

The effects of app-related factors on app stickiness: The role of cognitive and emotional app relationship quality

Abstract:

Prior research tends to examine the effect of a narrow set of app-related factors on the construct of app relationship quality holistically. However, it is well-established that app relationship quality consists of cognitive and emotional aspects. To address these two issues, our study takes a more nuanced approach by examining a comprehensive set of app-related factors, including functional, offerings, experiential and relational factors, and their differential impacts on two distinct components of app relationship quality, namely cognitive app relationship quality (CARQ) and emotional app relationship quality (EARQ). It also examines the differential impact of CARQ and EARQ on app stickiness, which has long been considered as a managerial challenge. A 'modular design approach' was used to collect the data from an online UK consumer panel. 605 responses were analyzed using AMOS 24. The results indicated that functional and offering factors produced greater effects on CARQ than on EARQ. In contrast, experiential and relational factors were found to have stronger effects on EARQ than on CARQ. Further, CARQ was found to have a stronger effect on app stickiness compared to EARQ. The current study offers a detailed understanding of the factors that contribute to each component of app relationship quality and empirically demonstrates the differential effects of the cognitive and emotional aspects on app sickness. Such results are expected to help e-retailers to develop a strong digital presence, build future readiness for their brands, and design app-focused strategies using a consumer-centric approach.

1. Introduction

Retail apps are custom-built branded smartphone applications used by retailers as communication channels to target new consumers and keep current ones loyal (Stocchi et al., 2020). Consumers use these apps to browse the retailer's offerings, obtain information about products, read reviews, compare prices, place an order, contact customer services and even socializing with retailer's communities (Flacandji and Vlad, 2022; Fang, 2019). Since apps are easily un-installable, many re- searchers (e.g., Nandi et al., 2021; Martinez and McAndrews, 2021) have vested their interest in understanding what makes consumers continually use them (i.e., app stickiness).

Studies have demonstrated that various app-related factors are instrumental in enhancing consumers' cognitive (Molinillo et al., 2020) and emotional responses (Lin et al., 2021),

ultimately leading to improved app loyalty (Shahid et al., 2022) and stickiness (Martinez and McAndrews, 2021). Such factors, which have been proposed from different theoretical perspectives, can be broadly categorized into four main types (see Table 1; functional (e.g., speed), experiential (e.g., escapism), relational (e.g., customer support) and offering factors (e.g., price offering). Consumers typically evaluate these factors based on the utilitarian and hedonic benefits that they offer (Tran et al., 2022; Nikhashemi et al., 2021). Utilitarian benefits are more cognitive in nature and emphasize accomplishing shopping tasks more efficiently and effectively (Stocchi et al., 2020). In contrast, hedonic benefits are more emotional in nature and emphasize the fun and enjoyment that consumers receive from using the app (Al-Nabhani et al., 2022).

For example, functional factors are primarily evaluated based on their utilitarian benefits, as they help consumers achieve their desired outcomes efficiently and safely (Lee and Lee, 2019). Similarly, offering factors are typically evaluated based on their utilitarian benefits, as they focus on shopping efficiency (e.g., good deals, product availability, Atulkar and Singh, 2021). Such utilitarian benefits, which offer ‘good reasons’ as to why to use the retailer’s app over others, are affect-poor since they enhance the acquisition utility of shopping (Hossain and Saini, 2015). Thus, judging the relationship with the retail app would rely more on calculations (e.g., cost-benefit analysis), and less on the emotions it creates (e.g., Alba and Williams, 2013). In contrast, experiential factors are normally evaluated based on their hedonic benefits, as they fulfil fantasies and provide consumers with enjoyable experiences. (Flacandji and Vlad, 2022). As these benefits are affect-rich (Al-Nabhani et al., 2022), judging the relationship with the retail app would rely less on calculations, and more on the emotions it creates. Relational factors tend to reflect both utilitarian and hedonic benefits, given that they help accomplishing the shopping task while creating enjoyable interactions too (Fang, 2019; Steinhoff et al., 2019), indicating that consumers would judge the relationship with the retail app based on calculations and sensations.

Understanding how consumers judge their relationships with a retail app is usually referred to as app relationship quality, which reflects the richness of the consumer-app relationship and the depth of psychological bonds with the app (Alagarsamy et al., 2021; Furner et al., 2014). Such a judgment is made based on two key components: cognitive app relationship quality (CARQ) and emotional app relationship quality (EARQ; Nyffenegger et al., 2015). The former refers to the strength of consumers’ beliefs in and evaluations of app performance and is developed through focusing on app satisfaction, whereas the latter reflects “the strength and

intensity of a consumer's personal connection and closeness with an [app]", and is developed through focusing on app passion and app intimacy (Nyffenegger et al., 2015, p.91). Due to the nature of each one, it is commonly suggested that CARQ is primarily driven by cognitive antecedents, while EARQ is mostly driven by emotional ones (Alnawas et al., 2021; Nyffenegger et al., 2015). From this perspective, it is reasonable to assume that the type of benefits (i.e., utilitarian vs. hedonic) offered by each of the four app-related factors would contribute differently to CARQ and EARQ. In particular, offering factors, which provide utilitarian benefits such as shopping efficiency, may contribute more to CARQ, as consumers would perceive the app as being useful and efficient in achieving their goals. In contrast, experiential factors, which offer hedonic benefits such as entertainment, may contribute more to EARQ, as consumers would perceive the app as providing pleasurable experiences.

Nonetheless, such issues are not well-understood as prior research has largely overlooked the role of relationship quality and has not explicitly investigated the concept in app context (see Table 1). More specifically, prior research tends to examine the effect of a limited number of app-related factors on a specific cognitive/emotional aspect of app relationship quality. For example, Molinillo et al. (2022) exclusively examined the effect of experiential factors on satisfaction, whereas Al-Nabhani et al. (2022) examined the effect of functional and experiential factors on satisfaction, and Kang and Namkung (2019) examined the effect of functional and relational factors on trust. Other researchers such as Lin et al. (2021) examined the effect of experiential and functional factors on intimacy. Assessing one aspect (e.g., trust or satisfaction not both) of a single component of app relationship quality (CARQ or EARQ) instead of assessing different aspects contributing to both components would lead to inaccurate assessment of the role of app-related factors in establishing app relationship quality. This is because each component of app relationship quality is made up of multiple interrelated aspects, and these aspects work together to create the overall perception of the construct. Thus, if only one aspect (e.g., intimacy) is assessed without considering the other (e.g., passion), it may lead to an incomplete understanding of the overall EARQ component. Given that no research has integrated the various app-related factors into a broader conceptualization to investigate their effects on both components of app relationship quality, it remains largely unclear whether the four factors would exhibit differential or similar effects on CARQ and EARQ.

Another key issue that requires further research attention is the link between app relationship quality and app stickiness, which has long been a managerial challenge for retailers (Stocchi et al., 2021). On average, an app loses 77% of its daily active users within three days of

installation, jumping to 90% within 30 days, and 95% within 90 days (Tas, yürek, 2022). Thus, while initial adoption rate is very high, the retention of app users is very low (Bhandari et al., 2015). This very low retention rate may further decrease given the consumers' myriad choices of retail apps and the fierce competition among them, which make the survival of the app highly dependent on its ability to improving its stickiness (Nandi et al., 2021).

Nonetheless, the majority of current studies have focused on continuance intention, which reflect consumers' future behavior (i.e., consumers' willingness to use an app again in the future; see Table 1), and paid little attention to stickiness, which measures consumers' current behavior and engagement (e.g., frequency of use, duration, involvement) with the app (Stocchi et al., 2021). Having high continuance intention does not necessarily indicate an active engagement and involvement with the app, as consumers might be highly willing to continue using the app in the future, yet they are currently not using it very often or not very engaged with it.

Additionally, studies that measured app stickiness have not explicitly examined how app relationship quality contributes to app stickiness. Rather, they examined how consumers' emotional state (e.g., mood), not the emotions that consumers developed toward the app, contributes to stickiness (Martinez and McAndrews, 2021), or how customer value (Nandi et al., 2021), usefulness and playful engagement contribute to stickiness (Kim et al., 2016). Others measured relationship quality implicitly through assessing how a specific cognitive aspect of relationship quality such as satisfaction contributes to app stickiness (Hsu and Lin, 2016). As such, prior research offers little insights and hardly any evidence on whether both components are equally/unequally important to app stickiness. Given the significant contribution of stickiness to retailers' bottom line (Roy et al., 2014), it becomes increasingly important to understand the role of each relationship quality component in improving app stickiness.

The objectives of the current study are twofold: first, to examine the differential effects of functional, offerings, experiential and relational factors of the app on CARQ and EARQ, and second, to examine the differential impact of CARQ and EARQ on app stickiness. In line with other studies in app contexts (e.g., Shahid et al., 2022; Lim et al., 2021), the current research will use the stimulus-organism-response (S-O-R) as an overarching theoretical framework to achieve the stated objectives. This will contribute to the literature in several ways. First, unlike many of the previous studies, which investigated a limited set of app-related factors (e.g., Al-Nabhani et al., 2022; Ho et al., 2022; McLean et al., 2022; Molinillo et al., 2022; Tseng et al.,

2022), this research offers a more comprehensive investigation into a wider range of factors, leading to a better understanding of app-based relationship quality. Second, previous studies examined the effect of app-related factors on specific aspects of app relationship quality such as satisfaction (Tseng et al., 2022), trust (Kang and Namkung, 2019), and intimacy (Lin et al., 2021). Our research investigates the app relationship quality explicitly through offering a deeper and richer conceptualization of the concept, taking into account both cognitive and emotional aspects, thus identifying the key determinants of each component. Investigating such issues would lead to the development of more effective managerial interventions to improve app relationship quality. Third, several studies (e.g., Shahid et al., 2022; Lim et al., 2021; Nikhashemi et al., 2021) examined the mechanisms through which app-related factors lead to subsequent consumer responses (i.e., continuance intention). Our research complements these efforts by investigating how app relationship quality components transfer the effect of app-related factors into current consumer actions (i.e., app stickiness). Fourth, this study shows that while rational evaluations (CARQ) have a significant impact on app stickiness, emotional evaluations (EARQ) play a lesser role in enhancing it, which complements the work of other studies in this domain (e.g., Martinez and McAndrews, 2021; Nandi et al., 2021; Kim et al., 2016).

2. Literature review: identifying app-related factors

Prior research has identified a myriad of app-related characteristics that could potentially affect app relationship quality (see Table 1). Such a large pool of app's characteristics can be explained by the variation of the theoretical approaches adopted from one study to another. The use of a specific theoretical approach leads to presenting app-related characteristics that are only within the domain of the embraced theoretical approach. This means that other salient characteristics are left behind simply because they are beyond the boundaries of that domain. To overcome this issue, we carefully reviewed the content of the app-related characteristics in order to identify the most common ones (see Table 2). This resulted in identifying 12 characteristics, namely: speed, ease of use, privacy, entertainment, escapism, aesthetics, price offering, product offering, delivery attributes, two-way of communication and personalization. Nevertheless, variations remain within the list of characteristics. For example, ease of use, entertainment, aesthetics and personalization were more frequently cited, whereas customer support and delivery attributes were less used. Nonetheless, the current study considers both because they have been shown to play a central role in helping consumers to maximize the utility and efficiency of shopping in other contexts such as retail website (Alnawas and Al

Khateeb, 2022; Kumar and Anjaly, 2017). The 12 characteristics were then grouped based on the common themes they share with each other, which led to identify four key factors as follows:

Functional factors: speed, ease of use, and security.

Offering factors: price offering, product offering, and delivery attributes.

Experiential factors: entertainment, escapism, and aesthetics.

Relational factors: two-way communication, customer service, and personalization.

3. Conceptual framework

The current research uses the S–O–R model proposed by Mehrabian and Russell (1974) as an overarching theoretical framework to understand how app-related factors affect app relationship quality and subsequently app stickiness. The S–O–R model indicates that the features within the environment (i.e., stimuli) affect consumers' emotional states (i.e., internal processes known as organism) along three dimensions: pleasure, arousal, and dominance, which in turn, lead to behavioral responses (i.e., response) characterized by either avoidance or approach. Due to the robustness of this framework, it has been used in different computer-mediated environments such as virtual reality (Kim et al., 2020), social media (Kamboj et al., 2018), mobile auction (Chen and Yao, 2018), online reviews (Bigne et al., 2020), augmented reality (Lee et al., 2022) and retail apps (Elsotouhy et al., 2022).

Shahid et al. (2022) applied the S–O–R model in the context of mobile banking app and considered trust, convenience, social influence, app attributes and customer support as stimuli that affect customer experience with mobile banking app (organism), and subsequently customer loyalty and continuous usage intentions (response). Lim et al. (2021) investigated how stimuli related to experiential (i.e., telepresence) and relational elements (i.e., social presence) trigger customer engagement and value co-creation (i.e., organism), which in turn, evoke consumers' continued usage of branded apps. Similarly, using an experimental research design, Martinez and McAndrews (2021) examined how stimuli such as app design features (e.g., product promotion features, multi-media product viewing features), affect consumers' emotional state (i.e., pleasure, arousal and dominance), causing them to stick with retailer apps. Using health and fitness app as a research context, Elsotouhy et al. (2022) considered app attributes including information quality, system quality and service quality as stimuli that

triggered consumers' engagement, satisfaction and love (i.e., organism), which in turn leads to increase app stickiness and spread positive word of mouth (i.e., response).

Following these studies, the current research considers the four app- related factors namely; functional, offering, experiential and relational factors as stimuli. Due to the different hedonic and utilitarian benefits that these factors offer, it will be argued that they will exert differential effects on cognitive (i.e., CARQ) and emotional responses (i.e., EARQ), known as organism. The integration of both cognitive and emotional responses is in line with the recommendations of Kim et al. (2020) to understand consumers' internal processes (i.e., organism) in a given situation. Based on the notion of affective vs. cognitive-based attitude, it will be proposed that the cognitive and emotional responses (i.e., CARQ and EARQ) will exert differential effects on app stickiness (response).

For the purpose of the current research, CARQ is conceptualized as a high-order construct consisting of app satisfaction and app trust (Nyffenegger et al., 2015). App satisfaction refers to the cognitive process that results from consumers' evaluation of the app's performance prior to expectations (Smith and Reynolds, 2009), while app trust reflects consumers' knowledge about the app being reliable, honest and able to fulfil any obligations (Chaudhuri and Holbrook, 2001). Similarly, EARQ is conceptualized as a high-order construct consisting of passion and intimacy (Nyffenegger et al., 2015). App passion reflects consumers' profound and intense emotions towards the app, which entail elements of separation anxiety, longing and exclusivity (Fournier, 1994). App intimacy refers to consumers' feelings of emotional closeness, bonding and connectedness to the app (Nyffenegger et al., 2015). Intimacy without passion creates friendship and passion without intimacy creates infatuation, but the co-existence of them leads to a profound emotional attachment similar to love (Lastovicka and Sirianni, 2011). Finally, mobile app stickiness is defined in the current research as "the time [consumers] spend interacting with specific apps and how often [they] return to a specific app to accomplish specific tasks" (Furner et al., 2014, p.169). Thus, stickiness, which covers frequency and usage duration, is a measure of dominance in a given set of apps (ibid) and can be viewed as an indicator of 'customer retention' and 'loyalty towards the retailer' (Stocchi et al., 2020).

Fig. 1 summarizes the key study's constructs and their hypothesized relationships

4. Hypotheses development

4.1. The effect of functional factor on relationship quality

Functional factor is conceptualized in the current research as a high-order construct that consists of ease of use, speed, and security. Ease of use refers to “the degree to which a person believes that using a particular information system would enhance his/her job performance” (Davis, 1989, p.320). It indicates that a retail app is easy to operate and understand, thus, enhancing consumers’ perception of its usefulness (Atulkar and Singh, 2021). It encourages efficient and error-free transactions and reduces consumers’ efforts during shopping (Bake and Yoo, 2018). It also reduces the time needed to familiarize with the app and its functions, and to find solutions when encountering problems (Huang et al., 2019; Stocchi et al., 2019).

Speed reflects how quickly it takes to load pages, respond to requests, perform certain functions (Chen and Dibb, 2010) and access information instantaneously when clicking on links (Fang, 2019). When an app processes consumers’ input quickly and allows them to obtain information without any delay, it will increase transaction speed, thus, completing the shopping task efficiently (Bake and Yoo, 2018). A recent study showed that 71% of consumers expected apps to load in less than 3 s and 63% of them abandoned apps when loading took more than 5 s (Digital Commerce360, 2022).

Security reflects the extent to which a technology is secure from an unauthorized third-party access (Stocchi et al., 2019). It is concerned with consumers’ perception of the app’s security essentials (e.g., authentication, encryption, non-repudiation and integrity) during transactions and demonstrates its efforts to earn trust and addressing consumers’ concerns (Kim et al., 2008). Security further indicates that consumers’ private information will not be shared with others, transactions are risk-free and credit card details are safe (Rajaobelina et al., 2021).

From the perspective of the S–O–R model, the above three stimuli would influence app trust and satisfaction as cognitive responses more than app passion and intimacy as emotional responses (i.e., organism). Such a differential effect on cognitive responses is assumed because the benefits associated with these factors are more utilitarian in nature as they focus on saving consumers’ time and efforts and offering secure transactions. That is, these benefits provide consumers with value by acting as a mean to an end (utilitarian benefits). Such benefits require cognition-based than affection-based processing as they emphasize the functional characteristics of the app. Since cognitively-oriented benefits provide consumers with evidence as to why to use the retailer’s app over others, consumers would assess its performance positively (i.e., satisfaction), and consider it as safe, honest and dependable partner (i.e., trust). Fernandes and Proença (2013) noted that when attitudes towards a service provider is formed

based on cognition, consumers would engage in cognitive assessments (e.g., trust) more than emotional ones (e.g., passion). Similarly, prior research found that websites' utilitarian attributes produced a stronger impact on cognitive attitude than it did on affective attitude (Moon et al., 2017). Accordingly:

H1. Functional factors manifested via ease of use, speed, and security have a stronger (weaker) effect on CARQ (EARQ).

4.2. The effect of offering factor on relationship quality

Offering factor is conceptualized as a high-order construct that consists of app price offering, app product offering and delivery attributes. App price offering relates to offering reasonably/low priced and value for money products, allowing consumers to save when using the app (Atulkar and Singh, 2021; Chiu et al., 2014). Consumers tend to view price as a monetary sacrifice rather than a quality cue (Wang et al., 2019). This is because they can quickly and conveniently compare prices across multiple apps, allowing them to find the lowest price to increase transaction utility and perceived value (ibid). In fact, when products are easily searchable across various apps and their quality is comparable, consumers will more likely focus on lower prices (Garbarino and Maxwell, 2010). In sum, price offering provides consumers with monetary benefits and reduces search and decision efforts.

App product offering is related to the depth and breadth of products offered by a retail app such as providing a wide variety, updating the app with new items, and providing product features that suit consumers' preferences (Alnawas and Al Khateeb, 2022). This attribute generates utilitarian value for consumers as it fulfils their diverse needs, allows them to complete transactions in one place (Yang et al., 2004) and it incentivizes them to shop again (Chiu et al., 2014). Product offering allows consumers to make comparisons and find the right product. It makes shopping more effective and efficient (ibid) since it decreases shopping cost (Hamilton and Richards, 2009) and offers information required to find out what consumers need, particularly when unclear about their preferences (Boatwright and Nunes, 2001).

Delivery attributes are related to sending the correct items within the promised timeframe and providing tracking information (Kumar and Anjaly, 2017). Since logistics are usually outsourced, delivery attributes are the most vulnerable areas of online retailing and account for nearly half of dissatisfactory incidents (Holloway and Beatty, 2008). The convenience of shopping remotely and getting products delivered, which are utilitarian benefits, are the

primary reasons behind online purchases with little mental and physical efforts required from consumers (Singh and Söderlund, 2020).

From the perspective of the S–O–R model, the above three sub-functional factors, which act as stimuli, would influence app trust and satisfaction as cognitive responses than app passion and intimacy as emotional responses (i.e., organism). It is assumed that these factors would have stronger effects on cognitive responses because they tend to provide consumers with utilitarian value as they allow them to find good deals in relation to cost and quality (i.e., price offering), complete shopping in one place (i.e., product offering), and receive the correct order(s) within the promised timeframe (i.e., delivery attributes). These ‘affect-poor’ benefits enhance the acquisition utility of shopping, increase its efficiency, and reduce overall costs (Stocchi et al., 2018). As these variables are primarily tied to efficiency and effectiveness, consumers would judge their relationship with the app based on cost-benefit analysis and the fulfilment of shopping (Babin et al., 1994). Additionally, these variables offer consumers with a range of different information, which helps them find solutions for their problems, judge the expected utility, and make decisions regarding the brand. This, in turn, requires consumers to put efforts to process information, provoking higher levels of brand-related cognitive thinking and elaboration (Van Noort and Van Reijmersdal, 2019). Taken together, these activities and benefits relate more to assessing the performance competency and dependability of the app and less to assessing deep and intense emotions developed towards it. Empirically, prior research found emotions to be less influential when evaluating utilitarian value (Alba and Williams, 2013). Similarly, Van Noort and Van Reijmersdal (2019) found that informational (vs. entertainment) apps stimulated higher levels of elaboration, which improved cognitive brand responses. In websites context, Alnawas et al. (2021) found that utilitarian experiences had a stronger impact on cognitive (vs. emotional) relationship quality. Therefore:

H2. Offering factor manifested via price offering, product offering, and delivery attributes have a stronger (weaker) effect on CARQ (EARQ).

4.3. The effect of experiential factor on relationship quality

Experiential factor is conceptualized as a high order construct that consists of entertainment, escapism and aesthetics. Entertainment is related to “sensations from using [retailers’] apps that result in feelings of pleasure” (Baek and Yoo, 2018, p.4). It reflects a “psychological state of positive feelings ... a positive intrinsic motivator” and “emotion-based evaluations”, which entails that consumer consider the use of a retailer app as an enjoyment “in its own right, apart

from any performance consequences” (Yang et al., 2013, p.1346-1348). This experience occurs when events are passively “absorbed” by consumers’ senses (Jeong et al., 2009). Escapism, which involves immersion rather than absorption, refers to the app’s ability to make consumers escape from reality and feel as if they are in a different world, putting them in the middle of excitement and triggering their emotions (ibid). It is a psychological reward that leads to a mental diversion from daily life (Al- Nabhani et al., 2022), escaping stress and social isolation and/or achieving instant forms of gratification, thus becoming habitual compensatory gratifications or coping mechanisms (McLean et la., 2022). Aesthetics are related to sensations resulted from the attractiveness and beauty of the visual design (e.g., color combination, images, look, fonts) of a retailer’s app (Atulkar and Singh, 2021). This experience, which involves immersion rather than absorption and engages consumers passively (Jeong et al., 2009), provides “immediate pleasure for its own sake”, regardless of the completion of a certain shopping task (Mathwick et al., 2001, p.108). As noted by Jeong et al. (2009), consumers having entertainment experiences “sense,” while those having escapist experiences “do,” and those having aesthetic experiences wish to “be” in an attractive retail setting.

From the perspective of the S–O–R model, the above three stimuli would trigger more emotional responses (i.e., app passion and intimacy) than cognitive responses (i.e., app trust and satisfaction). These stimuli are expected to have stronger impacts on emotional responses because they are ‘affect-rich’ and represent hedonic value (Al- Nabhani et al., 2022; Alba and Williams, 2013), which are intrinsic and created by the experience itself rather than being extrinsic value resulting from accomplishing the shopping task (McLean et al., 2022). They fulfil fantasies, offer a sense of enjoyment during the purchase process (Fla- candji and Vlad, 2022), and make consumers absorbed and engaged (Van Noort and Van Reijmersdal, 2019). As these experiences are less related to offering utilitarian and/or information-gathering needs, judging the relationship with the retail app would rely less on calculations (e.g., cost-benefit analysis, app utility), and more on the emotions and sensations it creates. In this case, emotions become more important than cognitions in processing experiential value and are likely to form the basis of a deep and intense relationship with the retailer app, which goes beyond satisfaction and trust to building an emotional connection (i.e., intimacy) and a profound feeling of attraction (i.e., passion). Additionally, if the benefits received from the app may not be easily obtained from other apps, the relationship with the brand becomes “extremely beneficial” (Hennig-Thurau et al., 2000, p.371), leading consumers to develop a committed relationship, which involves intense emotions (Tsai, 2014). Further, once consumers become absorbed and

engaged (Van Noort and Van Reijmersdal, 2019), they will spend more time on the app and have more thoughts about the brand (Fang, 2019), intensifying the emotions towards it. From an empirical standpoint, Van Noort and Van Reijmersdal (2019) found that entertainment (vs. informational) apps generated higher level of affective (vs. cognitive) brand responses. Similarly, Tran et al. (2021) found that hedonic (vs. utilitarian) value produced a significant effect on brand attachment. In websites context, Alnawas et al. (2021) found that hedonic (vs. utilitarian) experiences had a stronger impact on emotional relationship quality. Accordingly:

H3. Experiential factor manifested via entertainment, escapism and aesthetics have a stronger (weaker) effect on EARQ (CARQ).

4.4. The effect of relational factor on relationship quality

Relational factor is conceptualized as a high-order construct that consists of two-way communication, personalization, and customer service. From the perspective of the S–O–R framework, these three stimuli are expected to trigger both emotional responses (i.e., app passion and intimacy) and cognitive responses (i.e., app trust and satisfaction), as explained next. Two-way communication reflects the retailer’s app ability to facilitate a reciprocal communication with consumers (Fang, 2017). It helps with speeding up the exchange process, developing a refined knowledge of consumers’ preferences, adjusting the retailer’s offerings and positioning, making decision easier through reducing uncertainty, keeping consumers informed about the brand, and offering quick information on product/services (Ahmad and Akbar, 2021; Kumar and Kaushik, 2020). Such activities require cognitive processing from the consumer side (Yoon and Youn, 2016) and more related the shopping task itself. From this perspective, consumers would judge the relationship with a brand based on its performance relative to expectations (satisfaction), and the extent to which it is a dependable partner (trust). However, the two-way interaction emphasizes conversations and dialogues and allows the brand to better listen, inform and answer consumers before, during, and after transactions, which entails a much deeper relationship with the brand (Duncan and Moriarty, 1998). Personalization reflects a retailer’s app ability to offer a customized environment in terms of design and content (e.g., choice of products/ service, tailored ads) to meet consumers’ needs and preferences (Kang and Namkung, 2019). It helps consumers with finding and focusing on what they want, matching them with products/services, and completing transactions efficiently (Srinivasan et al., 2002). Personalization offers customized contents and aims to convince consumers to do certain tasks, which increases perceived information quality and provides

gains related to pricing, product variety and convenience (Pappas et al., 2017). These utilitarian benefits, which aim to improve consumers' online decision-making process (Pappas et al., 2014), act as a basis to assess CARQ. Nonetheless, personalization is perceived as something novel, which makes consumers feel as valuable and their personal needs are addressed (ibid). This, in turn, enhances their perceived enjoyment (Benlian, 2015), positive emotions (Pappas et al., 2014) and delight (Bock et al., 2016), indicating that personalization is a strong predictor of EARQ.

Customer service, which is concerned with the extent to which a re-tailer's app is helpful and responsive to consumers' queries/complaints, is an important relational element as consumers may need support prior, during, and after purchases (Holloway and Beatty, 2008). Activities such as solving consumers' problems and handling of returns promptly make shopping more effective and efficient (e.g., Cao et al., 2018), leading to meeting/going beyond consumers' expectations (i.e., satisfaction), and providing evidence of reliability and dependability (i.e., trust). Nonetheless, relational activities, which reflect a reciprocal, enduring exchange and collaboration between the retailer brand and consumers that engenders customer's value (Fang, 2019), offer emotional support (Fischer et al., 1996), making them intimate and emotionally rich (Steinhoff et al., 2019). Accordingly:

H4. There is no significant differences concerning the effect of relational factor on CARQ and EARQ.

4.5. The effects of CARQ and EARQ on app stickiness

From the perspective of the S-O-R model, it will be argued that affective responses (i.e., EARQ) will exert a stronger effect on app stickiness (i.e., response) compared to cognitive responses (i.e., CARQ). This perception will be explained subsequently. Prior research has distinguished between affective-based and cognitive-based attitude, where the former tends to be more objective and corresponds to the "true/false" aspect and the latter tends to be more subjective and corresponds to the "positive/negative" aspect (Zajonc, 1998). When new information is presented, individuals' cognitions can be invalidated or altered as they strive for correctness in relation to some external reality (Sherman and Kim, 2002). Alternatively, individuals consider affect as an internal reality because they feel that they can never be wrong about it and, therefore, it cannot be easily altered even with the presence of new information

(ibid). Cognitive-based attitude is subject to calculative considerations and counter-argumentation, which makes it easier to change and vulnerable to external incentives (Fernandes and Proença, 2013). Alternatively, affect-based attitude “perseveres even if the cognition that gave rise to the affect is invalidated” (Sherman and Kim, 2002, p.224). Fernandes and Proença (2013) explained that when an attitude is dominated by affect, individuals engage in a behavior for its own sake, which makes affect not easily dislodged, thus leading to much stronger responses than pure cognition. In the marketing domain, Morris et al. (2002) analyzed 23,000 responses to 240 advertising messages and concluded that affect is more dominant than cognition when predicting conative attitudes and actions.

Extending this logic into the current research, we pointed out previously that CARQ is formed based on cognitive evaluations of app performance relative to expectations (satisfaction), and the confidence in its reliability and quality (trust). Such cognitive evaluations would be subject to calculative considerations and counter-argumentation, making them vulnerable to change, particularly if consumers are presented with attractive offerings from competing apps (Nyffenegger et al., 2015), thus reducing app stickiness. Additionally, the cognitive nature of satisfaction and trust suggests that consumers might not feel the need to stay longer and navigate deeply once shopping is completed. A cognitive-based relationship emphasizes a cost-benefit analysis, which makes consumers satisfied but not close to the brand (Fernandes and Proença, 2013). Consequently, consumers will be less willing to invest in the relationship beyond prescribed roles, given that they make a conscious assessment of the costs and benefits of the relationship.

Alternatively, EARQ is derived from the emotional values offered by the app, which does not involve a cost-benefit analysis and goes beyond delivering core products/services (Nyffenegger et al., 2015). From this perspective, having a psychological bond with the app will offer consumers a higher emotional value compared to other competing apps, thus increasing their willingness to invest time and efforts and preserve interactions beyond purchase and consumption (Fernandes and Moreira, 2019; Nyffenegger et al., 2015). As such, EARQ would affect consumers’ stickiness with the app, as stickiness allows them to continue receiving the corresponding emotional value. Further, emotional-based brand relationship reflects a ‘dedicated’ relationship with brand (Bendapudi and Berry, 1997) and a high intention relationship, which exerts a strong impact on the persistence of the relationship and reduced propensity to switch to other brands (Fernandes and Proença, 2013). Prior research also found that passionate consumers had significantly lower attrition rates (Fleming et al., 2005), and

higher levels of switching resistance loyalty (Alnawas and Hemsley-Brown, 2018). Accordingly:

H5. EARQ (CARQ) has a stronger (weaker) effect on stickiness

5. Research methodology

5.1. Data collection and sampling procedures

A ‘modular design approach’ was used to avoid any potential bias arising from collecting data from the same respondents assuming that people’s attitudes and behaviors do not vary considerably over a short time span (West et al., 2015). The researchers divided the questionnaire into shorter parts that included a fixed and mutually exclusive number of items, and then asked the same respondent to fill them in different sessions (Ioannidis et al., 2016). The questionnaire had 36 items to measure the predictor variables and 18 items to measure the outcome variables. It was split into two parts: one for the predictor variables and another for the outcome variables.

A marketing research firm was hired to collect data from an online UK consumer panel. Those who purchased online in the past six months represented the criterion used to identify the sampling frame. Email invitations were sent (including the first questionnaire link) to potential participants, who were randomly chosen by the system. Those who responded were identified by their panelist ID and were re-contacted three days later to complete the second questionnaire. This process took place a number of times until the agreed target of complete responses was achieved excluding biased ones (e.g., similar responses to all items or very short completion time). Further, the firm provided us with an identifier (a panelist ID) to combine both questionnaires for each respondent. We over-recruit by 52.5% (923 surveys) in order to receive 605 complete and nonbiased responses. This number was deemed appropriate since the item ratio (13:1) exceeded the 10-to-1 threshold (Kock and Hadaya, 2018), and it was also well above the recommended minimum sample size of 218 obtained using Daniel Soper’s calculation tool¹. Respondents’ characteristics appear in Table 3.

5.1.1. Research instrument

The variables were assessed using previously validated scales (see Table 4), measured on a 5-point Likert scale. The questionnaires were sent to two experts in mobile apps for face validity.

¹ <https://www.danielsoper.com/statcalc/calculator.aspx?id=89>.

Very minor comments were made on the wording of few items. The final questionnaires were then setup on Qualtrics and pre-tested with 20 online shoppers to ensure that the items were clearly understood (Bhattacharya et al., 2019).

The questionnaire started with the following Yes/No filter question in order to qualify respondents: “Do you have a retailer app (e.g., Very, Tesco, Argos ...) installed on your smartphone that you normally purchase from?” Respondents were then required to write the name of that retailer followed by another Yes/No filter question: “Did you purchase from XYZ’s app over the last month?”, to ensure that only active shopper filled the questionnaire (Japutra et al., 2021).

Those who answered ‘No’ to filter questions were excluded. Using this question: “Approximately, how long have you been using XYZ’s app (in Months)?”, we controlled for usage period (app use length) since it affects shaping consumers’ positive attitudes and the decision assessment process in app settings (see Li and Fang, 2021).

5.1.2. Measurement and model validation

The study’s model was validated using Amos 24 in two steps: validating the first-order variables then the high-order constructs. The first model included 17 first-order variables: speed, ease of use, security, aesthetics, escapism, entertainment, price offering, product offering, delivery attributes, two-way communication, personalization, customer service, satisfaction, trust, passion, intimacy and stickiness. The fit indices were within the conventional standards: CMIN/DF (2.00), IFI (0.93), TLI (0.919), CFI (0.93), and RMSEA (0.047). The regression

weights of all the items (see Table 2) were above 0.70; composite reliability ranged from 0.80 to 0.90 and the average variance extracted (AVE) of each construct was above 0.50 (Hair et al., 2011).

The second step included six high-order constructs (functional, experiential, relational, offering, CARQ, and EARQ) and one first-order variable (stickiness). The fit indices were within conventional standards: CMIN/DF (2.15), IFI (0.91), TLI (0.907), CFI (0.91), and RMSEA (0.05).

The composite reliability and the AVE of each high-order construct were above 0.70 and 0.50, respectively (see Table 4). The square root of AVE of each construct was greater than the correlation between all other constructs, thus establishing discriminant validity (see Table 5).

5.2. Common method bias

A number of methodological, technical and statistical procedures were used to control for common method variance. Methodologically, a modular design approach was used to reduce biases arising from collecting data from the same respondents. Technically, the variables and their items were randomly shuffled for each participant. Statistically, a common latent factor (CLF) approach was used through comparing the standardized regression weights of the measurement model with CLF and the standardized regression weights of the measurement model without CLF (Archimi et al., 2018). The highest difference in standardized regression weights was lower than the threshold of 0.25 (Archimi et al., 2018).

5.2.1. Model testing

Chi-square (χ^2) difference test was used to examine the differential effects of the proposed hypotheses (Nyffenegger et al., 2015) by comparing the χ^2 value of the unconstrained SEM to that of a constrained model. The values of two paths being compared (e.g., functional factors to CARQ and to EARQ) are forced to be equal. If the χ^2 difference is higher than 3.84, then the two paths are considered significantly different, thus supporting the differential effect (Nyffenegger et al., 2015). To do so, we first specified a model including the six high-order constructs (functional, experiential, relational offering, CARQ, and EARQ) and one first-order variable (stickiness).

The results indicated that functional factors had a significant effect on CARQ ($\beta = 0.34$, $p < .001$) and an insignificant effect on EARQ (0.09 , $p > .05$). The χ^2 difference test between the constrained and unconstrained paths is significant ($\Delta\chi^2 = 11.69$, $p < .01$), thus providing support for H1.

Concerning H2, offering factors have a significant effect on CARQ ($\beta = 0.52$, $p < .001$) and an insignificant negative effect on EARQ (-0.08 , $p > .05$). The χ^2 difference test indicated that the difference is significant ($\Delta\chi^2 = 27.5$, $p < .01$), thus providing support for H2.

Regarding H3, experiential factors had a significant effect on EARQ ($\beta = 0.47$, $p < .001$) and an insignificant effect on CARQ (0.11 , $p > .05$). The χ^2 difference test showed that the differential effect was significant ($\Delta\chi^2 = 52.09$, $p < .01$), thus confirming H3.

As far as H4 is concerned, it was originally hypothesized that there will be no significant differences concerning the effect of the relational factors on CARQ and EARQ. However, the results suggest that relational factors have a significant effect on EARQ ($\beta = 0.43, p < .001$) and a marginal significant effect on CARQ ($0.15, p < .1$). The χ^2 difference test shows that such a difference is significant ($\Delta\chi^2 = 17.63, p < .01$), thus rejecting H4.

Concerning H5, it was hypothesized that EARQ (CARQ) will have a stronger (weaker) effect on app stickiness. Our results indicate the opposite. The effect of CARQ ($\beta = .46, p < .001$) has a significantly

stronger effect on app stickiness compared to EARQ ($\beta = 0.29, p < .001$).

Additionally, the χ^2 difference test shows that the differential effect is insignificant ($\Delta\chi^2 = 2.47, p > .05$), thus rejecting H5.

A summary of the above results is provided in Table 6

6. Discussion and conclusions

Using the S–O–R model as a theoretical framework, the current research investigate the differential effects of four sets of antecedents on two distinct aspects of app relationship quality (CARQ and EARQ) as well as the differential effect of the latter constructs on app stickiness. Our results indicate that there is no single factor that contributes significantly to both elements of app relationship quality. Rather, each factor contributes differently depending on its utilitarian/hedonic nature. The results also indicate that CARQ and EARQ are developed via two different and distinct paths. For example, functional and offering factors appear to be more salient for forming CARQ than EARQ. These factors offer consumers with tangible and concrete benefits since they are often related to specific features and benefits that an app provides to its consumers. Functional factors such as ease of use and security have a direct impact on consumers' ability to use the app effectively and completing the shopping task efficiently, while offering factors such as price and product offerings have a direct impact on meeting consumers' needs and expectations and determining if the app provides value and convenience. As such, emotional factors such passion and intimacy would be less relevant when evaluating the app, whereas cognitive factors such as trust and satisfaction would be more relevant since they are directly related to the consumers' rational evaluation of the app's functionality and utility, which more are important for forming a cognitive appraisal of the app. However, given that functional and offering factors offer distinct utilitarian benefits to

consumers, they should be considered as complementary rather than mutually exclusive factors (i.e., focusing on either functional or offering factor).

Our findings suggest that while the experiential factor acts as a primary antecedent of EARQ, its role in driving CARQ is less significant. This indicates that experiential factors are more directly related to consumers' emotional experiences with the app, whereas cognitive factors (i.e., functional and offering factors) are more related to their rational evaluation of the app's functionality. When an app provides aesthetically pleasing interface, consumers may have more positive emotions toward the app, and when it provides entertainment value or an escape from daily routine, consumers may feel more engaged and passionate about the app. Therefore, such factors are more likely to elicit emotional responses from consumers such as enjoyment and pleasure, which are less directly related to the functionality of the app or its offering. This insight reflects the different processes that consumers pursue when assessing the components of app relationship quality, thus confirming the two distinct paths for developing CARQ and EARQ.

Contrary to our prediction, relational factors did not yield similar effects on CARQ and EARQ. Rather, they have exerted a significantly stronger effect on EARQ than on CARQ. A possible explanation for this finding is that relational factors, which reflect interdependency and commitment, entail multiple interactions, conversational exchange and value-producing transactions. Such activities require time and are affective-oriented as they focus less on the value of the object (technical quality) and more on the psychological aspect of the process (emotional experience, symbolic meaning; Wongkitrungrueng et al., 2020). Therefore, although relational factors may offer some utilitarian benefits, they are essentially intimate and emotionally rich because their primary focus is creating customer value and offering emotional support (Steinhoff et al., 2019). Consequently, relational factors are likely to generate more emotional connections with consumers, resulting in enhancing EARQ rather than CARQ.

Concerning the effect of CARQ and EARQ on app stickiness, the results were surprising. It was expected that EARQ would have a stronger impact on app stickiness, but the findings showed the opposite. A possible explanation is that trust and satisfaction are more closely related to the functional and utility aspects of the app. Such aspects can be critical to the customer experience and they would not continue to use an app if trust or satisfaction with its performance don't exist. Another explanation is that stickiness indicates that consumers spend long time when conducting shopping activities through the app; and if this is not associated

with saving effort and money, finding the right solutions, and increasing perceived utility benefit, it may result in decreasing consumers' perceived productivity. This, in turn, would make consumers experience a feeling of guilt, as the time spent on the app could have been used doing other activities (McLean et al., 2022). From this perspective, unlike EARQ, which is driven by hedonic benefits, CARQ is driven by utilitarian benefits related to performing the shopping task effectively and efficiently. This, in turn, provides consumers with 'good reasons' and 'evidence' as to why to stick to the app and reduces guilt feelings for not spending time wisely.

6.1. Theoretical contributions

The findings of the current research contribute to the literature in several ways. First, while previous studies (see Table 1) were insightful in enhancing our understanding of the different app-related factors, they did not offer a comprehensive model that integrates the various factors into a broader conceptualization, leading to a partial understanding of the importance of such factors. For example, some studies examined one factor (e.g., McLean et al., 2022; Huang et al., 2019); while other studies examined two factors (e.g., Al-Nabhani et al., 2022; Ho et al., 2022) and a minority of studies focused on three factors (e.g., Shahid et al., 2022; Tran et al., 2022). This study extends prior research by offering a more comprehensive conceptualization of app-related factors through examining factors that cover a range of different aspects related to apps (i.e., functional, relational, offering and experiential factors). Second, although prior research examined the effect of certain app-related factors on specific elements related to CARQ such as satisfaction (Tseng et al., 2022) and trust (Kang and Namkung, 2019) or specific elements related to EARQ such as intimacy (Lin et al., 2021), they did not fully examine the scope of the app relationship quality construct by considering both its cognitive and emotional components. This research explicitly investigates the two components of app relationship quality, thus, offering a richer and deeper conceptualization that accounts for the complex interplay between these components. The findings identify the determinants of each component through examining how diverse app-related factors affect each component. Third, while prior research has identified mechanisms such as brand engagement (e.g., Ho et al., 2022) and service experience (e.g., Shahid et al., 2022) as key drivers of future consumer behavior (i.e., continuance intention), the current research complements these insights by identifying app relationship quality as a key driver of current consumer activity (app stickiness). It also complements other studies that explicitly examined the concept of app stickiness. These studies identified consumers' emotional state (Martinez and McAndrews, 2021), perceived value

(Nandi et al., 2021), usefulness, playful engagement (Kim et al., 2016), attitude and satisfaction (Hsu and Lin, 2016) as key determinants of app stickiness. Our findings add to this research stream through showing that app stickiness is influenced by two key factors: consumers' rational evaluation of and emotional connection with the app. While rational evaluation has a significant impact on app stickiness, emotional connection also plays a role, albeit to a lesser extent. This research, therefore, offers a new understanding of other mechanisms that makes consumers stick with the app.

7. Managerial implications

We provide important insights about what makes consumers stick to an app after download. First, retailing apps should not only distinguish between the cognitive and emotional components of relationship quality but also between the cognitive and emotional app-related factors driving the relationship quality itself. In particular, CARQ (satisfaction and trust) appears to be more critical than EARQ (passion and intimacy) for app stickiness and, thus, retailers are well-advised to pay attention to the factors (i.e., functional and offering) that drive CARQ. Furthermore, these factors have variations in terms of their contributions to CARQ. As such, these set of factors should not be treated as equal given that the offering factors appear to tap more into CARQ compared to the functional ones. Second, retailers should not ignore EARQ since they still influence app stickiness to a lesser extent, indicating the importance of further understanding of the experiential and relational factors that drive EARQ. From this perspective, to generate positive emotions, retailers should invest in understanding what makes their consumers enjoy using the app and the factors that make it fun and engaging. They also should invest in enhancing their relational factors (two-way communication, personalization and customer service) as such factors are more emotional in nature and thus are expected to generate higher levels of EARQ. To enhance two-way communication, retailers, for example, can offer consumers multiple channels to connect such as email, phone, and social media. They can add a live chat feature in their app where consumers can contact support team with any queries related to products, delivery, or payment. To improve the personalization aspect, they can use data analytics to recommend products to consumers based on their past purchases, preferences, and browsing history and to offer them personalized discounts and promotions based on their shopping behavior. To enhance customer service, retailers can provide all essential information about products, shipping, and returns. They can provide consumers with order tracking and notifications, which offer consumers real-time updates on their orders, including shipping status, delivery time, and any other relevant

information. They can also integrate hassle-free returns and refunds feature in the app, which simplifies this process for consumers.

Third, given the importance of functional/offering and experiential/relational elements in driving CARQ and EARQ respectively, retailers should strike the best balance and blend the two together to create a unique shopping experience, while keeping the cognitive aspects in mind given their significant contribution to CARQ and subsequently to app stickiness. For example, retailers can include an engaging and immersive need analysis tool where consumers can input some prerequisite information about the purchase so that it recommends fewer and more relevant product options. This can act as an educational experience to the app users which alleviates the psychological burden of the decision-making process, thus, enhancing the cognitive aspect of shopping. In parallel, it would make the experience fun and enjoyable, thus, cultivating the emotional aspect of shopping. Together, consumers are provided with specific and related information while leaving them with positive emotions. This long-term relationship building strategy may be more effective than short-term monetary rewards (e.g., discount codes) to encourage consumers to keep the app loaded on their devices. Fourth, when the purchase decision requires consumers to spend longer time to browse and research (e.g., technology and high involvement products), functional factors, such as speed and ease of use, become crucial to alleviate feelings of guilt resulting from extra time and energy needed to make the right decision.

Fifth, given that app abandonment/uninstallations are high as discussed before, retailers need to survey those who stopped using the app based on the four factors (functional, offering, relational and experiential) identified by our study to understand which of them are underperforming from the user's perspective. Since doing this may pose the issue of contacting these users, retailers are recommended to make the consent to contact consumers about the app an integral part of the registration process when using it for the first time.

Sixth, developers of smartphone apps can benefit from the dimensions identified in the study, which go beyond Android and iOS user interface guidelines. In particular, the design of the app should facilitate the relational elements where the interaction between the user and the retailer plays an important role in improving EARQ. For example, the app should allow an easy two-way communication with the retailer so that consumers feel that the retailer is listening to them and addressing their concerns when a problem arises or when they need help before

making a purchase. Similarly, the design should facilitate personalization to give consumers the sense of uniqueness when using the app.

8. Limitations and directions for future research

While the current research used a ‘modular design approach’ to overcome a number of limitations, there are still other limitations that might be areas to be addressed in future research. First, the current study relied on self-reported data and used a cross-sectional design where data were collected at a single point in time, and therefore, it is difficult to establish a cause-and-effect relationship. An experimental design that manipulates different app features to explore their effect on app relationship quality and stickiness could be undertaken by future research to overcome these limitations. Second, it was beyond the scope of the current study to examine the role of demographic factors such as age in strengthening/weakening the proposed relationships. This is because young adults and older adults tend to have different app usage patterns, preferences, and priorities. For example, functional factors might be important to both groups, but older adults may prioritize them more than young adults due to differences in digital literacy and concerns about privacy. As such, the effect of functional factors on CARQ might be stronger for older adults compared to young adults. Alternatively, experiential factors might be more important for young adults who may value the visual appeal and engaging features of the app. While older adults may also appreciate such factors, they may place lower emphasis on that and greater emphasis on the ability to use the app to accomplish tasks efficiently. Thus, the effect of experiential factors on EARQ might be stronger for young adults compared to older adults. Third, it was beyond the scope of the current study to examine how different types of apps may strengthen/weaken the effect of app-related factors on CARQ and EARQ. For example, functional factors might be more important for a grocery app compared to a luxury fashion app or a beauty app, as consumers might need to easily navigate through different sections, search for specific products, and complete transactions quickly and efficiently. Similarly, although users of grocery apps might appreciate relational factors, they might not be a top priority for them as their primary focus is to quickly find and purchase products, whereas such factors might be top priority for users of a luxury fashion app as they want to feel heard and valued. Additionally, in a grocery app, experiential factors might not be the primary focus, as users are primarily looking for products, whereas such factors might be a top priority in a luxury fashion app to create an aspirational, high-end brand image.

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