples of immersive technology applications already live in or made for the banking sector. They also uncover the challenges arising through a comprehensive overview of the implementation, security, and privacy realm.

The crisis that has deeply marked the banking sector has, in fact, attacked banks from different angles. From an innovation point of view, the retail banking sector has always prided itself on a certain degree of technological innovation. From the very beginning, pioneers have contributed to the development of new technologies, benefiting from the network effect and building a solid competitive advantage. Banks have been the first to experiment with new

technologies influencing a wider public and filtering through society. This has led to various financial applications, software platforms, and cross-platform sensors and meters exploring internet applications.

3.2. Applications in Customer Engagement

The immediate future of conversationally intelligent AI in customer engagement in retail banking lies in deploying it to produce a commercially effective and risk-averse sales dynamism, improving the carefully judged malleability of financial products so they more closely and appropriately fit individual customers, which is what successful consultative sales approaches across all sectors aim to deliver. When channeled into developing desirable, flexible, and customizable products and delivering them conversationally, AI algorithms create new value, accelerate time to use, and streamline the commercial services process rather than replacing any substantial number of human workers out of one of the highest cost-producing sectors in employment. It is just as unlikely to trigger mass human displacement from retail banking, even though some routine commercial functions are eliminated, as is contemporarily widely anticipated for entire call center services.

For financial institutions, this pragmatic view of conversational AI will terminate projects that focus on reducing their own service costs and deepen the collaborative counsel and trust bond between finance specialists and the customers they serve. In consequence, it will not subvert what has survived of the personal branch finance service delivery system. It will enable banks with sufficient imagination to become important contributors to their branch’s social impact through better or more personally adviser-delivered value-added commercial services or as hosts or arrangers of valued collaborations or social communities. This will render some branches and units the most effective collective finance service social hosts and empathetic conversational brokers in their localities.

Financial Impact

$$F = \gamma_0 + \gamma_1 \cdot R + \gamma_2 \cdot E$$

Where

F = Financial impact (e.g., revenue increase, cost reduction,

R = Rate of technology adoption

E = Customer engagement level

γ_0 = Intercept (base level of financial outcomes)

γ_1, γ_2 = Coefficients for the effects of adoption and engagement

4. Benefits and Challenges of Implementing AR and Immersive Technologies in Retail Banking

Financial companies began implementing AR and VR in use cases such as online banking, displaying real-time 3D data and assets, etc. However, successful applications have spread very slowly, perhaps not surprising given the relative novelty of banks working with AR and VR technologies. Despite steady software improvements, the development cost and user efforts remain high. The return on investment of AR and VR in the financial industry is not worth discussing at the moment. The lack of a clear compensation structure, no clear advantage over competing banks in terms of banking experience, and the choice of AR and VR technology development are all drawbacks that limit the bank’s potential. Another challenge is that AR and VR projects have special requirements that necessitate an additional understanding of optimization areas such as display quality, 3D color judgment, and

understanding of stereo vision, combined with the situational perception essential to many banking applications.

In the long term, AR and VR have the potential to become the primary method and even replace physical branch offices because they may provide a more realistic way to communicate with customers. They combine remote customer service with remote technology, allowing customers to try products and services without the actual physical presence of a storefront. This method not only allows branch services to be provided and used but also enables the creation and exploration of new and impressive banking experiences that are not yet possible. Although AR and VR technology may have the potential to help improve customer service to a certain extent and make it more personalized, it has not yet been widely accepted or used. In addition, there has not been much evidence of significant differentiation in competitive markets since banks began experimenting with AR and VR, reminding banks to accumulate more specialized experience.



Fig. 4 Benefits of implementing in retail banking

4.1. Enhanced Customer Experience

Customer experience is the key driver for the likely adoption of AR applications in retail banking. AR can not only enable digital enhancements and add-ons to more traditional retail bank branches, moving them closer to being both showrooms and spaces for premium private client services, but it can also enrich the direct interface and interaction with the customer. More than ever, retail banks are interested in building meaningful connections, strong trust relationships, and the level of customer experience that leads to customer loyalty through the personalization of their services. AR can contribute significantly to all these tasks by making information access less invasive and more natural, accelerating analysis and decision-making, and simplifying the use of complex products through clear, compelling, and interactive visual explanations. In fact, many financial products are complex and, especially during assisted self-service delivery formats, the consumer needs to know a great diversity of documents, information, and data to make the most informed decisions. AR is an extraordinary way to assist users in understanding more complex products and services. It can also support documentation consultation through visual range and simplified taxonomy representations, advertising complementary products through scanning and pattern recognition, promoting service conversions through parametric interactions in three-dimensional environments, and providing sales pitches and prospect base analysis through visual access to big data with overlays. Innovation, relevance, utility, and beauty are some of the keys that motivate consumers to build new and higher customer experiences. AR, thanks to its intrinsic capability to create stronger, more involved, and macro-aesthetic customer experiences, has the potential to help retail banks foster customer interest, increase consumer trust, and lower the natural resistance that comes with any commitment to using new technologies so that both clients and banks win.

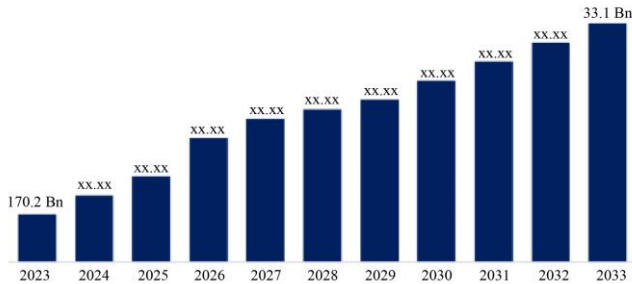


Fig. 5 Global Immersive Technologies Market Size To Worth USD 170.2 Billion By 2033

4.2. Increased Operational Efficiency

Immersive technologies in the retail banking sector can be seen as a means to increase the sector’s operational efficiency. In the next two subsections, we will progressively consider IT’s contribution to improving the brand experience and the level of convenience for retail banking customers. In particular, improved brand experience and increased convenience may have a far-reaching operational benefit by making customer retention strategies more effective. Consequently, by keeping the cost of acquiring new customers low, more resources could be allocated for creating, promoting, and delivering higher-value products and services to existing clients. An overall reduction in operating expenditures would translate into less crowded, higher quality, and more personalized customer service. The beneficial spillover from this to the bottom line should not be overlooked. Recall earlier the mention of shopper marketing’s selling proposition, enhancing at the same time the overall process efficiency while increasing the average revenue per customer. Customers could do more on their own through a virtual advisor, save time and effort via expedited processes, or benefit from more personalized advice and services thanks to intelligent business analytics algorithms. Those service elements that do not require a physical presence are obviously ideal candidates for improved efficiency.

5. Future Prospects and Recommendations

The Future of Customer Engagement in Retail Banking The future of customer engagement using continuous and immersive technologies in multi-channel retail banking is likely to employ physiologically based analytics based on eye-tracking and other assessment variables related to user state and sentiment analysis supervised by a dynamic learning semantic search facility and speech recognition system. This analyzes consumer conversations and discerns purchasing intentions in real-time, which models the relationship between the retail bank customer, the retail bank, and the retail bank’s products. These future systems will be able to sense customer needs and intentions and make suggestions that make customers feel confident that the retail bank is truly dedicated to service excellence. By linguistically programming the VCD and producing and customizing the versions of the VCD, the most complex and expensive part of these systems, each retail bank can tailor its customer service proposition to ensure that it is consistent with the customer service proposition that the retail bank wishes to project. The retail bank can ensure that the framework is used to support the retail bank’s operations through a hands-on support philosophy. The retail bank can also stake a position in the market in emerging geographies with this approach and build a large customer base from the outset, assuming that the retail bank strategy team comes up with a good customer service proposition. Furthermore, by training the VCD to understand natural language and hence answer

questions and make recommendations, the VCD can be used to support multi-channel interactions, thus ensuring that all customer interaction routes contain the same information, which will be provided in the same way, a further method to ensure reduced ambiguity about the propositions made by the retail bank and further support a physically inclusive customer experience through a symbols-first approach, which has been shown to be superior by empirical studies of deep consumer profiling and deep consumer motivations because it allows a quality experience in the vision.

5.1. Potential Innovations in Customer Engagement

A dynamic customer engagement process is the differentiator for future retail banks. Data needs to become a bank’s “ashes”, and artificial intelligence is a “phoenix”. Actuarial risk model decision-making needs to become a shrinking “port” in a bank’s service offering. Retail banking needs a decision refresh, a strategic innovation mindset that can be delivered through hard and informal axis change, and a change in board anchoring. Retail banking business models need to meet the future innovatively.

5.1.1. Potential Innovations in Customer Engagement

Potential process innovation opportunities inviting augmented reality and immersive technology can be summarized. Although essentially not specific to banking, these potential innovations provide insights into some impact potentials banks could leverage for differentiation. A number of these potential innovations are currently expensive to install or adopt. Their dissemination and cost can be addressed through object replication models and through options to purchase replication rights by specific applicants.

Impact on Customer Experience (CX)

$$CX = \delta_0 + \delta_1 . P + \delta_2 . AR + \delta_3 . Q$$

Where

CX = Customer experience

P = Personalization of services (tailored to the individual customer)

AR = Augmented Reality experiences

Q = Overall service quality (speed, ease, security)

δ_0 = Intercept term

$\delta_1, \delta_2, \delta_3$ = Coefficients fo the impacts of personalization, AR, and service quality

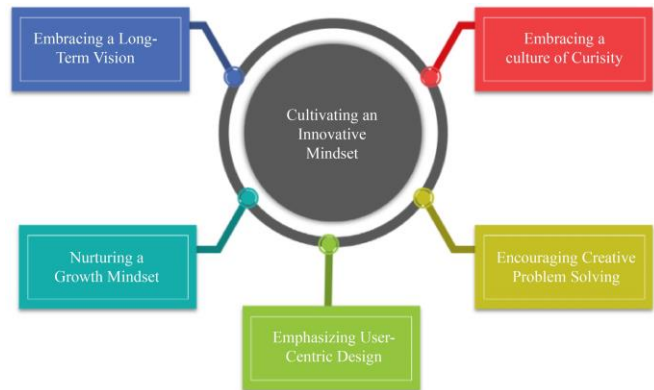


Fig. 5 Innovation in digital transformation

6. Conclusion

As consumers become more digitally adaptable and that world becomes increasingly defined by the virtual reality and experiences that technology can deliver, traditional banking facilities increasingly

find their market share eroded by those institutions that take advantage of the new commercial paradigm. However, by understanding the potential of immersive technologies and how these can be used both to disrupt and also redesign the product offering of 21st-century banks, it is possible for established institutions to lead rather than follow the evolving market. The financial sector is exploring ways to engage with customers in ever more innovative ways. There is a promise to deliver new sophisticated digital services and differentiated, relevant products. Additionally, firms are looking to reduce wastage from ineffective marketing and avoid the complications of customer opt-out. Banks have a remarkable opportunity within the next decade to redefine and rejuvenate their digital product and service offerings and how these are offered and distanced from the potentially limiting legacy technology and processes that have built up behind the veneer of prevailing customer touch-points. Immersive technologies already demonstrate their exciting potential within the financial sector and in more common digital customer experiences. Rapidly evolving technology portfolios, the proliferation of competing and complementary immersive technologies, reduced market entry and operational costs, improved customer adaptability and social demand driven by cultural genre entwining are priming conditions that demand sectoral analysis and a clarion call for focus within each department of each organization. This text both identifies and recommends further strategic research on the role of disruptive technologies in defining the future journey of the bank's customers.

6.1. Future Trends

This chapter has seen substantial progress in studying these related fields of inquiry through the qualitative research phase carried out within our target groups at our client banks. Based on these interviews, we have put forward a series of ten tentative propositions intending to begin to establish the validity, or otherwise, of some initial assumptions regarding customer interaction with AR and immersive technologies. The research here has taken two roles in

terms of its contribution. Firstly, it will formulate some forward-looking assumptions of future practices in these domains. Secondly, it will be a preliminary exercise in condensing findings from the first phase of data collection.

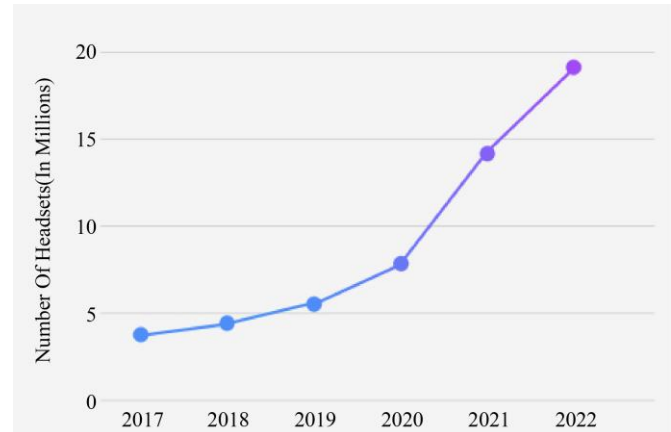


Fig. 6 Extended Reality To Add \$240 Billion To Indian Economy

We have initiated a theoretical position that examines the role and impact of AR and digital immersion in tomorrow's financial services. More specifically, we have been prepared to outline key assumptions emanating from our qualitative data phase by crafting a series of ten proposed strategic practice assumptions. We have been prepared to speculate on what the consequences of such new practices and opportunities may hold for each of the major stakeholders in future financial service operations, including corporate strategy, risk management, HR management, customer relationships, knowledge management, front office operations, supply chain management, and lastly, outsourcing practices and potential.

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