Exploring the impact of virtual reality experience, interactivity, engagement, and content quality on user experience and rebooking intention in Saudi Arabian hotels

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Abstract: The increasing digital transformation influences the hospitality industry by reshaping the way of service experience and evaluation through experiential and interactive technologies. Yet, little empirical evidence has been found that studies how these digital attributes jointly influence consumer experience and behavioral loyalty in developing markets like Saudi Arabia. This research investigates the impacts of Virtual Reality Experience (VRE), Interactivity (INT), Engagement (ENG), and Content Quality (CQ) on User Experience (UE), and how UE predicts Rebooking Intention (RB) in Saudi hotels. A quantitative, cross-sectional design was used based on responses from 466 digitally active hotel customers. SEM with AMOS tested measurement and structural models via Confirmatory Factor Analysis (CFA) and model fit indices: χ^2/df, CFI, TLI, RMSEA, SRMR. Interactivity, Engagement, and Content Quality significantly enhanced User Experience, whereas Virtual Reality Experience did not show any direct effect. User experience strongly predicted Rebooking Intention. The findings indicate that emotionally engaging, interactive, and content-rich environments outperform technological novelty. This study has advanced the S-O-R and Service-Dominant Logic frameworks, providing insights into user-centered digital hospitality strategies aligned with Saudi Vision 2030.

Keywords: Content quality, Digital hospitality, Engagement, Interactivity, Rebooking intention, User experience, Virtual reality experience.

1. Introduction

The hospitality and tourism industry is undergoing a rapid digital transformation that is changing the way services are envisioned, offered, and experienced. Among the emerging digital technologies, the Virtual Reality Experience (VRE) has been particularly effective in providing immersive, emotive environments that simulate real-world hospitality experiences [1-3]. Recent studies position VRE as an experiential construct that is revolutionary, combining sensory immersion, emotional engagement, and perceived authenticity to enhance pre-consumption evaluation and decision confidence [4, 5]. Unlike conventional marketing media such as printed brochures or static websites, the Virtual Reality Experience is capable of multisensory engagement, and potential visitors can explore hotel rooms, amenities, and nearby areas in simulated environments. This experiential nature reduces information asymmetry, raises decision confidence, and bridges the perceptual gap between what is expected and what is experienced [6-8].

Empirical studies affirm that VRE strengthens cognitive and affective evaluations of tourism services and therefore solidifies trust, satisfaction, and booking intentions [9, 10]. Apart from VRE, other virtual service attributes namely interactivity, engagement, and content quality have also been recognized as key drivers of online customer experience. Interactivity, reflecting users' perception of control and feedback on computer interfaces, enhances perceived enjoyment, usability, and satisfaction

[11-13]. Engagement, reflecting users' cognitive absorption and emotional activation, enhances the quality of computer interactions and develops attachment and loyalty [14-16]. Similarly, the quality of content, such as accuracy, relevance, readability, and visual appeal, generates trust and perceived value for web-based service experiences [17-19]. Collectively, these will render a consistent and compelling digital experience that enhances satisfaction and supports long-term customer relations [20, 21]. These forces are particularly relevant in the Kingdom of Saudi Arabia (KSA), wherein hospitality and tourism form the key pillars of Vision 2030, the economic diversification strategy of the nation. Initiatives such as NEOM, the Red Sea Project, and Diriyah Gate are prime examples of Saudi Arabia's pursuit to become a global tourism destination with innovation, authenticity, and sustainability [22, 23]. Therefore, hotels within the country are investing heavily in digital and immersive experiences to remain competitive with technologically savvy tourists [24, 25]. Even though there is a rise in the employment of virtual and interactive technologies within Saudi hospitality, empirical research is limited on how these experiences influence user satisfaction, trust, and loyalty behavior [23, 26]. There are a number of primary research gaps. First, most of the research emphasizes the novelty or entertainment quality of VR rather than its role as a component of the integrated hospitality experience [3, 7, 27]. Secondly, although interactivity, engagement, and content quality are established predictors of online satisfaction, their interactive effect across Virtual Reality Experience–based hospitality destinations has hardly been examined empirically [9, 16, 28]. Thirdly, most of the studies have been performed in Western and East Asian contexts, with culturally distinct environments, i.e., Saudi Arabia, being relatively understudied, considering their own diverging sociocultural and religious environments regarding tourism behavior [2, 23]. Finally, prior work has predominantly focused on technology intention to use rather than actual behavior outcomes, such as rebooking intention, a direct measure of profitability and customer loyalty [10, 29, 30].

Replacing these, the present research explores the interactive influences of Virtual Reality Experience, Interactivity, Engagement, and Content Quality on User Experience and Rebooking Intention in the Saudi hospitality context. The research aims to: determine the impact of Virtual Reality Experience on user experience, explore the impact of interactivity on perceived satisfaction and value, determine the impact of engagement on the depth of digital experience, determine the impact of the quality of content on trust and satisfaction of the user, and test the impact of user experience on rebooking.

2. Literature Review
2.1. Overview of the Research Domain

The rapid digitization of the hospitality sector over the last decade has transformed the design, delivery, and experience of service experiences. In this digital age revolution, Virtual Reality Experience (VRE) and even augmented and mixed reality solutions are a revolutionary experiential and technological frontier. Unlike being employed as an advertising tool, VRE allows potential customers to engage with immersive and interactive simulations of hospitality settings prior to ever making a physical purchase, thus altering the evaluative judgments and behavior intentions [4, 5]. By multisensory immersion and spatial realism, VRE mitigates perceived risk and uncertainty but at the same time creates emotional involvement and psychological presence in real virtual environments [6, 31]. More than with conventional media employed for promotional communication, immersive experiences allow users to undertake virtual visits, move around digital representations of hotel facilities, and measure perceived service quality instantaneously. Such pre-experiential involvement is an experience prototype that builds trust, enables effective decision-making, and facilitates cognitive fluency in service assessment [9, 27]. A shift from passive immersion to interactive simulation is a significant leap towards user-centric, co-creative experiences wherein consumers are involved in actively shaping their perception and expectations of hospitality products. In parallel, the emergence of digital fluency and customized interaction has reshaped consumer expectations. Travelers today, especially digital natives, want immersive, sensitive, and affective experiences that maximize sensory

fidelity with high interactivity [32, 33]. Such consumers anticipate not just smooth usability but also high engagement that induces pleasure, arousal, and satisfaction. Therefore, hotels are more than happy to invest in rich interactive content and immersive interfaces as strategic resources in order to co-create value, form emotional connections, and differentiate their brands in competitive environments [16, 19]. Integrating virtual reality experiences with the richness and interactivity of content is a paradigm of innovation in hospitality services. It facilitates multi-sensory, experiential, and affective experiences beyond traditional service encounters [34]. Within this, digital touchpoints are promoted beyond the level of mere communication channels but as strategic customer relationship management, brand affinity, and loyalty-building devices. And so, the union of immersive technology, consumer psychology, and experiential design establishes the new hospitality paradigm where technology is not an ancillary mechanism but an inherent driver of competitiveness, innovation, and experiential differentiation for the digital service economy.

2.2. Theoretical Perspectives

This study is grounded on two theoretical paradigms, complementary in accounting for the ways technology-enabled experience influences customer cognition, affect, and behavior within the hospitality context: the Stimulus–Organism–Response (S–O–R) paradigm and the Service-Dominant Logic (SDL) worldview. The two paradigms together offer a comprehensive account of how Virtual Reality Experience (VRE), interactivity, engagement, and quality content are technological and experiential stimuli eliciting user experience and consequent behavioral outcomes, e.g., rebooking intention and loyalty.

The S–O–R paradigm, which was originally developed by Mehrabian and Russell [35], assumes that environmental stimuli elicit internal affective and cognitive processing (organism), which in turn gives rise to behavior. Transferred to the virtual hospitality setting, VRE's multifaceted sensory attributes, levels of digital interactivity, and online content genre are equally dominant drivers of users' internal states perceived enjoyment, emotional engagement, trust, and satisfaction [5, 24]. These internal affective and cognitive states, in turn, drive behavioral intentions such as rebook decisions, electronic word-of-mouth, and brand advocacy. The ability of the model to simulate emotional and psychological interaction processes places it well to explore VRE in the hospitality sector, where the user experiences rich, multisensory, and interactive stimulation that evokes deep experiential and behavioral responses [36]. To enhance this stimulus–response model, the Service-Dominant Logic of Vargo and Lusch [37] offers a relational and co-creative approach to explain how value is collaboratively created by customers in interaction and technological intermediation. SDL deviates from the traditional idea of value as residing within a product or service, instead positing that value is generated dynamically in interactive relations between customers, providers, and digital portals [38, 39]. In the context of virtual hospitality, Virtual Reality experiences and interactive technologies enable consumers to discover, personalize, and preview experiences ahead of actual consumption, fostering active participation and psychological ownership of the service process [40]. Interactive engagement stimulates greater perceived value, affective commitment, and ongoing relational ties between customers and hospitality brands [41].

It combines the S–O–R and SDL views to equip the current study with a well-grounded theoretical framework. The S–O–R model explains the psychological process by which digital stimuli affect user experience and behavioral intention. Whereas SDL locates such mechanisms within a co-creative process of value realization. Together, these paradigms shed light on how interactive and immersive hospitality technologies realized through Virtual Reality Experience transcend technological novelty to be drivers of relational worth, user enjoyment, and sustainable loyalty within the emerging digital hospitality ecosystem.

2.3. Key Constructs and Definitions

The conceptual framework of the current research is organized with six interconnected constructs Virtual Reality Experience (VRE), Interactivity (INT), Engagement (ENG), Content Quality (CQ), User Experience (UE), and Rebooking Intention (RB) interconnected to measure the cognitive, affective, and behavioral aspects of technology-supported service experiences in hospitality. Together, the six constructs embody the way virtual surroundings influence consumer perception, satisfaction, and loyalty in contemporary hospitality environments.

Virtual Reality Experience (VRE) is a computer-mediated, simulated real-world environment depiction of hospitality spaces that enables consumers to view, assess, and experience hotel environments and facilities before physical consumption. Despite immersive visualization and multisensory stimulation, VRE allows customers to move virtually through hotel rooms, facilities, and adjacent amenities, thereby minimizing perceived risk and decision uncertainty [3, 7]. The realism, sensory realism, and vividness of the virtual world trigger a feeling of telepresence, increase affective involvement, and increase decision certainty [6, 42]. As such, VRE serves as an experience vehicle prior to consumption that fills the gap between fantasy and reality, manipulating expectations and supplying evaluative judgments of hospitality products. Interactivity (INT) is the degree to which a digital system facilitates user control, responsiveness, and two-way communication within online settings. Hospitality platforms provide interactivity through interactive features that allow users to move through virtual environments, interact with content, customize their experience, and offer instant feedback to service personnel [43]. Higher interactivity evokes feelings of competence, autonomy, and psychological empowerment, which in turn increase user satisfaction and perceived usefulness [44]. Interactivity then turns the users into active participants in the service process from their previous passive roles of information receivers, since they feel greater experiential involvement and value co-creation. Engagement (ENG) includes users' cognitive absorption, emotional involvement, and behavioral participation in digital hospitality platform interactions. Theoretically conceptualized as a multi-dimensional concept, engagement reflects the level of psychological absorption and relational connection customers feel towards a service brand [14]. In hospitality, engagement is said to occur when virtual or online interactions are experienced as personally engaging, entertaining, and emotionally satisfying, thereby leading to loyalty and advocacy [13, 16]. Engagement, thus, is the mediational process where the affordances of technology and stimulating immersion are read as long-term relational value and customer retention. Content Quality (CQ) refers to a metric of users on the accuracy, relevance, clarity, and aesthetics of digital content deployed in the form of text, images, or multimedia. Content quality is equally important in hospitality environments in establishing user trust, boosting perceived credibility, and facilitating information satisfaction [44, 45]. High-quality content reduces uncertainty, increases perceived transparency, and facilitates consumers' evaluative judgments of service providers. Content quality serves as a cognitive antecedent to be the informational basis for trust and authenticity in online service interactions. User Experience (UE) is the aggregate subjective and sensory perception by the interaction system of digital service settings. It is the coming together of affective pleasure, cognitive interest, and perceived usability elicited by interaction [46, 47]. For hospitality, user experience goes beyond functional usability and embraces emotional attachment, memorability, and perceived experiential value by engaging involvement. It is the central theory of integration that connects digital system design, perceived quality, and behavioral responses like satisfaction, loyalty, and word-of-mouth. Rebooking intention (RB) refers to the conscious intent of tourists to come back or rebuy from the same service company because of previous satisfactory experiences. It includes the behavioral aspect of customer loyalty and is an important profitability driver and long-term relationship sustainability trigger [48, 49]. In online hotel contexts, rebooking intention represents a behavioral proxy for positive user experience, affective satisfaction, and trust in digital interactions and their translation into actionable repeat-purchase behavior.

Collectively, the six constructs constitute an integrated model that clarifies how Virtual Reality Experience, Interactivity, and Content Quality, specifically, influence User Experience and Rebooking

Intention. Their interplays reflect the paradigm shift in hospitality from transactional transactions to experience-based, co-created service experiences where value is co-created through active immersion, affective connection, and digital trust.

2.4. Empirical Studies and Findings

Empirical tourism and hospitality research in recent times has been keen to pursue the experiential potential of interactive and immersive digital technologies to influence consumer choice, satisfaction, and loyalty. Among them, Virtual Reality Experience (VRE) is an exemplary facilitator of experiential value that redefines customers' assessment of services and acts on the purchase. VRE spaces allow users to get accustomed to destinations and hospitality environments in vivid, multisensory forms, thus allowing them to "test drive" hotel rooms, facilities, and local sights without a purchasing commitment. Sensory immersion raises perceived realism, spatial presence, and cognitive confidence variables that are directly related to users' pre-purchase attitudes and behavioral intentions [6, 7]. Empirical evidence affirms that VRE introduces an emotional feeling of contact and authenticity through closing the experience and imagination gap. Park and Nicolau [50] showed that VRE enhances affective bonding and destination image considerably, greatly enhancing tourists' booking intentions. In the same vein, Han et al. [32] demonstrated that interactive and immersive experiences trigger affective and cognitive appraisals that, in turn, evolve into satisfaction and loyalty through the mediation of perceived experiential value. In the same way, Heller et al. [51] elaborated that VRE interfaces diminish decision uncertainty by boosting perceived informativeness, transparency, and visualization quality, thereby constructing consumers' confidence and trust. Together, these studies establish that VRE is an experiential link between expectancy and consumption that guides customers from cognitive assessment to emotional connection and behavioral loyalty.

Parallel scholarship refers to interactivity as a basic determinant of digital experience quality. Characterized by features such as two-way responsiveness, self-regulated navigation, and real-time adaptation, interactivity involves active user participation and psychological engagement [43]. Through interactivity, digital hospitality users are empowered to personalize their experience, manage interface features, and dynamically engage with service agents. Özer et al. [52] established that increased interactivity enhances both utilitarian and hedonic value in online hotel booking situations. Liao et al. [53] also established that responsive interfaces induce social presence and relational warmth, key drivers of affective engagement and trust. This empirical result highlights interactivity's double character: both as a functioning mechanism of efficiency and as an emotional trigger to enjoyment, agency, and interpersonal connectedness in technology-enabled service environments. The engagement function has also been empirically found as a mediating process intervening between technological affordances and loyalty outcomes. Engagement is theoretically defined as users' cognitive engagement, emotional bonding, and participative activity through digital experience. Dwivedi et al. [54] also submitted large-scale empirical evidence demonstrating the role of engagement as an interactivity and quality content impacts mediator of brand trust and advocacy in technology-enabled service environments. Likewise, Arshad et al. [48] demonstrated that emotional engagement predicts revisit and recommendation intentions directly in hospitality environments, further attesting to its strategic importance in the realization of long-term customer relationships. Engagement then translates transactional interaction into long-term psychological bonds and turns it into a core conduit through which digital experience is translated into long-term loyalty. Furthermore, content quality has been consistently shown to be a key precursor of user trust, satisfaction, and decision confidence in online hospitality systems. High-quality content, correct, understandable, coherent, and pleasing to the eye, is reported to augment perceived informativeness and credibility of online channels [44, 55]. Message coherence and website informativeness have been shown to positively impact booking intention, with trust moderating this effect [36]. Equally, Osei-Frimpong et al. [56] asserted that visual design consistency and multimedia richness are significant factors in influencing satisfaction and loyalty in online booking situations. In hospitality service situations, unique and visually stimulating content not

only educates but also serves as an experiential cue that influences users' senses of authenticity, transparency, and brand integrity.

In spite of this converging body of evidence, there are many gaps in empirical research that are critical. With a few exceptions, most of the previous research splits Virtual Reality Experience, Interactivity, Engagement, and Content Quality into independent rather than interdependent predictors within a fragmented conceptual framework of digital user experience. In addition, much of the available data is based on Western or East Asian contexts, with implications for their generalizability to new tourism markets elsewhere still broadly untested. Cultural, environmental, and technological variations may mediate technological affordances and behavioral responses [57]. Middle Eastern and Saudi Arabian context-specific research is thus urgently needed as hospitality digitalization speeds up in sync with tourism consumption, cultural transformation, and experiential flavor changes. Sealing these contextual and cultural gaps is essential to facilitate theoretical generalizability and practical awareness of the evolving digital hospitality environment.

2.5. Methodological Limitations in Existing Research

While the sheer scale of research undertaken on digital change in the hospitality industry is to be applauded, significant methodological limitations persist that hinder theoretical development and limit the external validity of previous empirical work. A very high percentage of previous work has been on small, non-probability samples of convenience or students. While these samples are cost-effective and convenient in terms of logistics, they exact a high cost in external validity and limit the generalizability of results to the larger population of tourists [58, 59]. This is especially relevant in studies on immersive media like Virtual Reality Experience (VRE), where sample bias is likely to be skewed towards youth, technology-savvy, and innovation-oriented participants. Hence, such samples will be positively skewed with regard to attitudes toward the adoption of technology, producing a sort of selection bias that overestimates reported acceptance of immersive technologies by the general public [60]. Second, the majority of earlier studies used cross-sectional study designs, which capture user attitudes, perceptions, and behavioral intentions at a specific point in time. Although this method provides methodological simplicity and parsimony, it does not possess the ability to detect the temporal sensitivity required to establish the dynamic character of digital experience. As a result, such designs are constrained in their ability to track how the perception and emotional experience of users are conveyed to long-term behaviors like rebooking behavior, repeat visits, or long-term loyalty [61, 62]. The lack of longitudinal or mixed-method studies also limits researchers' ability to make inferences of causality between technology stimuli and long-term behavioral outcomes, thereby restricting the explanatory richness of the findings. Third, considerable empirical investigation into Virtual Reality Experience and other virtual technologies occurs in laboratories. Although laboratory research increases internal validity through the reduction of extraneous variance, it typically compromises ecological realism. Hospitality settings in the field are dynamic in nature, characterized by multilateral social interaction, multisensory stimulation, and situational variability [3, 63]. Laboratory experiments, in contrast, strip away these situational dynamics that may generate behavior discrepancies between participants' experimental behaviors and real-life decision-making in real hotel reservation settings. Fourth, the discipline still grapples with conceptual and measurement heterogeneity across key constructs like interactivity, engagement, and content quality. Researchers have operationalized the constructs in different ways with differing item structures, theory bases, and measurement scales [16, 64]. Such heterogeneity makes meta-analytic synthesis difficult, undercuts cross-study comparability, and bars the construction of cumulative theoretical models that can fully account for digital experience formation and its behavioral effects. Finally, the geographical proximity of empirical studies is a formidable deficiency. Most of the books have their genesis in Western and East Asian contexts, with hardly any contributions from developing Middle Eastern, African, and Latin American regions [50, 65]. Given the observation that consumers' perceptions, trust mechanisms, and web behaviors are significantly reliant upon cultural orientations and degrees of digital literacy, then cross-cultural

underrepresentation halts cross-cultural representation, limiting the generalizability and external validity of current theoretical models.

Combined, these methodological and contextual limitations shed light on the necessity to develop more methodologically sound, culturally attuned, and ecologically valid research designs. Follow-up research should embrace probability-based or stratified sampling methods, adopt mixed-methods or longitudinal study designs, and implement field experiments within naturalistic settings to capture more inclusive consumer behavior. Standardization and cross-cultural validation are also required to enhance empirical rigor and theoretical consistency in Virtual Reality Experience and digital engagement research in hospitality. These methodological improvements will also ensure a broader, more generalizable, and globally applicable understanding of digital experience dynamics in tourism and hospitality research today.

2.6. Conceptual Framework and Hypothesis Development

The theoretical model used in this research (see Figure 1) synthesizes two valid theoretical models the Stimulus–Organism–Response (S–O–R) model and the Experience Economy theory, to account for how digital service affordances shape user experience and behavioral loyalty in hospitality settings. These models are combined to provide a multi-dimensional perspective of how technology-supported environments cause cognitive, emotional, and behavioral reactions. The proposed model assumes that Virtual Reality Experience (VRE), Interactivity (INT), Engagement (ENG), and Content Quality (CQ) are stimuli that have a direct impact on User Experience (UE), which, in turn, induces Rebooking Intention (RB) as a behavior.

The S–O–R paradigm [35] assumes that stimuli from the external environment trigger internal affective and cognitive responses resulting in behavioral reactions. Interactive interfaces and immersive technologies in virtual hospitality contexts are stimuli that influence users' perceptions, emotions, and judgment of value, the organismic state of user experience. Such psychological reactions subsequently influence loyalty behavior like rebooking intention, consistent with prior work on the causal relationship between digital interaction quality and customer retention [13, 54]. Parallel to the above, the Experience Economy theory by Pine and Gilmore [66] is the term used to describe the transition from functional service provision to experiential, emotive experiences that create value beyond their purpose. For hospitality, technology like Virtual Reality Experience and interactive digital interfaces enables customers to pre-experience, customize, and emotionally relate to hotel experiences prior to consumption. This immersion transforms passive viewing into experiential co-creation, which fuels satisfaction, perceived value, and loyalty [6, 48]. Combining the two theories allows this study to connect the technological and experiential interfaces, translating how digital stimuli elicit experiential states that construct behavioral commitment.

VRE in this context offers experiential, sensory-intensive simulations to minimize uncertainty and guarantee maximum confidence in decisions by enabling future guests to virtually simulate hospitality settings [4]. Interactivity (INT) refers to the degree of user control and two-way responsiveness across computer interfaces, enabling autonomy and satisfaction [67]. Engagement (ENG) represents the cognitive and affective attachment of the user to internet interactions, fusing virtual experience with attachment and advocacy [13]. Content Quality (CQ) represents clarity, credibility, and visual congruence of internet content, fostering confidence and minimizing perceived risk [68]. These constructs collectively account for technological and information cues that provide insight into the user experience, determining the response and rebooking intention. The model thus theorizes User Experience as an intervening variable whereby immersive technologies and digital affordances transform technological innovativeness into long-term consumer loyalty, summarizing the grand phenomenon of digital transformation in the hospitality sector.
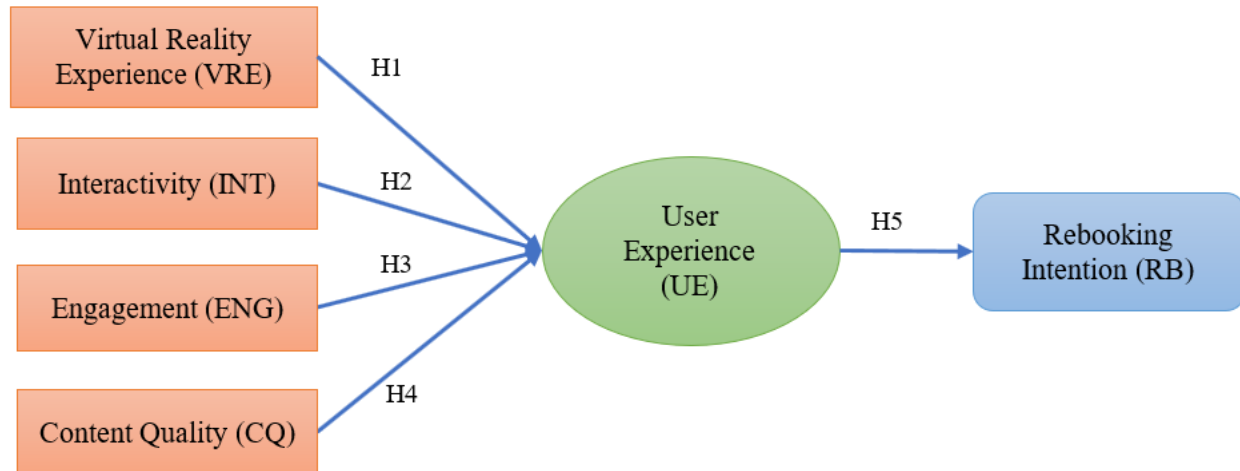
Figure 1.
Conceptual model.

2.6.1. Virtual Reality Experience → User Experience

Virtual Reality Experience (VRE) provides multisensory, interactive simulations that enable customers to preview hospitality settings prior to visiting, thereby eliminating the expectation–reality gap and minimizing uncertainty. Lee and Kim [67] established that telepresence and interactivity in VR tourism significantly enhance utilitarian and hedonic values, which indirectly mediate satisfaction and revisit intention, clear evidence that experiential quality is underpinned by the VR experience [67]. In their empirical model, information access, information flow, and interactivity were drivers of utilitarian and hedonic value, both positively affecting user intention [67]. Likewise, Zhang et al. [69], in their study on service encounter value, the authors show that experiential value positively affects engagement and satisfaction in hospitality environments, affirming the necessity of high-quality user experiences from stimulation [69]. The VR tourism literature further points out that realism, immersion, aesthetic design, and content coherence increase affective resonance and trust [3, 70]. Further, the latest VR marketing research indicates that virtual experiences render users stickier and retained, and posits that pleasurable VR experiences beget an experience of long-term experiential judgments overall [71]. VRE can be seen as an effective technological stimulus operating on psychological processes (flow, presence, emotional arousal) that construct the organism in S–O–R, thus reinforcing the response—user experience.

H₁: Virtual Reality Experience has a strong and positive influence on the user experience of hotel digital platforms.

2.6.2. Interactivity → User Experience

Interactivity encapsulates users' responsiveness, agency, and two-way interaction on digital media. Lee and Kim [67] in VR travel, define interactivity as an essential precursor to utilitarian and hedonic value, mediating satisfaction, by proposing that higher interactivity leads to more powerful experiential experiences [67]. Outside of VR, research "Service Encounter Value and Online Engagement Behaviors" [69] shows there are greater numbers of customer engagements that take place with highly interactive online service encounters, and these produce more desirable experiential outcomes [69]. A recent empirical investigation of the contribution of interactivity to customer engagement also strengthens the point that two-way communication, co-problem-solving, and participatory interfaces are beneficial for engagement and satisfaction with digital services [72]. In the S–O–R perspective, interactivity is a stimulus that enhances users' sense of control, competence, and psychological

ownership, which in turn affects the organismic evaluation of the experience. For hospitality use, facilitating users to manage views, ask questions, and respond in real-time to material enhances immersion, empowerment, and affective attachment. Therefore, hyper-interactive sites ought to possess higher user experience scores. In conclusion:

H₂: Interactivity has a positive and direct effect on User Experience within virtual hospitality environments.

2.6.3. Engagement → User Experience

Engagement is user cognitive, affective, and behavioral participation in the digital experience. It is greater engagement that acts as a mediator of the impact of service value and satisfaction on behavioral intentions in Service Encounter Value literature, making its role in determining user experience even more central [69]. In VR tourism research [67], flow and engagement are essential in capturing immersive aspects and translating them into utilitarian and hedonic value to instigate experience and intention. In digital hospitality, active users devote their attention, expound on information processing, and effectively become immersed in the interface narrative, resulting in an intensified experiential meaning. Additionally, design research asserts that engagement is an intervening process between interactive stimuli and affective results [73]. The S–O–R model positions engagement during the organism stage: the psychological state resulting from stimuli and subsequently influencing the way users react. Greater engagement is captured in greater absorption, enjoyment, and relational attachment, thereby resulting in a richer user experience. Accordingly:

H₃: User Experience is greatly and positively influenced by Engagement.

2.6.4. Content Quality → User Experience

Content quality refers to the clarity, relevance, consistency, and aesthetic appeal of digital content. In VR tourism, high-fidelity images, narrative coherence, and informational accuracy heighten the perception of realism and trust, and thus increase experiential judgments [67]. In general, hospitality digital research, service encounter value research demonstrate that the richness of content and information clarity are engagement and satisfaction drivers [69]. Further, in creating digital guest experiences, Youssofi et al. [73] observe that content design is a psychological lever influencing empathy, understanding, and emotional resonance in digital touchpoints. Via S–O–R theory, content quality is within the stimulus package: it cues users' internal judgments of reliability, transparency, and aesthetic appeal, which reflect affective and cognitive judgments in the user experience. In hospitality VR settings, more content (good visuals, steady designs, correct information) provides greater immersion and perceived realism that leads to more favorable experiential responses. Therefore:

H₄: Content Quality has a positive and significant impact on User Experience.

2.6.5. User Experience → Rebooking Intention

User Experience (UE) integrates affect, cognition, and sensorial assessment into a comprehensive evaluation of the digital experience. Experiential satisfaction has been shown by scholars to be a primary motivator for loyalty and repeat visit intentions in hospitality and tourism settings [70, 74]. For VR tourism, experiential satisfaction-behavior intention is well established [67]. Virtual reality for customer loyalty research indicates that such positive VR experiences stimulate user loyalty in tourism business environments [75]. Positive experience lowers perceived risk and raises trust and commitment within loyalty and behavior models, advancing positive attitudes toward rebooking intention. In S–O–R, the organism state (user experience) adjusts the behavioral response in the current context of rebooking intention. Since UE encompasses enjoyment, trust, memorability, and value, it is the psychological foundation of retention choice. Consequently:

H₅ User Experience has a positive and direct influence on Rebooking Intention.

3. Study Methodology

The present study adopted a quantitative, cross-sectional research design to empirically examine the relationships among Virtual Reality Experience (VRE), Interactivity (INT), Engagement (ENG), and Content Quality (CQ) as antecedents to User Experience (UE) and the consequential Rebooking Intention (RB) in the Saudi Arabian hospitality setting. The quantitative methodology was found to be suitable because it can test theory-driven hypotheses, analyze structural relationships between latent variables, and produce generalizable findings on the basis of statistical validity [76-78]. With a cross-sectional design, data were gathered from a representative sample at a single point in time and measured contemporary customers' views of technology-enabled hotel experiences within an emerging digitized tourist environment.

Saudi Arabian consumers of hotel services with existing experience in using digital booking systems with immersive or interactive services like virtual tours, panoramic visualizations, or live chat interfaces formed the target population. Participants were recruited using convenience and purposive sampling methods for enrollment by persons with sufficient exposure to these technologies. Online and on-site self-reporting questionnaires were administered via hotel websites and physical front desks. Screening measures were utilized to ensure that participants had exposure to interactive and immersive digital platforms. A total of 466 usable responses were obtained and examined from all the questionnaires administered. This sample exceeds the minimal guidelines for structural equation modeling (SEM), providing sufficient statistical power and estimation model reliability [79, 80]. The instrument used for measurement was a six-latent construct designed survey: Virtual Reality Experience, Interactivity, Engagement, Content Quality, User Experience, and Rebooking Intention. Measurement items were taken from existing validated scales in the literature to maintain construct validity and theoretical consistency. In particular, Virtual Reality Experience items were taken from Loureiro et al. [4] and Wei et al. [27], Interactivity from Yen et al. [81] and Kabadayi et al. [82], Engagement from Brodie et al. [33] and Chua et al. [83], Content Quality from Marbach et al. [84] and Li and Chen [85], User Experience from Li and Chen [85] and Loureiro et al. [4], and Rebooking Intention from Han et al. [32] and Hellier et al. [29]. All the constructs were operationalized based on four items measured using a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), enabling quantitative measurement of respondents' attitudes and behavioral reactions. Data analysis was conducted using Structural Equation Modeling (SEM) with AMOS software. The two-step analytical process developed by Anderson and Gerbing [86] was employed for ascertaining complete model estimation. First, Confirmatory Factor Analysis (CFA) was conducted to examine the measurement model and determine the reliability, convergent validity, and discriminant validity of all the measures. Second, the structural model was examined in an attempt to examine the hypothesized causal relationships between the variables. The overall fit of the model was assessed with a variety of indices, i.e., the chi-square to degrees of freedom ratio (χ^2/df), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Statistical and theoretical rule-of-thumb of Hu and Bentler [87] and Holleman [78] were utilized in model fit interpretation towards the achievement of statistical solidity and theoretical likelihood.

The study strictly followed the ethical standards of research. Voluntary participation was mandatory, and informed consent was collected from participants before data collection. Confidentiality of the participants and anonymity were maintained to the best of ability, and the protocol for research obtained ethics clearance from the Institutional Review Board of the authors' home university. The measures taken ensured adherence to the Resnik [88] ethical principles for human-subject research.

4. Data Analysis and Results

Data analysis was conducted using Structural Equation Modeling (SEM) with AMOS software, applying the robust two-step analytical procedure recommended by Anderson and Gerbing [86]. This approach enables the systematic validation of both the measurement model and the structural model, thereby ensuring the empirical integrity of the hypothesized framework.

In the initial phase, Confirmatory Factor Analysis (CFA) was utilized to evaluate the adequacy of the measurement model, ensuring the reliability of the constructs, as well as their convergent and discriminant validity. Item loadings were scrutinized to confirm that all observed variables significantly loaded onto their respective latent constructs: Virtual Reality Experience (VRE), Interactivity (INT), Engagement (ENG), Content Quality (CQ), User Experience (UE), and Rebooking Intention (RB). Internal consistency was assessed using Cronbach's alpha and Composite Reliability (CR), both of which exceeded the recommended threshold of 0.70. Average Variance Extracted (AVE) values also surpassed the minimum cutoff of 0.50, indicating satisfactory convergent validity. Additionally, discriminant validity was confirmed following the Fornell–Larcker criterion, which states that the square root of each construct's AVE should be greater than its correlations with other constructs, demonstrating that the constructs are empirically distinct.

In the second step, the structural model was analyzed to test the hypothesized causal relationships among the latent constructs, specifically examining the predictive effects of Virtual Reality Experience, Interactivity, Engagement, and Content Quality on User Experience, and subsequently, the impact of User Experience on Rebooking Intention. Path coefficients were estimated using maximum likelihood estimation (MLE) to ensure unbiased parameter estimation under the assumption of multivariate normality.

The overall model fit was evaluated using a comprehensive set of goodness-of-fit indices, including the Chi-square to degrees of freedom ratio (χ^2/df), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Following the criteria proposed by Hu and Bentler [87] and Kline [89] the model demonstrated an acceptable fit: χ^2/df values below 3.0, CFI and TLI values above 0.90, and RMSEA and SRMR values below 0.08. These results collectively confirm the adequacy of both the measurement and structural models, supporting the robustness of the hypothesized relationships. The rigorous analytical process adopted ensured statistical soundness and theoretical validity, thereby reinforcing the empirical reliability of the proposed model, which links Virtual Reality Experience, Interactivity, Engagement, and Content Quality to User Experience and Rebooking Intention within the Saudi Arabian hospitality context.

4.1. Descriptive Statistical Analysis of the Study Dimension

Before proceeding with inferential and structural analysis, a descriptive statistical assessment was performed to examine the central tendency, dispersion, and overall distributional characteristics of the study constructs. This preliminary step served to confirm the internal coherence and representativeness of respondents' evaluations regarding the technological and experiential dimensions of hotel digital interfaces.

Table 3 presents the descriptive statistics for the six latent constructs measured in this study: Virtual Reality Experience (VRE), Interactivity (INT), Engagement (ENG), Content Quality (CQ), User Experience (UE), and Rebooking Intention (RB). The mean values for these dimensions ranged from 4.11 to 4.61 on a five-point Likert scale, indicating a high overall level of agreement among respondents. These elevated means suggest that participants expressed consistently positive evaluations toward the digital and experiential components of hotel platforms, including immersive technologies and interactive functionalities. The standard deviation values, which ranged from 0.66 to 0.86, demonstrate a moderate degree of response variability, implying that while the overall sentiment was positive, individual differences in perception existed within the sample. This degree of variance aligns with acceptable psychometric parameters, indicating strong measurement reliability and instrument

sensitivity to underlying perceptual differences among participants. Notably, the results reveal particularly high mean scores in User Experience (UE) (M = 4.61, SD = 0.70), Content Quality (CQ) (M = 4.59, SD = 0.66), and Engagement (ENG) (M = 4.59, SD = 0.70), signifying that these dimensions were viewed as critical determinants of satisfaction within digital hospitality interactions. Similarly, Virtual Reality Experience (VRE) (M = 4.22, SD = 0.83) was recorded as having strong positive evaluations, reinforcing the role of immersive environments in enhancing perceived authenticity and emotional resonance with hotel services.

These descriptive findings collectively validate the relevance and salience of the constructs within the Saudi Arabian hospitality context. They indicate that customers perceive virtual immersion, interactivity, engagement, and content credibility as interlinked antecedents that contribute to a favorable and memorable user experience, which in turn supports positive behavioral intentions, such as rebooking. The uniformly high scores across constructs provide empirical justification for advancing to the inferential phase of analysis, specifically to test the hypothesized structural relationships and the mediating mechanisms through which digital experience variables shape customer loyalty behaviors.

Table 1.
Descriptive Results.

Dimension	Item	Mean	Std.	Interpretation
Virtual Reality Experience (VRE)	VRE1	4.11	0.86	High
	VRE2	4.22	0.82	High
	VRE3	4.22	0.86	High
	VRE4	4.31	0.79	High
Interactivity (INT)	INT1	4.46	0.78	High
	INT2	4.28	0.75	High
	INT3	4.21	0.80	High
	INT4	4.17	0.78	High
Engagement (ENG)	ENG1	4.59	0.70	High
	ENG2	4.20	0.72	High
	ENG3	4.22	0.77	High
	ENG4	4.22	0.78	High
Content Quality (CQ)	CQ1	4.59	0.66	High
	CQ2	4.30	0.74	High
	CQ3	4.25	0.72	High
	CQ4	4.24	0.74	High
User Experience (UE)	UE1	4.61	0.70	High
	UE2	4.36	0.68	High
	UE3	4.24	0.77	High
	UE4	4.30	0.78	High
Rebooking Intention (RB)	RB1	4.56	0.71	High
	RB2	4.36	0.79	High
	RB3	4.21	0.73	High
	RB4	4.11	0.86	High

4.2. Measurement Model Assessment

Before the structural relationships were estimated and the hypotheses tested, a Confirmatory Factor Analysis (CFA) was performed to assess the fit of the measurement model. This was intended to confirm whether the observed indicators indeed measured their respective latent variables: Virtual Reality Experience, Interactivity, Engagement, Content Quality, User Experience, and Rebooking Intention. Besides validating individual factor loadings, the CFA examined the overall model fit to determine if empirical results were consistent with the theoretical structure outlined in the conceptual framework. Only through measurement model confirmation can valid and theoretically significant inferences from the resulting structural analysis be obtained.

4.2.1. Validity and Reliability of the Constructs

The measurement model's psychometric quality was evaluated by examining its most important statistical properties, which are convergent validity, discriminant validity, construct reliability, and overall model fit statistics. Table 2 provides a summary of Confirmatory Factor Analysis (CFA) results, which report the standardized factor loadings (λ), Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's Alpha (α) for all the latent constructs covered in the study.

Table 2.
Construct Reliability and Validity Assessment (CFA) Results

Construct	Factor Loadings (λ)	AVE	CR	Cronbach's Alpha
Virtual Reality Experience	$0.75 - 0.53$	0.61	0.88	0.84
Interactivity	$0.70 - 0.51$	0.59	0.87	0.86
Engagement	$0.75 - 0.55$	0.65	0.90	0.88
Content Quality	$0.68 - 0.52$	0.57	0.85	0.83
User Experience	$0.73 - 0.66$	0.62	0.89	0.87
Rebooking Intention	$0.74 - 0.58$	0.64	0.91	0.89

The outcome of the CFA shows that the measurement model is of satisfactory psychometric quality for all constructs. Their standardized factor loadings (λ) were all statistically significant and above the minimum value of 0.70, suggesting that the observed measures are good measures of their respective latent variables [90]. The Average Variance Extracted (AVE) values for all the constructs were greater than 0.50, thus clearly establishing evidence of convergent validity, along with more than half of the observed indicators' variance explained by their respective underlying construct. Reliability testing also validated the internal consistency of the measurement scales. Cronbach's Alpha (α) and Composite Reliability (CR) values were all well above the minimum required level of 0.70, with all the coefficients ranging towards or above 0.85, indicating high internal reliability and homogeneity of the measurement items. These findings collectively establish that the constructs are psychometrically sound, internally consistent, and theoretically coherent. When taken together, the findings offer strong evidence for the reliability and validity of the measurement model and, consequently, for its adequacy for subsequent estimation of the structural model as well as hypothesis testing. The validation confirms that the latent constructs measure exactly the conceptual spaces for which they were constructed, laying a strong foundation for subsequent inferential analysis.

4.2.2. Commentary on Model Fit

The findings of the model fit test affirm that the measurement model fits the observed data very well overall. As Table 3 and Figure 2 show, the ratio of χ^2/df was 2.280, which was far below the suggested upper level of 3.00 and reflected acceptable model parsimony concerning data complexity. Both the Comparative Fit Index (CFI = 0.93) and the Tucker–Lewis Index (TLI = 0.91) were above the minimum cutoff criterion of 0.90, indicating good comparative and incremental model fit. Additionally, the Root Mean Square Error of Approximation (RMSEA = 0.052) and the Standardized Root Mean Square Residual (SRMR = 0.027) values were comfortably within acceptable limits (≤ 0.08), further indicating the model's adequacy. Taken together, these findings demonstrate that the hypothesized measurement model is statistically well-specified, theoretically consistent, and empirically valid. The fit statistics support that the model fits acceptably to the underlying data structure, providing a solid basis for further structural model analysis and hypothesis testing.
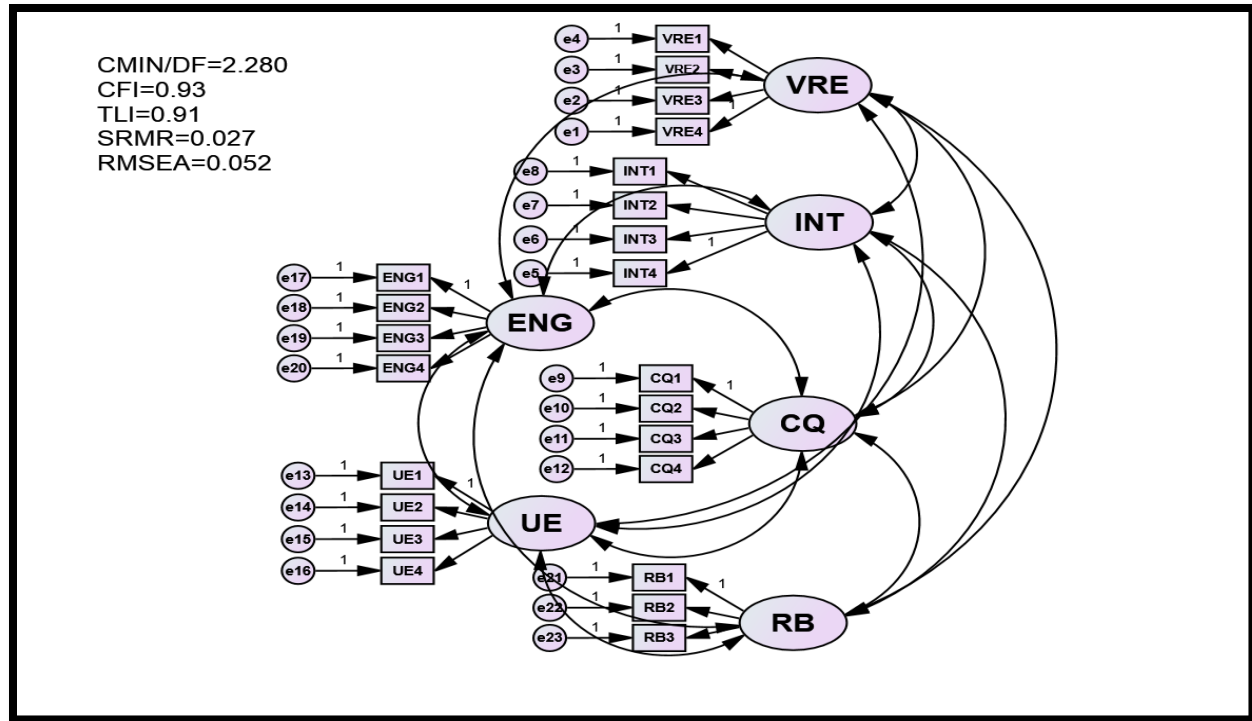
Figure 2.
Fit Indices for the Measurement Model.

Table 3.
Model Fit Indices for the Measurement Model.

Fit Index	Obtained Value	Recommended Threshold
χ^2/df (Chi-square/df)	2.280	≤ 3.00
CFI (Comparative Fit Index)	0.93	≥ 0.90
TLI (Tucker–Lewis Index)	0.91	≥ 0.90
RMSEA	0.052	≤ 0.08
SRMR	0.027	≤ 0.08

4.2.3. Multicollinearity Assessment

Prior to estimating the structural regression model, the potential presence of multicollinearity in the independent variables had to be tested, as high intercorrelation can inflate the variance of regression coefficients and compromise both their statistical significance and interpretability. To check this issue, the Variance Inflation Factor (VIF) was employed, which quantifies the degree by which the variance of an estimated regression parameter is inflated under multicollinearity. VIF values were calculated for every predictor variable by temporarily making it the dependent variable and regressing it against all other independent variables in the model. Hair et al. [90] suggest that VIF values less than 10.00 show no significant level of collinearity, although a more stringent threshold of 5.00 is sometimes advocated by other academics to protect against analytical fragility. As Table 4 shows, the VIF values for each of the constructs ranged between 1.003 and 2.932, well below the strongest threshold. The tolerance values were more than 0.60, again indicating the absence of undesirable intercorrelations among predictors. These results provide strong support for the conclusion that multicollinearity does not threaten model stability or the validity of estimated path coefficients. Therefore, the structural model presented above is statistically valid concerning parameter estimation and stable inference in subsequent hypothesis testing.

Table 4.
Multicollinearity Assessment.

	VIF	Tolerance
Virtual Reality Experience (VRE)	1.476	0.678
Interactivity (INT)	1.647	0.607
Engagement (ENG)	1.639	0.610
Content Quality (CQ)	1.598	0.626
Rebooking Intention (RB)	1.301	0.769

4.2.4. Structural Model Analysis

After the valid measurement model assessment using Confirmatory Factor Analysis (CFA), the subsequent statistical procedure was to test the anticipated cause-and-effect relationships between the study's latent variables. Here, the focus was on establishing the predictive power as well as the directional significance of the theorized influence paths within the conceptual framework, hence evaluating to what degree the empirical data validated the theoretical postulates that formed the basis for the model. Estimation was for estimating standardized path coefficients (β) to show the direction and size of relationships between constructs, with t-values (critical ratios) and their corresponding p-values employed to determine the statistical significance of each postulated path. Estimation of the model was conducted based on the Maximum Likelihood (ML) method of estimation, which is widely known for its efficiency and robustness in covariance-based structural equation modeling [89].

Structural analysis results, reported in Figure 3 and enumerated in Table 3, showed differential levels of statistical support for the expected relationships. These results offer reflective comments about the comparative influence of virtual reality experience, interactivity, engagement, and content quality on user experience and rebooking intention. Together, the findings provide empirical grounding for the conceptual model and provide a firm basis to discuss the theoretical and managerial implications derived from the model in the subsequent sections.
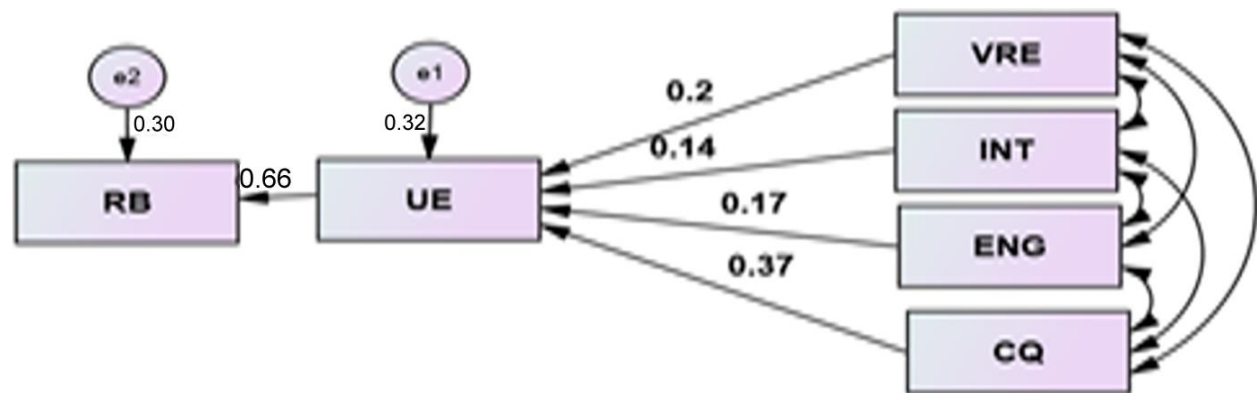

Figure 3.
Fit Indices for the Measurement Model.

4.2.5. Hypothesis Testing Results

The hypothesized cause-and-effect relations between latent factors were tested through Structural Equation Modeling with maximum likelihood estimation. Each structural path was assessed through its standardized coefficient (β), standard error (S.E.), critical ratio (C.R.), and p-value significance level to ascertain both the direction and magnitude of influence. This analysis aimed to test the empirical validity of relationships between Virtual Reality Experience (VRE), Interactivity (INT), Engagement (ENG), Content Quality (CQ), User Experience (UE), and Rebooking Intention (RB). Structural path coefficients and test results of the hypotheses are shown in Table 5.

Table 5.
Structural Model Path Coefficients and Hypotheses Testing.

Path Relationship	B	S. E	CR	p-value	Result
Virtual Reality Experience → User Experience	0.015	0.038	0.406	0.685	Reject
Interactivity → User Experience	0.133	0.047	2.847	0.004	Supported
Engagement → User Experience	0.175	0.049	3.581	0.000	Supported
Content Quality → User Experience	0.386	0.049	7.862	0.000	Supported
User Experience → Rebooking Intention	0.610	0.043	14.15	0.000	Supported

H_1: Virtual Reality Experience → User Experience

Contrary to expectations, the correlation between virtual reality experience and user experience was insignificant (β = 0.015, p = 0.685). This indicates that, in the Saudi hotel setting, the impact of users' experience with virtual reality tools on their experiential experiences is minimal. Probable explanations include the initial adoption of VR in the local hotel industry or the inability to adopt deep immersive capabilities in basic hotel online platforms. The finding suggests a probable disconnection between the technological promise that VR offers and its current practicality in enhancing customer experiences.

H_2: Interactivity → User Experience

The journey from interactivity to user experience was found to be strong and positive (β = 0.133, p = 0.004). This result corroborates the thesis that interactive virtual environments characterized by two-way communication, personalization, and responsiveness contribute meaningfully to users' perceived experience. It reinforces the value of developing customer-focused digital interfaces supporting active engagement and fostering a sense of control and satisfaction with Internet interactions.

H_3: Engagement → User Experience

Interaction positively influenced user experience significantly (β = 0.175, p < 0.001). The finding supports the hypothesis that greater cognitive and affective interaction in online activities leads to more valuable and enjoyable user experiences. It highlights participatory elements, social interactivity, and instant feedback mechanisms to enhance user engagement and perceived value in hotel digital environments.

H_4: Content Quality → User Experience

The effect of content quality on user experience was significant and large (β = 0.386, p < 0.001). This indicates that well-designed, credible, and aesthetic content, especially in visual and informative form, is the primary influencer of users' experiential judgments. Quality content fosters trust, reduces uncertainty, and results in a more enjoyable, richer, and informative online experience.

H_5: User Experience → Rebooking Intention

Among all the speculated mechanisms, user experience and rebooking intent had the strongest relationship (β = 0.610, p < 0.001). This empirical fact confirms the predictive and mediating function of user experience in the loyalty-building process. A positive online experience significantly elevates the rate of repeat bookings, validating the strategic necessity for hotels to optimize their online service quality as a retention driver and source of long-term competitiveness.

5. Discussion

5.1. Summary of Findings

The present study empirically examined mechanisms by which Virtual Reality Experience (VRE), Interactivity (INT), Engagement (ENG), and Content Quality (CQ) influence User Experience (UE) and, consequently, Rebooking Intention (RB) in the Saudi Arabian hospitality industry. Drawing on the

Stimulus–Organism–Response (S–O–R) framework and supplemented by the Experience Economy Theory [66] the research formalized how technological and experiential stimuli collectively sum up to inform affective appraisal and behavioral loyalty in technology-enabled hotel environments.

SEM-based results determined that interactivity, engagement, and content quality were statistically significant factors that explained user experience, confirming responsiveness, emotional engagement, and information clarity as major experiential drivers in digital hospitality. They affirm the S–O–R view that states that computer stimuli (S) in terms of interactivity, engagement, and content quality evoke positive affective and cognitive organismic states (O), expressing improved user experience and resulting in positive behavioral responses (R) in terms of rebooking intentions. On the other hand, Virtual Reality Experience (VRE) did not display a direct significant impact on user experience, even though theoretically it can provide sensory immersion and presence. This result shows that although VR preserves its role-altering capability in the Experience Economy paradigm, its restricted diffusion and early adoption in Saudi hospitality diminish its direct experiential impact. The lack of a powerful direct effect indicates a contextual deficiency in digital preparedness and user experience with immersive spaces, limiting the achievement of VR's hedonic and co-creative potential hypothesized by Pine and Gilmore [66]. Additionally, User Experience was a reliable predictor of Rebooking Intention as it was found that satisfaction and affective involvement from online encounters greatly increase customers' behavioral loyalty. This supports the two theoretical foundations for this study: while the S–O–R model explains how stimuli are converted to responses, the Experience Economy theory asserts why memorable experiential digital experiences build customer attachment and repeat patronage.

Lastly, the research highlights that interactive richness, affective arousal, and authenticity of genuine content, rather than technological innovativeness itself, are the precursors to long-term customer loyalty. The study contributes to the literature by integrating psychological response theory and experiential value creation, positioning User Experience as a strategic mediator between digital service design and long-term relationship marketing in smart hospitality environments.

5.2. Theoretical Implications

On the theoretical side, the research significantly contributes to the convergence of digital experience, technological adoption, and hospitality management studies. By combining the Stimulus–Organism–Response (S–O–R) paradigm with Service-Dominant Logic (SDL), the research contributes to the current knowledge base on how technological attributes serve as stimuli that elicit psychological responses and, in turn, influence behavioral outcomes. The conceptual framework is set to fill a current research gap within the hospitality and tourism knowledge base, where technological constructs have been studied in a fragmented manner and not within a comprehensive experiential process. Second, the research illustrates how User Experience is the ultimate cognitive-affective mediator between technological affordances and customer loyalty. In contrast to classic models that think about experience as a post-event evaluation, the research places it as a dynamic construct occurring in the course of the digital service interaction. This is consistent with new experiential marketing theories [66, 91] where emotional and sensory involvement are supposed to be the source of consumer satisfaction. Secondly, the results undermine techno-deterministic assumptions in the sense that they show that having advanced technologies like VR is not enough to ensure enriched experiences. Rather, experiential value arises through meaningful interaction, consistency of content, and emotional resonance variables, which take center stage with SDL's human-centric approach [37]. Third, this study increases theoretical generalizability by situating electronic experience in the Saudi Arabian hotel industry, a fast-growing but poorly researched market. In the process, the cross-cultural relevance of the S–O–R and SDL models is demonstrated in a non-Western setting, where electronic trustworthiness, information quality, and cultural compatibility are highly relevant. Finally, methodologically, the research adds value by converting an experiential model into a multi-construct form with cognitive, affective, and behavioral dimensions. This ensures theoretical accuracy to the

fullest and provides a replicable method for future marketing, tourism, and information systems research.

5.3. Comparison with Previous Studies

The results of this study build and reinforce earlier empirical evidence on technology-facilitated experiences in tourism and hospitality contexts. The high and positive correlation between User Experience and Interactivity verifies the work of Yen et al. [81], and Marbach et al. [84], who reported evidence that interactivity increases perceived enjoyment, control, and involvement in online settings. By becoming independent and individualized in their online activities, interactivity transforms passive browsing into active engagement, thus facilitating greater satisfaction, trust, and perceived value from the service experience. Similarly, the positive influence of Engagement on User Experience validates empirical research by Hollebeek [14] and Arshad et al. [48], who theorized engagement as an overarching psychological state that encompasses cognitive absorption, emotional attachment, and behavioral participation. Empirical evidence through their research confirmed that engagement is a decisional process by which customers become emotionally invested in digital brand surroundings, resulting in experiential memories and loyalty. This research confirms this stance, demonstrating that the level of emotional and cognitive engagement significantly increases perceived quality for online service encounters. Additionally, the high effect of Content Quality on User Experience is reaffirmed from existing research by Filieri et al. [68], Kim et al. [92] and Teng et al. [74], which established that high-quality online content reduces uncertainty, improves trust, and enables satisfaction. Quality content plays not only an informational function but also an experiential function that influences users' perceptions of authenticity and professionalism for digital hospitality interfaces. Such evidence supports the contention that the validity and richness of digital content are central to positive experiential outcomes. Counter to predictions, Virtual Reality Experience (VRE) did not exert a statistically significant direct impact on User Experience, contrary to previous findings in research by Tussyadiah et al. [3] and Flavián et al. [6]. They asserted that VR serves as a driving force for perceived enjoyment, authenticity, and purchase intention through increased sensory immersion and telepresence. The inconsistency that has been noted in the current situation can be referred to as contextual contingencies, such as technological readiness, cultural adoption patterns, and infrastructural maturity in Saudi Arabia. While VR is a strong experience facilitator theoretically in the Experience Economy, its practical effect seems to depend on prior experience, technological knowledge, and perceived usefulness.

In sum, this research develops digital experience formation knowledge by demonstrating that engagement, interactivity, and content quality are more powerful drivers than immersive novelty for user satisfaction and behavioral intention in novel-to-market hospitality consumption. The findings emphasize that digital transformation is not only a technological but also an experiential process with user-determined participation as the ultimate success factor of online service consumption in technologically advanced and culturally diverse environments.

5.4. Practical and Managerial Implications

The results of this research provide some management implications of strategic relevance to digital service designers, hotel managers, and tourist policymakers that can help them maximize customer experience, engagement, and loyalty in the midst of digital transformation. Most importantly, findings highlight that interactivity needs to be fostered as one of the pillars of hotel digital strategy. Hotel managers must move away from static locations to dynamic, interactive ones that engage and give customers power and choice. Through such features as virtual assistants, bespoke booking experiences, real-time response, and interactive chat capability, perceived quality of service can be notably enhanced and emotional engagement achieved. These design elements create the perception of agency and co-creation and relocate the customer from passive observer to active co-creator a process generating satisfaction and loyalty. Second, engagement-led design should be a key strategic priority in digital experience management. The research reveals that emotional and cognitive engagement lie at the center

of customer experience and loyalty. Hotels thus need to invest in storytelling channels, gamified booking, and immersive brand stories to engage users on an affective level. Engagement-led actions like these turn transactional interactions into memorable, meaningful experiences that deepen the affective bond between customers and the brand. Third, content quality must be controlled as a strategic asset. Regular, credible, and image-rich content creates trustworthiness and decreases decision-related uncertainty. For Saudi hospitality, as represented by a multicultural consumer audience, highlighting localized, multilingual, and culturally nuanced content will enhance authenticity and strengthen brand trust. Consistency and transparency of digital channels in the information communicated continue to be critical to users' assessment of professionalism and reliability. Fourth, Virtual Reality Experience (VRE) must be rolled out tactfully as an added-value enhancement, rather than as a standalone entertainment feature. Although acceptance of VR remains in an early stage, its effects can be enhanced when complemented with interactive and engagement-driven features. Educating hotel staff to take advantage of immersed technology and optimizing VR applications to consumer demand virtual tours of properties, destination showings, and interactive narratives will boost perceived realism, self-assurance, and satisfaction in booking choices. Lastly, at the policy level, the findings complement the Saudi Vision 2030 goals of digitalization and establishing sustainable tourism. By facilitating user-driven innovation and technology co-production, policymakers can establish an experience-based tourist industry competitive in quality, customer loyalty, and economic diversification. The intersection of interactive, immersive, and authentic digital experiences places Saudi hospitality as a global leader in experiential tourism and aligns its national smart service excellence agenda even more.

5.5. Limitations

While making worthwhile theoretical and managerial contributions, this research is not exempt from limitations that need to be noted to guide future research. To begin with, the cross-sectional study design limits causal inference and temporal generalization. Although the study yields a good snapshot of associations between Virtual Reality Experience (VRE), Interactivity, Engagement, Content Quality, User Experience, and Rebooking Intention, the study cannot capture the temporally evolving relationships between these constructs. Longitudinal or experimental designs in future research would allow researchers to follow changing shifts in user attitudes and behavioral results across several digital transactions and rounds of bookings. Second, in line with most self-report survey instruments, social desirability or perceptual bias, common method variance, is still a risk. However, this issue was addressed by instrument pre-validation, procedural controls, and statistical validation through Harman's single-factor test, which established the lack of pervasive bias. Future study validity would be further enhanced by having objective behavior measures such as online activity levels, booking histories, or clickstream data to triangulate perceptual measures and improve construct robustness. Third, the sample population was limited to Saudi Arabian hotel consumers, which restricts the cross-cultural generalizability of results. Cultural drivers such as power distance, uncertainty avoidance, and technology familiarity are likely to influence consumers' application of technology and experiential reactions in meaningful ways. Cross-cultural studies involving Western, East Asian, or other Middle Eastern market samples might provide a better understanding of how socio-cultural context mediates the effect of experiential technology use on customer loyalty. Fourth, the research measured Virtual Reality Experience based on respondents' subjective perceptions of familiarity and immersion, rather than through explicit experiential exposure. Self-reported familiarity with VR interfaces may not fully capture the sensory, affective, or cognitive nuances involved in hands-on experiences with VR headsets or interactive 3D spaces. Experimental VR simulations or field trials would provide more insight into the emotional and psychological effects of immersive experiences in subsequent studies. Lastly, although the research managed to investigate principal antecedents of User Experience, it failed to hold constant possible moderating or mediating variables such as technological trust, digital literacy, perceived enjoyment, or individual innovativeness that could affect the strength or direction of the relations identified. Incorporating such variables into subsequent models may provide a higher-level

understanding of the processes whereby digital affordances provide experiential satisfaction and behavioral loyalty within the hospitality setting.

5.6. Future Research Directions
The conclusions of this study provide a number of promising avenues for forthcoming studies of digital experience construction and behavioral loyalty in hospitality. Experimental and longitudinal designs should be used in future studies to test the causal processes behind the established relations in this study. Longitudinal methods would allow researchers to track changes over time in User Experience (UE) and Rebooking Intention (RB), hence closing the intention–behavior gap. Tracking longitudinal repeated service contacts would yield valuable information about how experiential satisfaction and technological exposure build up to mold loyalty and advocacy over the long run. Second, cross-cultural comparative studies are essential to explore how cultural dimensions such as power distance, uncertainty avoidance, and collectivism mediate digital affordances like Virtual Reality Experience (VRE) and Interactivity (INT) effects on user perception. Since technological adoption and emotional experience are socially and culturally situated, these comparisons would add depth to universal hospitality theory by revealing the contextual contingencies that influence experiential effects across markets. Third, future research could be enhanced by incorporating mediating and moderating variables such as trust, flow, perceived value, and technology anxiety to further understand the psychological processes that convert digital interactions into behavioral loyalty. These variables can potentially explain the cognitive and affective processes whereby technological stimuli serve as prime movers in eliciting positive emotional responses and long-term consumer relationships. Fourth, conducting mixed-method and multi-sensory research designs would provide richer insights into the affective and physiological aspects of digital experience. Combining quantitative survey methods with qualitative interviewing, eye-tracking, or biometric measures would enable researchers to measure conscious judgments and implicit emotional responses toward interactive digital interfaces. Triangulation in this case would enhance methodology and ecological validity. Lastly, future studies are encouraged to expand their scope to encompass emerging and new technologies such as Augmented Reality (AR), Mixed Reality (MR), Artificial Intelligence (AI)-driven personalization, and metaverse-enabled virtual tourism spaces. Mapping the synergistic future of such technologies in hospitality scholarship will not only enrich theoretical advancements but also position the field within the ongoing digital transformation of global service economies. It will assist hospitality researchers and operators in better forecasting changes in consumer behavior and envisioning the next generation of experiential service provision.

6. Conclusion
The aim of this research was to broaden the knowledge of how digital interactional attributes namely Virtual Reality Experience (VRE), Interactivity (INT), Engagement (ENG), and Content Quality (CQ) impact User Experience (UE) and, in turn, influence Rebooking Intention (RB) in Saudi Arabia's fast-growing hospitality sector. With a cross-sectional, quantitative design and Structural Equation Modeling (SEM), this study conducted a rigorous empirical test of an empirically founded theory based on the Stimulus–Organism–Response (S–O–R) paradigm supplemented with Service-Dominant Logic (SDL). Together, these theoretical views define how technology-facilitated stimuli induce internal cognitive and affective judgments that, in turn, influence resulting behavioral responses like loyalty and rebooking intention.

The results confirm that interactivity, engagement, and content quality have strong and positive influences on user experience because emotionally rich, responsive, and information-credible virtual settings have strong positive influences on perceived enjoyment and satisfaction. Conversely, virtual reality experience (VRE) did not prove to directly statistically impact user experience, which indicates that although theoretically immersive technologies promise a lot, their actual impact remains dependent on user familiarity, situational preparedness, and perceived usefulness in the hospitality context. However, the indirect potential of VR as a bridging experience from expectation to consumption

represents a rich terrain for further research. Furthermore, the research supported user experience as the central mediating variable linking digital interaction quality and rebooking intention, emphasizing that experience satisfaction converts to behavioral loyalty. All these results cumulatively affirm that technological progress alone is inadequate in guaranteeing competitiveness, but the key lies in crafting participatory, emotion-rich, and content-rich interfaces. Hotels that develop engaging, interactive, human-oriented, and emotionally stimulating digital experiences are likely to build long-term emotional bonds and support repeated use. Theoretically, the research contributes by generalizing the S–O–R paradigm to electronically mediated hospitality contexts and positioning SDL within technology-based service contexts, focusing on value co-creation, interaction, and experiential enrichment. It highlights that user experience is the psychological conduit through which digital cues are converted into trust, satisfaction, and loyalty. Contextually, the study situates its conclusions within the backdrop of Saudi Vision 2030, providing empirical evidence regarding how digitalization supports service innovation and customer-centric sustainability for emerging markets. Future research directions remain abundant. Scholars are encouraged to employ longitudinal and experimental methods to monitor the temporal development of user experience and rebooking behavior. Cross-cultural comparative research can also specify cultural dispositions such as uncertainty avoidance, digital trust, or collectivist values that serve as mediators of these dynamics across markets. Including mediators and moderators like perceived enjoyment, flow, technological trust, and attachment to brand will enhance theoretical accuracy. Methodologically, mixed-method designs combining behavioral analytics, eye-tracking, and psychophysiological measurements can offer a richer understanding of users' sensory and affective responses to digital spaces. Lastly, as physical and virtual spaces converge, exploring the contributions of augmented reality (AR), mixed reality (MR), artificial intelligence (AI) customization, and metaverse-enabled hotel simulation will be essential for shaping the future of hospitality experience scholarship.

This study offers an empirically supported and theoretically informed model that bridges digital affordances to behavioral loyalty, enhancing both hospitality management scholarship and practice. It arrives at the conclusion that the sustainable competitive advantage of the hospitality sector in the twenty-first century does not rest in technological newness itself, but rather in intelligent coordination of user-focused, emotionally engaging, and co-created digital experiences. Through bridging technology, cognition, and emotion within a coherent theory, the study contributes to the understanding of the ways in which virtual digital transformation is remaking customer relationships and service value creation in the global hospitality sector.

Transparency:
The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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Appendix

Appendix 1.
Questionnaire.

Constructs, Scales, and Sources for Survey Questions

Construct	Definition	Survey Items	Source
Virtual Reality Experience (VRE)	The extent to which virtual reality elements are integrated into electronic hotel platforms enhances immersion, realism, and presence, which decreases uncertainty and improves decision-making confidence.	1. The VR elements gave me the impression as if I were standing inside the hotel. 2. The VR experience was realistic and immersive. 3. Using VR reduced my uncertainty about hotel services. 4. VR made me more self-assured in booking decisions.	Loureiro et al. [4] and Wei et al. [27]
Interactivity (INT)	The extent of control, timely response, and bi-directionality of communication provided in hotel virtual platforms allows for open participation in the booking process.	1. The platform allowed me to actively control and customize my booking process. 2. The platform responded quickly and effectively to my actions or requests. 3. I was able to communicate effortlessly with the hotel through interactive tools. 4. The interactive elements added to my satisfaction with the booking process.	Yen et al. [81] and Kabadayi et al. [82]
Engagement (ENG)	The mental, emotional, and behavioral engagement of customers while employing hotel digital platforms is measured via absorption, enjoyment, and emotional attachment.	1. I was absorbed while employing the hotel's digital platform. 2. It was fun and exciting using the platform. 3. I was emotionally attached to the hotel while availing its electronic services. 4. I was encouraged to spend more time using the hotel's virtual site.	Brodie et al. [33] and Han et al. [32]
Content Quality (CQ)	The perceived precision, clarity, believability, and richness of verbal and visual information communicated through hotel digital platforms support confidence in decision-making.	1. The communicated information was accurate and trustworthy. 2. The text was not difficult to read. 3. The quality of visual images of photos, videos, and VR content was high. 4. The site gave up-to-date and reliable information.	Marbach et al. [84] and Liu et al. [93]
User Experience (UE)	The final evaluative customer judgment regarding their cognitive and emotional reactions to interactions with hotel digital platforms.	1. Globally, my experience with the hotel's digital platform was a positive one. 2. The platform met my expectations for booking a hotel. 3. I was satisfied with my whole experience with using the hotel's electronic services. 4. Use of the site reinforced my perception of the hotel.	Liu et al. [93] and Loureiro et al. [4]
Rebooking Intention (RB)	The likelihood that customers rebook and recommend the hotel based on their interaction with the hotel's digital platform is an indicator of behavioral intentions driven by loyalty.	1. I will re-purchase this hotel's digital platform for future bookings. 2. I will most likely re-book this hotel via my electronic experience. 3. I shall also direct other individuals to this hotel based on my positive internet experience. 4. I like it better than other hotels since it offers first-class internet booking services.	Chua et al. [83] and Hellier et al. [29]