“Augmented reality and consumer behavior in Jordan’s telecom sector: Cultural and technological determinants”

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AUGMENTED REALITY AND CONSUMER BEHAVIOR IN JORDAN'S TELECOM SECTOR: CULTURAL AND TECHNOLOGICAL DETERMINANTS

Abstract

In the context of ongoing digital transformation, augmented reality is increasingly reshaping consumer-brand interactions, particularly in marketing domains. This paper aims to investigate how augmented reality improves consumer interactivity, brand awareness, and purchasing behavior in Jordan's telecom industry. Selected by stratified random sampling, the 481 participants were subscribers of Jordanian telecom. They were qualified based on their expertise utilizing augmented reality capabilities in telecom mobile apps and reflected different age and gender groupings.

AMOS-based Structural Equation Modeling was used to validate the conceptual model. The results illustrate that augmented reality adoption greatly influences brand awareness ($\beta = 0.60$, $p < 0.001$) and consumer interaction ($\beta = 0.55$, $p < 0.001$). Adoption is influenced positively by technological readiness ($\beta = 0.35$, $p = 0.020$) and infrastructure support ($\beta = 0.40$, $p = 0.010$), and is negatively influenced by concerns related to cybersecurity ($\beta = -0.20$, $p = 0.045$). Cultural alignment strongly moderates augmented reality strategy effectiveness ($\beta = 0.38$, $p = 0.025$). Besides, brand recognition ($\beta = 0.45$, $p < 0.001$) and consumer engagement ($\beta = 0.50$, $p < 0.001$) have extremely high correlations with consumer purchase intention.

The findings suggest that Jordan's telecom industry should integrate augmented reality content with local cultural norms to generate confidence, tighten cybersecurity protocols to lessen consumer resistance, and upgrade digital infrastructure for smooth augmented reality experiences. These coordinated initiatives are needed to increase consumer engagement and augmented reality branding in digital markets.

Keywords augmented reality, telecommunications, cultural alignment, technological readiness, cybersecurity, consumer engagement, brand recognition

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INTRODUCTION

By designing engaging, immersive experiences that combine digital material with the physical environment, augmented reality is fast changing how companies connect with consumers. Augmented reality presents fresh ways for improving consumer contact, fostering brand loyalty, and improving service delivery in the telecoms sector.

Although augmented reality adoption has sped considerably in technologically mature economies, its acceptance in undeveloped nations like Jordan is still limited. This difference results from a complex interaction of sociocultural and infrastructure elements, not only from technical ones. In Jordan, low cultural alignment with digital technologies, cybersecurity issues, and aging infrastructure all impede the broad application of augmented reality in telecom marketing.

Crucially, many times these difficulties are studied separately. Few studies have looked into how cultural values, technology preparedness, security awareness, and infrastructure availability mix to affect augmented reality adoption and customer behavior. This disjointed knowledge creates a major gap, particularly as telecom companies turn to digital tools more and more to increase customer involvement in changing markets.

By looking at how augmented reality affects consumer engagement, brand awareness, and purchase behavior in Jordan's telecom industry, this paper fills in this need. It looks also at how the efficacy of augmented reality initiatives is shaped by cultural orientation, technological readiness, cybersecurity issues, and infrastructure. This helps the study present a whole picture of the enablers and limitations of augmented reality acceptance in developing digital economies.

1. LITERATURE REVIEW

Augmented reality has grown into an essential component of marketing campaigns in industries of all types through the provision of experiential interaction that combines the physical and digital worlds. Its effect is especially visible in consumer industries, with augmented reality leading to increased engagement, personalization, and brand image. Academic literature in marketing relies on augmented reality's potential as a brand-switching mechanism for consumer interactions with brands. Dwivedi et al. (2021) and Roggeveen et al. (2021) contend that augmented reality creates stronger consumer-brand relationships by combining emotional and cognitive processes during product interaction. Yadav et al. (2025) further contend that augmented reality campaigns are valuable in that they empower users to engage actively in brand stories, transcending passive consumption by traditional media.

This interactive potential has been found in promotional applications. Nascimento and Loureiro (2024) identify that augmented reality campaigns increase memorability and attention from customers, whereas Nair et al. (2024) observe that augmented reality reduces ambiguity in purchasing decisions, therefore creating higher consumer confidence in a brand promise. All of this is supported by previous research that emphasizes long-term advantages of immersive experiences, for instance, customer loyalty and purchase intentions. Turner (2022) also argues that augmented reality shifts the epistemology of digital interaction, reaffirming the perception of reality-enhanced messaging (Taqa, 2025). All of these benefits make augmented reality a specially pertinent tool in the telecom industry, where customer retention, personalization, and innovation in services are extremely critical competitive drivers (Ahmed et al., 2023).

Nonetheless, augmented reality effectiveness is not just determined by the technology itself but also by the context in which it is applied. In emerging markets, there are several structural and contextual barriers hindering augmented reality scalability and effectiveness (Oreqat, 2021). Among the most pertinent of those is cultural alignment (Barta et al., 2025; Ulutaş et al., 2025). A vast amount of research identifies that culture is the decisive factor in consumer acceptance of augmented reality material. Aldaihani (2023) and Le Mouélic et al. (2025) observe that augmented reality campaigns that do not consider local customs or social habits are found to yield poorer engagement and even disaffection. In exchange, campaigns aligned with cultural norms, e.g., approaches in communication, gender roles, or boundaries on privacy, engage users in a deeper manner. Sehnem et al. (2025) propose a formal model by applying Hofstede's dimensions, explaining how facets of collectivism or aversion for uncertainty can enhance or mitigate augmented reality's impact. It is expanded upon by Mardatillah et al. (2024) and Peng et al. (2023), stating that augmented reality deployments that are not aligned with culture are found to be marked by poor credibility and poor uptake in spite of technological correctness.

A cultural appeal is all the more necessary in cultures such as in that of Jordan, where technology is embedded in customary social contexts. Cultural interpretation in those cultures is not limited to affecting aesthetics but also affects perceived le-

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gitimacy and trust in technology-mediated brand communication. Thus, augmented reality's usefulness is not a function of its interactivity or newness but is based on its cultural compatibility in the target culture (Mahmoud et al., 2025).

The second main driver of augmented reality success in emerging economies is technological infrastructure. Technological requirements of augmented reality applications, although they have gained footholds in worldwide retail and entertainment spaces, depend on real-time rendering, high-speed connectivity, and mobile compatibility. Parekh et al. (2020) observe that augmented reality's technological demands, including real-time updates, geo-location, and 3D displays, are difficult to meet in spaces that are marked by legacy systems. Cho et al. (2024) show that successful augmented reality applications, such as smart mirrors and virtual fashion stalls, are facilitated by high-end backend systems and smooth front-end interfaces. However, emerging telecommunications markets do not have such capabilities (Teece, 2025).

Khan (2023) and Dinçkol et al. (2023) corroborate this by clarifying how incompatibility or immature APIs increase complexity and cost in terms of augmented reality implementation. Samira et al. (2024) emphasize how, without real-time integration and augmented reality harmonization between platforms, augmented reality campaigns are prone to delays, inaccuracies, and user irritation (Ghosh & Jha, 2025; Song et al., 2025). For a nation like Jordan, whose telecom infrastructure is in the developing stage, these lacunae are a major problem (Ashal & Morshed, 2024). They not only reduce operational feasibility but also diminish user confidence and campaign reliability. An additional layer in the technological landscape is the convergence of augmented reality with (Salhab et al., 2025). Ali and Morshed (2024) emphasize that artificial intelligence and augmented reality by enabling predictive analytics, personalization, and real-time adjustment of content based on user behavior. Jreissat et al. (2024) go further to suggest that the triad of augmented reality and artificial intelligence creates a scalable architecture for data-driven brand engagement. Nevertheless, Sethi and Sharma (2025) and Walunj et al. (2025) caution that such integrations assume digital maturity, which many developing markets, including Jordan, have not yet achieved. Without robust infrastructure and technical capacity, even the best-designed augmented reality campaigns may fall short of expectations (Jha & Singh, 2025).

Technological readiness at the consumer level plays a pivotal role. Jha and Singh (2025) and Aisyah (2023) highlight that augmented reality adoption correlates strongly with users' digital literacy and familiarity with mobile-based interfaces. In regions where technology exposure is uneven across age, education, or location, readiness becomes a defining factor (Meng et al., 2025; Yap et al., 2025).

Although technological capability and cultural compatibility are essential, consumer anxiety on the need for data privacy and cybersecurity is another challenge to augmented reality adoption, particularly in the communications sector (Al-Muntasir, 2022). Augmented reality experiences typically call for location information, camera, and behavior inputs in order to personalize experiences (Bindewari et al., 2025; Lamba & Pal, 2025). This richness of data, as it advances interactivity, also poses significant issues of user surveillance, unauthorized use of data, and system weakness. According to Shaikh (2024), even active consumers delay augmented reality adoption when there is limited transparency on handling data. Akinade et al. (2025) emphasize that a lack of multi-factor authentication, encryption, and regular security audit leads to a diminishing trust in augmented reality platforms.

In emerging online markets like those of Jordan, these are exacerbated concerns. Trust in online infrastructure is typically weak as a result of past experiences of abuse, a lack of user education on their rights to privacy, and general regulatory complexity. Alajlan et al. (2023) contribute that trust deficits, when integrated with invasive augmented reality applications, can lead to user disengagement or outright technology rejection. This is commensurate with the wider literature on online engagement in conservative or half-regulated environments, in which technology is taken up with caution and with trust being built through transparency and congruity with public values (Hähnel, 2025; Krishna et al., 2025).

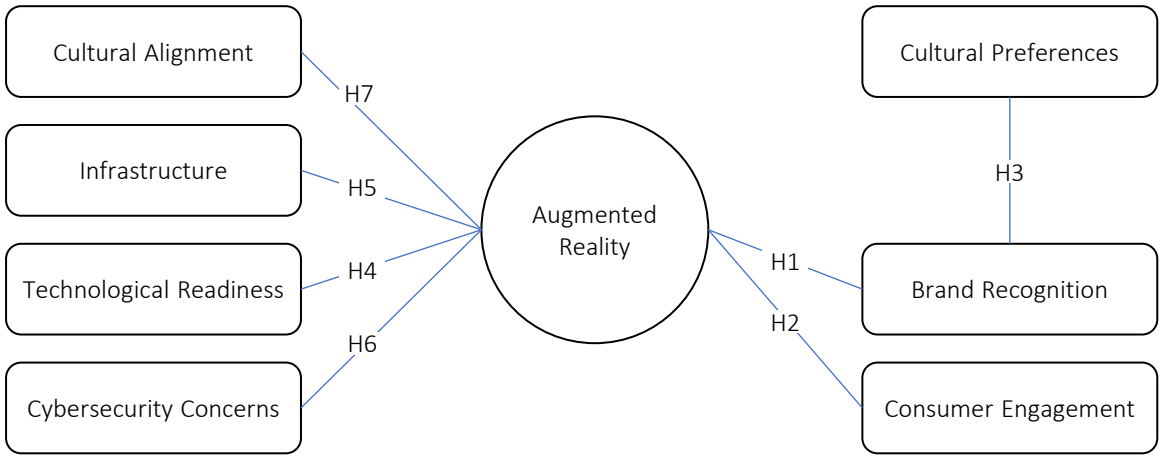

Figure 1. Conceptual framework

It becomes all the more obvious that the successful implementation of augmented reality in marketing depends not only on brand enrichment or entertainment potential but on cultural compatibility, sophistication in technologies, as well as trust in data privacy (Jha and Singh, 2025). While global implementations of augmented reality applications grew, empirical studies that take the associated factors into an integrated framework are sparse, particularly in new markets (Sethi and Sharma, 2025; Sehnem et al., 2025).

Existing works tend to treat variables—such as infrastructure, cultural fit, or security concerns—rather than examining how they interact in tandem to produce adoption outcomes. Thus, much remains unexplored regarding how the multiple dimensions interact in a complementary fashion to influence user experience and brand performance, at least in less-researched regions such as the Middle East (Mardatillah et al., 2024).

In the Jordanian telecommunication market, existing scholarship has remained surprisingly underdeveloped. While comparative works in other settings offer useful frameworks (Roggeveen et al., 2021), they are seldom translated to fit local values of the consumer, digital constraints of infrastructure, or sociocultural demands of Jordan. The absence of empirically derived, context-sensitive works prohibits homegrown marketers, as well as telecommunication firms, from developing culturally competent, successful strategies of augmented reality (Mahmoud et al., 2025; Le Mouélic et al., 2025).

To address such discrepancies, the present work presents a unified conceptual framework that links the use of augmented reality with brand awareness, consumer engagement, and behavioral impact. It contains the moderating variables of cultural orientation, technological sufficiency, adequacy of infrastructure, and awareness of cybersecurity, offering a comprehensive framework for measuring the efficaciousness of augmented reality within the Jordanian telecom landscape.

This research looks into how augmented reality affects consumer interactivity, brand recognition, and consumer behavior in Jordan's telecom industry. It also explores how cultural orientation, technological preparedness, cybersecurity issues, and infrastructure availability determine the adoption and effectiveness of augmented reality technology. Based on the objective and literature review, the hypotheses are as follows:

H1: Augmented reality integration enhances brand recognition.

H2: Augmented reality use increases consumer engagement.

H3: Cultural preferences moderate the effect of augmented reality on brand outcomes.

H4: Technological readiness positively influences augmented reality adoption.

H5: Outdated infrastructure negatively affects augmented reality adoption.

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H6: Cybersecurity and privacy concerns negatively affect augmented reality adoption.

H7: Cultural alignment strengthens the effectiveness of augmented reality campaigns.

2. METHODOLOGY

This research study utilizes a quantitative research design to explore how augmented reality influences consumer behavior, increases brand awareness, and offers brand engagement across the Jordanian telecom industry. In this research design, the survey will be designed in a cross-sectional manner because data will be collected at only one point in time; the relationships that may exist and the patterns and moderating factors in the data could be determined using this method. The design will allow one to delve deep into the role of augmented reality in improving brand outcomes and consumer experiences, considering cultural, technological, and security issues (Morshed, 2024a).

The total number of responses collected was 481 from the targeted 660 participants, representing a 73% response rate. They comprised Jordanian telecommunication subscribers who were selected based on their varied experience with the same telecommunication provider ranging from less than a year through more than five years as well as their active use of the use of augmented reality through the use of telecommunication cellular apps. A stratified random sampling technique was used in order to get a good representation across key demographic segments, including age groups, gender, and usage patterns. Participants will be recruited to participate in this study between September and November 2024 for a period of two months. In such a scenario, end-users and industry stakeholders can be recruited together to give comprehensive views on the integration of augmented reality technology. The sampling methodology ensures that diverse views are captured, along with different experiences that happened during their time (Shiyyab & Morshed, 2024).

This period was chosen because it coincided with increased promotional activities in the telecommunications industry, specifically in terms of augmented reality-based service trials, so the data became contextually meaningful and time-sensitive. The study was reviewed and cleared by the Institutional Research Ethics Committee at Middle East University, Jordan – Dean of scientific research. Informed consent was electronically obtained from all participants before they participated. Respondents were adequately informed about the voluntary nature of participation, respondents' anonymity, and respondents' data confidentiality. Identifying details were not gathered, and participants were free to withdraw at any point. Objectivity was maintained through neutral wording in questionnaire items and avoiding researcher-participant interaction while collecting the data.

Table 1. Demographic information of respondents (N=481)

Demographic variable	Category	Percentage
Age groups	18-25 years	30%
	26-35 years	40%
	36-45 years	20%
	46+ years	10%
Gender	Male	55%
	Female	45%
Years of engagement with current telecom provider	Less than 1 year	12%
	1-2 years	23%
	3-5 years	40%
	More than 5 years	25%
Experience with augmented reality	Frequent AR users	50%
	Occasional AR users	45%
	Non-users	5%

Table 1 is a demographically representative population with the largest age bracket (40%) being 26-35. Gender is also even at 55% male, 45% female. Most of the respondents (65%) have been with their telecom provider for over three years, indicating loyalty and value-added insights. For the experience of augmented reality , 50% use augmented reality all the time, 45% use it every now and again, with 5% having no experience with augmented reality, indicating the realistic level of consumer experience in Jordan's telecom market. This demographically wide population makes the research more reliable, credible, and relevant.

Data collection was done using a structured questionnaire administered via Google Forms. The survey instrument was designed to capture perceptions, attitudes, and experiences related to augmented reality technology, consumer behavior,

cultural alignment, technological infrastructure, and data privacy concerns (Morshed et al., 2024).

The questionnaire used items derived from existing validated scales in consumer behavior and augmented reality research, modified to fit within the Jordanian context. Measured constructs were technological readiness, concerns about cybersecurity, brand familiarity, engagement, and cultural fit. All items were thoroughly selected for relevance to the structural model without duplication, while representing constructs in an extensive manner.

Augmented reality integration changes the telecommunication sector's role using the power of augmented reality in cellular apps to give the consumer a more enhanced experience through digital information displayed upon the real world. This integration enables seamless service interactions, improves customer engagement, and boosts brand visibility (Samira et al., 2024). Effective augmented reality campaigns lead to brand recall, whereby a consumer can easily recognize a brand through its attributes, logo, or imagery, which is actually a sign of good marketing communication and positioning in the market (Nkukpornu et al., 2025). Beyond recognition, augmented reality nurtures deeper brand engagement, creating emotional and cognitive connections that drive customer loyalty, satisfaction, and long-term advocacy (La Rosa & Johnson Jorgensen, 2021). However, the success of augmented reality in telecommunications greatly depends on technological infrastructure, including high-speed internet connectivity, mobile device capabilities, and software compatibility, which are very important for seamless functionality. Technological readiness is equally important; it reflects the willingness and preparedness of both consumers and organizations to adopt and utilize augmented reality solutions effectively (Farrukh Shahzad et al., 2025). Despite these advances, cybersecurity and data privacy concerns remain one of the major barriers: fears of unauthorized access, data misuse, and security vulnerabilities can undermine user trust in augmented reality. Besides, the believability of the augmented reality campaign would be aligned with the cultural preference and cultural alignment that involves shared beliefs, values, and behavior, making augmented reality content resonate with target audiences to increase acceptance and engagement. When augmented reality strategies successfully combine strong technological infrastructure with cultural alignment and data security measures, experiences that raise customer satisfaction and strengthen the brand relationship for the long run can be given way to (Alajlan et al., 2023).

All the variables had been measured through a 5-point Likert scale, ranging between 'strongly disagree' and 'strongly agree'. A Likert scale will be chosen due to its clarity and simplicity, making it easy for a wide variance of opinions from participants while having consistency and being standardized in the assessment related to attitude, perception, and experiences.

Reliability of the survey instrument was tested using Cronbach's alpha, and the results exceeded 0.80, hence indicating internal consistency across the items in the survey instrument. A pilot study was done to test the clarity of the items of measurement on a subset of participants to ensure that it served the purpose of the research objectives and the capturing of intended constructs. The duality of validation has been effected to ensure the robustness and credibility of the research instrument. Ethical considerations were also paramount, and participation was purely voluntary. The respondents were informed of the purpose of the study and that all data provided would be treated as confidential and anonymous. Ethical approval was obtained from relevant authorities before the commencement of data collection (Morshed, 2024b). Pilot feedback also helped ensure neutrality of question phrasing, eliminating leading or culturally biased wording to preserve response integrity.

In order to perform the actual data analysis, this research has utilized IBM AMOS, a particular statistical software proposed for use in conjunction with SEM and CFA. This decision was made since AMOS is specifically well-suited to analyze the relationship between observed and latent variables and to test the mediation and moderation effects of some variables regarding the confirmation of theoretical models. The GUI of AMOS allowed intuitive construction of path diagrams, while its seamless integration with IBM SPSS ensured efficient preparation of data

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and its analysis. For advanced analyses in the relationship of augmented reality integration, brand awareness, cultural fit, and consumer engagement, this study used such sophisticated analytical approaches as regression analysis, path analysis, bootstrapping, and moderation analysis supported by AMOS. Besides, AMOS has produced critical model fit indices such as Chi-squared Chi-squared (χ^2), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA), which were applied to validate the structural model against theoretical expectations (Morshed et al., 2024).

This study identified the indirect as well as the direct variables, the moderating factors being like technological readiness as well as cultural preference, using the use of AMOS. Being hard to master but requiring large samples, correspondingly, the provision of the capabilities for model estimation, mediation analysis, as well as hypothesis testing, proved highly advantageous.

The results have been analyzed using AMOS to make sure data analysis is at a rigorous threshold of statistics, ensuring that insights into the integration of augmented reality technology within Jordan's telecommunication sector are both accurate and actionable.

The key indices of Chi-squared (χ^2), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA) were assessed to evaluate model fit for the adequacy of the model. Such indices gave a complete overview of the appropriateness of the model proposed against the observed data and guided necessary refinements. Thus, insights obtained from employing AMOS greatly contributed to extending the understanding of the adoption of augmented reality and provided some critical evidence upon considerations: implications related to brand awareness and involvement and the ways in which cultural fit and technological readiness may influence them. This approach of methodology has ensured that the results are valid, reliable, and directly related to the enhancement of strategic adoption for augmented reality technologies within the context of the telecommunications industry (Ye et al., 2025).

The AMOS-based structural model consists of the following latent variables:

Exogenous variables:

- Technological readiness
- Infrastructure availability
- Cybersecurity concerns
- Cultural orientation
- Cultural preferences (moderator)

Endogenous variables:

- Augmented reality adoption
- Brand recognition
- Consumer engagement
- Consumer purchase behavior

The specified direct paths are:

- Technological readiness → Augmented reality adoption
- Infrastructure availability → Augmented reality adoption
- Cybersecurity concerns → Augmented reality adoption
- Cultural orientation → Augmented reality adoption
- Augmented reality adoption → Brand recognition
- Augmented reality adoption → Consumer engagement
- Brand recognition → Consumer purchase behavior
- Consumer engagement → Consumer purchase behavior

Moderation paths:

- Cultural preferences × Augmented reality adoption → Brand recognition
- Cultural preferences × Augmented reality adoption → Consumer engagement

Every construction was designed as latent variables with reflecting indicators. Interaction terms built within AMOS tested moderation effects. Maximum likelihood was used for model estimation; all structural routes were simultaneously assessed. Model sufficiency and hypothesis support were evaluated using fit indices and path coefficients.

3. RESULTS

The key drivers of augmented reality adoptions in Jordan's telecom setting are cultural fit, technological readiness, and the possible development of cybersecurity fears. The effective relationship between augmented reality adoptions, brand awareness, and involvement were revealed by the survey results, which confirm that proper cultural adaptation of augmented reality is needed, trustworthy and suitable infrastructural and conditional development, and gained confidence to ensure trust in the influences which augmented reality exerts on consumer behaviors.

Table 2. Descriptive statistics

Variable	Mean	Standard deviation	Range
Augmented reality integration	3.55	0.80	1-5
Cultural preferences	3.75	0.85	1-5
Brand recognition	4.10	0.90	1-5
Brand engagement	3.90	0.75	1-5
Consumer behavior	3.65	0.88	1-5
Technological readiness	3.76	0.73	1-5
Technological infrastructure	4.17	0.73	1-5
Cybersecurity and data privacy concerns	4.01	0.71	1-5
Cultural alignment	3.92	0.87	1-5

The results in Table 2 show Brand recognition (M = 4.10, SD = 0.90) and Technological infrastructure (M = 4.17, SD = 0.73) as key strengths, indicating strong brand visibility and adequate infrastructure for augmented reality adoption. Lower scores for augmented reality Integration (M = 3.55, SD = 0.80) and Consumer behavior (M = 3.65, SD = 0.88) suggest moderate augmented reality adoption and behavioral impact. Cultural preferences (M = 3.75, SD = 0.85) and Cultural alignment (M = 3.92, SD = 0.87) highlight the need for culturally tailored strategies. Cybersecurity concerns (M = 4.01, SD = 0.71) indicate persistent trust issues. Overall, enhancing augmented reality integration, addressing privacy concerns, and aligning strategies culturally are essential for maximizing augmented reality's potential in Jordan's telecom sector.

Table 3. Reliability analysis

Variable	Cronbach's Alpha
Augmented reality integration	0.85
Cultural preferences	0.82
Brand recognition	0.88
Brand engagement	0.86
Consumer behavior	0.84
Technological readiness	0.83
Technological infrastructure	0.87
Cybersecurity and data privacy concerns	0.81
Cultural alignment	0.85

In this regard, all variables meet the cut-off point threshold of 0.70 on Cronbach's Alpha values; hence, they have satisfactory internal consistency and ensure a reliable measurement instrument as table 3. The highest reliability is shown by Brand recognition and Technological infrastructure, with $\alpha = 0.88$ and $\alpha = 0.87$ correspondingly, which is evidence of stability and consistency in their measures. Only the variables, such as Cybersecurity and Data privacy concerns with $\alpha = 0.81$ and Cultural preferences with $\alpha = 0.82$, are a little lower, while still within the acceptable range. Overall, the findings confirm the reliability of the survey tool in measuring augmented reality integration, cultural dynamics, technological factors, and consumer-related outcomes in Jordan's telecommunication sector (Ramadan & Morshed, 2024).

The correlation matrix in Table 4 indicates significant positive relationships among the study variables. Brand recognition shows the strongest correlation with Brand engagement (0.75) and Consumer behavior (0.65), suggesting a strong relationship between brand visibility and customer interaction. Augmented reality integration also correlates significantly with Brand Recognition (0.60) and Brand engagement (0.55), highlighting its role in improving brand outcomes. Moderate correlations are observed with Technological readiness (0.45) and Technological infrastructure (0.52), emphasizing their importance in facilitating augmented reality adoption. Meanwhile,

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Table 4. Correlation matrix

Variable	Augmented reality integration	Cultural preferences	Brand recognition	Brand engagement	Consumer behavior	Technological readiness	Technological infrastructure	Cybersecurity concerns	Cultural alignment
Augmented reality integration	1.00	0.35	0.60	0.55	0.50	0.45	0.52	0.40	0.48
Cultural preferences	0.35	1.00	0.45	0.40	0.30	0.38	0.33	0.29	0.36
Brand recognition	0.60	0.45	1.00	0.75	0.65	0.55	0.62	0.50	0.58
Brand engagement	0.55	0.40	0.75	1.00	0.70	0.50	0.58	0.46	0.54
Consumer behavior	0.50	0.30	0.65	0.70	1.00	0.48	0.53	0.42	0.49
Technological readiness	0.45	0.38	0.55	0.50	0.48	1.00	0.57	0.43	0.51
Technological infrastructure	0.52	0.33	0.62	0.58	0.53	0.57	1.00	0.47	0.55
Cybersecurity and data privacy concerns	0.40	0.29	0.50	0.46	0.42	0.43	0.47	1.00	0.44
Cultural alignment	0.48	0.36	0.58	0.54	0.49	0.51	0.55	0.44	1.00

Cybersecurity concerns exhibit weaker correlations with other variables, particularly with Cultural preferences (0.29), indicating a more isolated influence. Overall, these relationships reinforce the interconnected roles of augmented reality adoption, cultural alignment, and technological factors in shaping consumer engagement and behavior in Jordan's telecommunications sector.

Table 5. Model fit indices

Fit index	Value	Interpretation
Chi-squared (df)	350.25 (180)	Indicates model fit
CFI	0.95	Good fit
TLI	0.94	Good fit
RMSEA	0.05	Good fit

The model fit indices in Table 5 reflect that the proposed model fits the observed data well. A Chi-squared value of 350.25 along with its 180 degree of freedom shows a reasonable fit. However, one must remember that the value of this statistic is a function of sample size. Besides, both the Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) are greater than 0.90, reflecting an acceptable fit. The model's suitability is further supported by the RMSEA of 0.05, which falls below the acceptable level of 0.08. After carefully weighing in all the relevant factors, these indices have been able to indicate that the structural model is reliable and robust in measuring the theories being proposed.

Path analysis from Table 6 indicates that main study variables significantly inter-relate with each other. Integration of Augmented Reality is significantly and positively related to Brand recognition at 0.60 as well as to Brand engagement at 0.55, lending support for H1 and H2 as accepted hypotheses. Cultural Preferences are comparatively moderate drivers of brand outcomes of Brand Recognition at 0.25 and Brand Engagement at 0.30, thus validating H3 as accepted, owing to significant moderation on brand outcomes. Both Brand recognition and Brand engagement determine Consumer behavior at a rate of 0.45 and 0.50 respectively, thus evidencing their significance in determining customer responses.

Table 6. Path coefficients

Path	Coefficient	p-value	Interpretation
Augmented reality integration → Brand recognition	0.60	< 0.001	Significant positive effect
Augmented reality integration → Brand engagement	0.55	< 0.001	Significant positive effect
Cultural preferences → Brand recognition	0.25	0.015	Moderating effect
Cultural preferences → brand engagement	0.30	0.005	Moderating effect
Brand recognition → consumer behavior	0.45	< 0.001	Significant positive effect
Brand engagement → consumer behavior	0.50	< 0.001	Significant positive effect
Technological Readiness → Augmented Reality Integration	0.35	0.020	Significant positive effect
Technological Infrastructure → Augmented Reality Integration	0.40	0.010	Significant positive effect
Cybersecurity and Data Privacy Concerns → Augmented Reality Integration	–0.20	0.045	Significant negative effect
Cultural Alignment → Augmented Reality Integration	0.38	0.025	Significant positive effect

From the antecedents, Technological readiness and Technological infrastructure significantly positively influence integrated AR at 0.35 and 0.40 respectively, lending support to H4. Notwithstanding, since infrastructure was hypothesized to be negatively related because of its outdated nature (*H5*), but emerges with a significantly positive relationship, *H5* is therefore rejected. Consistently significant negative value of Cybersecurity and Data privacy concerns at –0.20 support H6 and confirm further that distrust problem can be deterrent to utilizing integrated AR. Finally, Cultural alignment positively influences integrated AR ($\beta = 0.38$), thus lending support to H7 and confirming further that campaigns should be cultural alignment-friendly.

Combined, they offer strong empirical support for the conceptual model and permit a comprehensive understanding of what is motivating adoption of augmented reality and, as a consequence, what are its outcomes for brands and consumers.

4. DISCUSSION

The present study looks at the degree of augmented reality adoption in Jordan's telecom industry as well as its effects on consumer involvement, brand awareness, and behavioral reactions later on. Empirical results show that by generating both emotional resonance and cognitive connection, augmented reality greatly increases brand recall and customer interaction. These findings complement earlier studies such Turner (2022) and Yadav et al. (2025), which highlight augmented reality's ability to foster significant and immersive interactions enhancing consumer-brand ties. Similarly, Nascimento and Loureiro (2024) have pointed out the ability of augmented reality to decrease buying uncertainty and build brand trust. Contrarily, multiple barriers for its adoption are antiquated IT systems, inconsistent API integrations, and a lack of high-speed internet access, also reported in the works of Sethi and Sharma (2025), and Walunj et al. (2025). Other issues also emerged with cybersecurity and data privacy, whereby consumers were skeptical about data safety, just like the insights provided by Shaikh (2024) on encryption protocols and audits as a means to build trust in a company. The cultural fit is important, and augmented reality advertising campaigns that are suited to Jordanian culture increase trust and participation, a fact noted by Aldaihani (2023) and Sehnem et al. (2025).

Non-congruent augmented reality ad campaigns that disregard local cultural values are likely to erode consumer confidence and disengage (Aldaihani, 2023; Sehnem et al., 2025). Among Jordanian consumers, whose values are formed by social norms and customs, discongruent messages are commonly perceived as intrusive or culturally insensitive (Mahmoud et al., 2025). Even if the technology works well, non-congruent campaigns are likely to endure limited adoption and credibility (Le Mouélic et al., 2025).

It identifies a number of constraints reducing the use of augmented reality in the telecommunications market of Jordan. These are aged digital infrastructure, non-uniform technical standards, limited local knowledge, data privacy concerns, and restricted funds among the smaller telecom operators. These are in line with the others found in other emerging markets and are thus no different from Jordan (Sethi and Sharma, 2025; Teece, 2025).

To address these, there is a need for coordinated action. National policies, funding incentives, and cooperation among private and public players can facilitate broader deployment (Barta et al., 2025). Investments in trusted high-speed internet, in applications that are interoperable, and in information security technologies like encryption and multi-factor authentication can be helpful in generating trust among the users (Bindewari et al., 2025).

Moreover, local campaigns need to be customized to consumer values and communication methods because cultural relevance will amplify the emotional significance of the experience of augmented reality (Mahmoud et al., 2025). Capacity-building initiatives in collaboration with universities and regulators can enhance competencies in the use of both augmented reality and artificial intelligence, speeding up development and take-up (Samira et al., 2024).

Future studies need to explore the long-term impact of augmented reality on customers' loyalty, determine how artificial intelligence can be leveraged to further personalize, and compare consumer behavior in various demographic groups in Jordan.

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CONCLUSION

With an eye toward the moderating roles of cultural alignment, technological readiness, infrastructure quality, and cybersecurity concerns, this study aim to investigate how augmented reality affects brand recognition, consumer engagement, and behavioral responses inside the Jordanian telecommunications sector.

Empirical research verified that augmented reality integration significantly increases brand recognition and interaction. Strong digital infrastructure and user readiness promote these impacts even more. Effective augmented reality adoption was thus hampered by cultural inconsistencies and data security concerns, nevertheless.

These results let one realize that technical execution by itself is not enough to guarantee the success of augmented reality-driven policies in underdeveloped countries. Rather, sustainable consumer involvement depends on a whole approach including user-centric design, safe data environments, and culturally sensitive material.

Longitudinal studies tracking augmented reality's impact on consumer retention and brand loyalty should take the stage in next investigations. Comparative studies among variously culturally diverse emerging economies would also offer more general understanding of contextual adaptation. A fascinating path for academic research is also investigating how artificial intelligence integration might improve personalization in augmented reality situations.

AUTHOR CONTRIBUTIONS

Conceptualization: Hanadi Salhab.
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Funding acquisition: Hanadi Salhab.
Investigation: Hanadi Salhab.
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