Augmented reality as a supplementary service in the phygital marketplace: Evidence of hedonic primacy and social influence variability

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Abstract

Purpose – Augmented reality (AR) has diffused as a supplementary service in phygital retail, yet evidence on what it changes in consumer evaluation remains thin. The goals of this research are twofold: first, this research aims to examine whether AR differently shapes hedonic and utilitarian attitudes and second, this research aims to test whether normative social influence and informational social influence shift the relationship between bidimensional attitude toward AR and desire to use AR.

Design/methodology/approach – Two experiments compare an AR app condition with a non-AR mobile site condition. Study 1 assigns 224 participants to Sephora Virtual Mirror or a non-AR Sephora mobile site (cosmetics as a hedonic, public-facing, non-durable category). Study 2 assigns 194 participants to Ikea Place or a non-AR Ikea mobile site (furniture as a utilitarian, private-facing, durable category).

Findings – AR experience strengthens hedonic attitude in both product categories, whereas utilitarian attitude shows no comparable increase. Normative social influence weakens the link between hedonic attitude toward AR and desire to use AR in the cosmetics context while informational social influence strengthens the same link in the furniture context. Hedonic attitude and utilitarian attitude each predict desire to use AR.

Originality/value – Self-regulation theory frames desire as the motivational mechanism that connects evaluations of AR to use. Evidence of hedonic primacy challenges the common assumption that AR earns adoption mainly through utilitarian improvement in decision-making. The opposing moderation effects reject a single social strategy for AR across categories. Normative social influence can dampen hedonic motivation in cosmetics, whereas informational social influence can amplify hedonic motivation in furniture, which implies that phygital brands should design AR social cues to match the product category rather than rely on uniform social endorsement features.

Keywords Augmented reality, Attitude, Desire, Hedonic, Utilitarian, Social influence, Customer experience, Technology and service

Paper type Research paper

1. Introduction

According to Frow *et al.* (2014), immersive technologies and social networks have changed how firms design supplementary services that surround a core product and shape customer value. Augmented reality (AR) try-on now appears in many phygital journeys as an ancillary feature that can alter evaluation before purchase. Consider a consumer choosing lipstick under time pressure. AR try-on enables rapid shade comparison and reduces reliance on in-store trial, shifting part of the journey into a digital service layer. Retailers adopt such features not as decorative add-ons, but as strategic instruments intended to raise experiential value and reduce friction in purchase processes (Batat and Hammedi, 2022). However, research on supplementary services has not kept pace with this shift, leaving us with a limited theoretical understanding on what AR changes in consumer evaluation and which psychological mechanisms carry those changes into technology use.

Levitt (1980) advised marketers to focus on the total product offering, which includes *supplementary services* beyond the core product, as perceived value is shaped not only by the core product but also by accompanying services. The literature refers to these ancillary elements using several labels, including augmented product (Levitt, 1980), extended product (Kotler, 1972), peripheral services (Normann, 1984) and supplementary services (Lovelock, 1995). Service research subsequently

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formalized how these services operate, dividing them into facilitating and supporting elements (Grönroos, 1990) and translating the categories into the *flower of service* model for managerial design (Lovelock, 1995). Scholars have also linked supplementary services to the dimensions of service quality (Ferguson *et al.*, 1999) and subsequent customer outcomes such as risk reduction and satisfaction (Balin and Giard, 2006; Magaldi and Crescitelli, 2008; Piccoli *et al.*, 2004), thereby establishing a pathway from service design to competitive advantage. Frow *et al.* (2014) extended this logic to technology, positioning technology as an enabler of interaction, knowledge transfer and personalization. Nevertheless, the service environment has changed faster than the theory base and recent reviews argue that treating technology as a neutral delivery channel understates its role as an operant resource that reshapes value creation in service ecosystems (Grönroos, 2020; Wilden *et al.*, 2017), a gap that becomes especially salient for immersive technologies such as AR.

AR differs from many digital service add-ons as AR can embed digital content and provide simulated physical control in a consumer's environment, which makes remote service encounters more intuitive (Hilken *et al.*, 2017). In retail, AR try-on can approximate parts of in-store examination by allowing consumers to visualize products on the self or in the home environment (Soon *et al.*, 2023). This capacity extends product evaluation beyond the limits of standard mobile interfaces, deepening interaction during service consumption (Marinova *et al.*, 2017). Extant research credits AR with mimicking touch-related cues and accelerating decision processes, signaling potential value for both hedonic and utilitarian evaluation (Soon and Lim, 2025; Zanger *et al.*, 2022). Yet, existing research often treats AR as an isolated engagement feature (ELSamen *et al.*, 2026) rather than as a supplementary service that reshapes the augmented offering around the core product. That framing matters, given that service augmentation produces satisfaction and strategic differentiation only when it changes the experience in ways that customers value (Heller *et al.*, 2019; Ibáñez-Sánchez *et al.*, 2022). Yet, scientific evidence on how AR functions as a supplementary service in competitive phygital markets remains limited (Barile *et al.*, 2025), which restricts both theory development and managerial justification for investment.

The rapid proliferation of AR reinforces the managerial urgency for a more refined theoretical understanding of AR as a supplementary service. Noteworthily, the AR market is expanding through rising investment in AR technology and apps (Technavio, 2025). Research and Markets (2025) projects growth from US$43.98bn in 2024 to US$635.67bn by 2033, with a projected compound annual growth rate of 34.26% from 2025 to 2033. Evidence from retail platforms also suggests that interactive AR content can coincide with large increases in conversion under conditions that intensify reliance on remote shopping (Fortune Business Insights, 2026). Firms also combine AR with artificial intelligence (AI) to extend functionality. The Ikea Place app, for instance, allows consumers to place true-to-scale furniture models into their rooms and supports search via camera-based recognition. Such AR-AI integration, in turn, blurs the boundary between product evaluation and service augmentation, positioning AR less as a visualization add-on and more as a decision-support service embedded in the offering.

Despite diffusion (Nadeem *et al.*, 2025), the impact of AR on shaping consumer attitudes and behavior remains underexplored, particularly when social influence conditions AR use. Two evaluative mechanisms are especially relevant – namely, hedonic attitude and utilitarian attitude – yet AR research rarely tests whether these dimensions respond differently to AR experience or whether one dimension carries the primary motivational force for use. Social influence amplifies that gap. Normative social influence (i.e. the tendency to conform to others' expectations to gain approval or avoid disapproval) and informational social influence (i.e. using others' information and behavior as evidence about reality) can shift technology decisions by altering perceived social expectations and the informational basis of evaluation (Bearden *et al.*, 1989; Burnkrant and Cousineau, 1975; Jang *et al.*, 2024). Prior work in consumer behavior shows that these two dimensions operate differently, yet limited evidence models them as distinct moderators in technology use contexts (Clark and Goldsmith, 2006). Moreover, there is little evidence on how normative social influence and informational social influence condition the link between hedonic attitude, utilitarian attitude and desire to use AR, despite calls to connect AR with social needs (Barta *et al.*, 2025; Lawler-Sagarin *et al.*, 2025). Notably, prior AR studies have concentrated on consumer, product or technology moderators (Table A1), leaving social influence largely unmodeled as a boundary condition. Such a gap, in turn, creates a practical risk, as managers may deploy social cues that suppress motivation in one product category while amplifying it in another.

In response, this research draws on self-regulation theory, which treats desire as the motivational bridge between evaluation and action (Bagozzi, 1992; Perugini and Bagozzi, 2001), to examine, *first*, whether AR, conceptualized as a supplementary service, differentially shapes hedonic and utilitarian attitude and, *second*, whether normative and informational social influence condition the relationship between bidimensional attitude toward AR and desire to use AR. Two experiments test a model that encapsulates these variables across cosmetics (a hedonic, public-facing, non-durable category) and furniture (a utilitarian, private-facing, durable category) using Sephora Virtual Mirror and Ikea Place as stimuli. Three noteworthy observations emerge. First, AR primarily strengthens hedonic, rather than utilitarian, attitude. Second, bidimensional attitude toward AR predicts desire to use AR, linking evaluation to use within a phygital journey. Third, normative and informational social influence operate as boundary conditions on the attitude-to-desire relationship, with opposing effects that challenge a one-size-fits-all view of social cues in AR design. Consequently, this research offers adequately incremental *theoretical novelty* through *theoretical modification* and *theoretical extension* (Lim, 2026), specifically by *modifying* how attitude is theorized in AR contexts via a bidimensional evaluative structure and *extending* self-regulation theory into phygital journeys by specifying when evaluation converts into desire under distinct social influence conditions. *Theoretical interestingness* rests on counterintuitive results (Lim, 2026), showing that AR's motivational force runs primarily through hedonic, rather than utilitarian, evaluation and that

social cues do not uniformly enable use, instead working in opposing directions depending on whether influence is normative or informational. These mechanisms clarify when phygital service design – in this case, AR as a supplementary service – supports autonomy and authentic experience versus when social cues risk suppressing motivation, which offers empirical grounding for human-first experience design in hybrid physical-digital ecosystems and, in turn, situates this contribution within the phygital service research framework advanced by Batat (2026).

2. Literature review

2.1 Service-dominant logic in a phygital marketplace

Batat (2026) positions phygital service research as a human-first paradigm that integrates foundational service concerns with transformative outcomes in hybrid physical-digital environments. Service-dominant logic provides a natural theoretical anchor for this paradigm as the theory reframes exchange as value co-creation rather than discrete transactions, wherein value follows from value-in-use, which means market actors create value through applying and integrating resources during service processes (Vargo and Lusch, 2004, 2008). This framing raises a direct implication for technology. Technology can operate as indirect service provision that shapes how actors co-create value, rather than serving as a neutral delivery channel (Wilden *et al.*, 2017). The operant resource premise clarifies why this matters. Competitive advantage depends on operant resources that act on other resources (Vargo, 2009) and technology can meet that definition when embedded as a supplementary service surrounding a core offering (Frow *et al.*, 2014). Karpen *et al.* (2012), therefore, call for work that specifies how particular technologies facilitate a service-dominant orientation. Yet, current theory still offers limited guidance on what AR changes in consumer evaluation and which mechanisms convert those evaluations into motivation to use AR in a phygital journey.

AR fits the operant resource logic as AR expands consumers' capacity to integrate product information, spatial cues and experiential feedback during evaluation. Sephora Virtual Mirror illustrates this integration. Consumers can test shades and compare options in real time, which can reduce purchase uncertainty and enrich the experience of evaluation (Soon and Lim, 2025). Firms also gain value through learning which products consumers explore and which comparisons recur, which supports refinement of the augmented service offering. Evidence that augmented service offerings relate to perceived service quality reinforces the strategic relevance of this value co-creation logic (Ozment and Morash, 1994). Phygital service research subsequently adds a design consideration, whereby technology integration should preserve experiential authenticity and reflect human needs rather than forcing technology-first interaction patterns (Batat, 2026). While AR-supported phygital experiences can increase perceived closeness to the brand, which strengthens consumer–brand relationships (Rauschnabel *et al.*, 2024), AR can also function as ancillary support that raises satisfaction and encourages word of mouth, extending its effect beyond the immediate interaction (Ibáñez-Sánchez *et al.*, 2022). These premises justify treating AR as a supplementary service with strategic consequences while also motivating the need for a psychologically grounded account of how evaluation converts into desire under differing social influence conditions.

2.2 Augmented reality in phygital marketing

Batat (2024a) argues that "phygital" should be treated as "a comprehensive framework for better managing customer experiences" that "guarantees a continuum in value delivery by connecting offline and online offerings" (p. 1220), implying that phygitalization is a claim about value delivery through experience continuity, which requires a human-centric account of how customers evaluate technology-mediated offerings. Batat (2024b) makes the claim operational through the 7Es framework, replacing 7Ps and substituting extension for place, which reframes distribution as experience design across physical and digital touchpoints. Del Vecchio *et al.* (2023) reach a compatible conclusion, defining phygital as combining digital elements with physical advantages to deliver immersive and satisfying customer experience. Banik and Gao (2023) extend this view by arguing that phygital environments allow customers to select a preferred mix of physical and digital elements, which can strengthen relational outcomes. The shared implication is straightforward – that is, phygital marketing succeeds when technology changes how customers experience and evaluate offerings, not when firms (merely) add channels.

Phygital marketing reflects this premise through strategies that integrate physical and digital elements across the customer journey (Johnson and Barlow, 2024). Such integration matters given that consumers move across physical and digital settings while expecting coherent interactions across touchpoints. Immersive technologies such as AR and virtual reality (VR) promise coherence as they enable experiential forms of service consumption and can reshape customer experience in ways that standard interfaces cannot (Attri *et al.*, 2024; Batat and Hammedi, 2022; Zarantonello and Schmitt, 2022). AR, in particular, signals more than a conventional omnichannel upgrade. More specifically, AR overlays digital content onto the customer's environment through AR-enabled devices, which shifts the object of evaluation, not (merely) the access point, ranging from virtual try-on to interactive demonstrations (Barta *et al.*, 2025). Multi-sensory AR can further enrich sensory experience by blending the physical environment with digital-enabled visual, auditory and tactile modalities (Heller *et al.*, 2019). These claims, in turn, justify treating AR as an experience-shaping form of service augmentation within phygital marketing.

A human-first perspective, however, introduces a critical constraint. Experience enhancement does not guarantee human benefit, which makes it insufficient to treat AR adoption as a uniformly positive story of immersion and continuity. Batat's (2026) phygital service research paradigm explicitly prioritizes human-first experience design over technology-first design, which places ethical and wellbeing concerns inside the theoretical frame rather than treating them as an afterthought. Evidence raises three concerns consistent with this stance. First, AR-based product presentations can receive more positive evaluations than site-based product presentations among consumers with unfavorable perceived body image, which implies that the benefits of AR can depend on vulnerability and self-evaluation (Yim and Park, 2019). Second, AR-enabled body imagery can boost self-esteem

among Generation Z female consumers, which implies that AR can intensify social comparison dynamics that shape experience quality (Ameen *et al.*, 2022). Third, privacy risks linked to AR can reduce perceived usefulness and use, with policy disclosures sometimes lowering intention to use (Cowan *et al.*, 2021; Rauschnabel *et al.*, 2018). These concerns reinforce the central theoretical point of this research – that is, phygital marketing claims about continuity and immersion require a behavioral account that specifies which evaluative dimension AR strengthens and when social influence converts evaluation into desire to use AR.

2.3 Self-regulation theory

Self-regulation theory draws on a long tradition in the philosophy of mind and action that treats behavior as goal-directed. Belief-desire theory captures the basic claim, whereby human action can be predicted from the beliefs and desires an actor adopts (Ravenscroft, 2009). Work on agency reinforces the same point from a different angle, as people interpret their conduct through a sense of will, which keeps motivational states central when explaining why evaluation translates into action (Wegner, 2002). Narratives of practical reasoning and intention formation subsequently formalize the belief to desire to intention sequence. Bratman *et al.* (1988) theorize intention as the product of practical reasoning and Koo *et al.* (2016) translate this logic into the belief-desire-intention model in consumer settings, whereby beliefs reflect perceptions of the environment, desires reflect motivation toward an end state and intentions reflect commitment to act. This lineage matters for technology use as it challenges a common simplification – that is, evaluative judgments alone rarely explain why a person commits to act.

Self-regulation theory makes that critique explicit. Bagozzi (1992) argues that *desire* closes the explanatory gap between attitude and intention because desire carries motivational commitment that attitude alone does not guarantee. Perugini and Conner (2000) similarly position desire as the motivational state that energizes goal-directed action. Fishbein and Stasson (1990) treat intention as the immediate precursor to action, yet Bagozzi (1992) insists that intention and desire are conceptually distinct. An individual can form an intention without experiencing a genuine motivational pull, which makes intention an unreliable proxy for motivation. This distinction carries a direct implication for models of technology use – that is, attitude captures appraisal, yet appraisal predicts action only when the individual wants to act. Bagozzi and Kimmel (1995) support this claim empirically by showing that desire both predicts intention and mediates the attitude-intention relationship.

Another advantage of self-regulation theory lies in its account of maintenance and avoidance, which maps cleanly onto sustained technology use. The theory distinguishes outcome-desire fulfillment from outcome-desire conflict. Positive experiences that satisfy desired outcomes trigger coping responses oriented toward maintaining or increasing the outcome, which supports continuation of the behavior (Bagozzi, 1992; Lazarus, 1991). Negative experiences that frustrate desired outcomes, in contrast, trigger coping responses oriented toward avoidance, reduction or tolerance, which supports disengagement (Bagozzi, 1992). The implication for immersive technologies is straightforward – that is, continued use depends not only on whether a user evaluates a technology favorably, but also on whether the experience produces motivation to repeat the behavior under the user's goals and coping responses.

Comparative evidence supports the choice of this theory. Leone *et al.* (1999), in particular, conclude that models that explicitly link desire and intention offer a more complete account of attitude behavior relations than attitudinal theories such as the theory of reasoned action or the theory of planned behavior. This completeness matters, since the focal mechanism herein is attitude to desire, not attitude to intention, in line with recent discourse on AR (e.g. Soon and Lim, 2025; Soon *et al.*, 2023). In this regard, self-regulation theory supplies the missing lens that explains when those evaluations become desire to use AR, which prepares the ground for hypotheses that treat hedonic and utilitarian attitudes as antecedents and social influence as a boundary condition.

2.4 Attitude and social influence

Attitude captures an individual's evaluative judgment toward performing a behavior (Ajzen, 1989). Eagly and Chaiken (1993) similarly define attitude as an evaluation of an entity along favor and disfavor. Many consumer behavior models and technology acceptance frameworks operationalize attitude as a single continuum, which can be defensible when the target behavior has a dominant evaluative basis. However, AR use in phygital marketing violates that assumption, given that AR can deliver experiential gratification (hedonic) and decision support (utilitarian) in the same interaction. In this regard, a unidimensional attitude score cannot reveal which evaluative basis carries motivational weight, which creates a theory problem rather than a measurement problem.

Marketing research on AR has largely adopted the unidimensional convention when modeling attitude toward AR (Khan and Fatma, 2024; Pantano *et al.*, 2017; Plotkina *et al.*, 2021; Rauschnabel *et al.*, 2019; Rese *et al.*, 2017; Yim and Park, 2019), a practice that limits inference as it collapses potentially distinct drivers into a single appraisal. Noteworthily, Batra and Ahtola (1991) argue that attitude is fundamentally bidimensional given that behavior can be driven by hedonic and utilitarian reasons. Voss *et al.* (2003) formalize this position, defining hedonic attitude as evaluation grounded in experiential sensation and defining utilitarian attitude as evaluation grounded in functional performance. Applied to AR, hedonic attitude reflects the pleasure and enjoyment derived from the AR experience while utilitarian attitude reflects the perceived usefulness of AR during evaluation. Both dimensions can coexist, diverge in valence and remain partially latent, which means a single measure can mask trade-offs that matter for desire. This bidimensional framing fits the theoretical intention of this research, since self-regulation theory treats desire as the motivational bridge, which depends on which evaluation becomes motivationally diagnostic.

Social influence provides the next theoretical lever as AR use unfolds in social contexts even when adoption is voluntary. Social influence, often labeled interpersonal influence in consumer research, refers to cues and pressures that shape evaluation and behavior through reference groups (Clark and Goldsmith, 2006; Mourali *et al.*, 2005). Technology research

similarly treats social influence as perceptions about what important others think one should do, linking the construct to subjective norm in the theory of planned behavior and to social influence itself in technology acceptance models (Venkatesh *et al.*, 2003; Venkatesh and Bala, 2008). Workplace technology adoption can amplify these effects through compliance motives, yet consumer settings lack formal obligation, which makes social influence more contingent. In this regard, family, friends and social media contacts can thus function as important others without creating the same compliance structure that organizations create.

In service marketing, social influence is particularly salient given that service attributes are harder to evaluate before consumption and performance can vary across encounters, which increases decision difficulty and perceived risk (Mourali *et al.*, 2005). Susceptibility to such influence varies across consumers, which means social influence should not be treated as a uniform environmental force (Clark and Goldsmith, 2006). Notably, Bearden *et al.* (1989) conceptualize this variation as consumer susceptibility to interpersonal influence and operationalize it as two dimensions that align with the moderators in this research – namely, normative social influence and informational social influence.

Normative social influence reflects conformity to others' expectations and is operationalized with items that emphasize approval seeking, such as "When buying products, I generally purchase those brands that I think others will approve of" (Bearden *et al.*, 1989; Burnkrant and Cousineau, 1975; Jang *et al.*, 2024). This dimension captures value-expressive and reward-oriented motives, which helps explain why public self-presentation settings can heighten normative pressure (Bearden *et al.*, 1989, Lessig and Park, 1978). Informational social influence reflects reliance on others as evidence that guides evaluation and problem solving and is operationalized with items that stress observation and learning, such as "To make sure I buy the right product or brand, I often observe what others are buying and using" (Bearden *et al.*, 1989; Deutsch and Gerard, 1955; Jang *et al.*, 2024). While normative cues can trigger informational learning within reference groups, the mechanisms remain conceptually distinct and can generate different effects on consumer decision-making (Burnkrant and Cousineau, 1975). More importantly, evidence that normative influence is stronger for publicly consumed products than for privately consumed products supports modeling normative social influence and informational social influence as separate boundary conditions rather than collapsing them into a single moderator (Bearden and Etzel, 1982).

2.5 Hypotheses development

Prior studies show that perceived usefulness and perceived ease of use relate positively to attitude toward using AR (Huang and Tseng, 2015; Pantano *et al.*, 2017; Rese *et al.*, 2017), which suggests that AR can shape evaluation through both functionality and usability benefits. Engagement with AR can also improve attitude toward a firm that deploys the technology (Moriuchi *et al.*, 2021), which signals that AR can spill over from evaluation of the feature to evaluation of the provider. Virtual try-on apps can further strengthen positive evaluations of the AR app relative to general brand exploration apps (Plotkina *et al.*, 2021), which suggests that AR features can improve appraisal of the digital service layer rather than only appraisal of the product. This stream, however, typically models attitude as unidimensional, which prevents inference about which evaluative basis carries motivational force. Instead, the bidimensional view of attitude (Batra and Ahtola, 1991) indicates that AR experience can strengthen both hedonic attitude and utilitarian attitude toward AR. In this regard, hedonic attitude should increase as AR adds experiential gratification to evaluation, making the shopping process feel more engaging and enjoyable (Rauschnabel, 2018) while utilitarian attitude should also increase as AR can improve diagnosticity during evaluation, which can reduce uncertainty and support decision-making (Soon *et al.*, 2023). These arguments, in turn, motivate the following hypothesis:

H1. AR experience enhances (a) hedonic attitude and (b) utilitarian attitude toward AR.

Self-regulation theory clarifies why attitude should predict desire rather than being treated as an endpoint. More specifically, desire captures motivational commitment that converts appraisal into a reason to act (Perugini and Bagozzi, 2001), which makes desire a more apt diagnostic than intention (Bagozzi, 1992; Perugini and Conner, 2000), especially when consumers face no obligation to use a technology. Indeed, many studies have linked attitude to desire in goal-directed settings, including Chiu *et al.* (2018), Kim and Preis (2016), Meng and Choi (2016), and Song *et al.* (2014). Taylor *et al.* (2006) extends this logic to bidimensional attitude and shows that hedonic and utilitarian attitudes can each contribute to desire. This evidence, in turn, supports treating hedonic attitude and utilitarian attitude toward AR as distinct antecedents of desire to use AR:

H2. (a) Hedonic attitude and (b) utilitarian attitude toward AR positively influence desire to use AR.

Social influence subsequently becomes a boundary condition given that susceptibility to interpersonal influence varies across consumers and can change how personal evaluations translate into motivation (Bearden *et al.*, 1989; Clark and Goldsmith, 2006). Service marketing makes this boundary condition hard to ignore given that service evaluation often occurs under uncertainty, which increases reliance on social cues during decision-making (Mourali *et al.*, 2005). Notably, consumer susceptibility to interpersonal influence comprises two dimensions with distinct motivational logics, which Bearden *et al.* (1989) operationalize as normative social influence and informational social influence.

Normative social influence reflects conformity to others' expectations and approval seeking, which can shift the basis of motivation away from personal appraisal toward perceived social acceptance (Burnkrant and Cousineau, 1975; Jang *et al.*, 2024). Under stronger normative social influence, desire can reflect compliance motives rather than the consumer's own hedonic enjoyment or utilitarian assessment, which weakens the marginal role of attitude in generating desire. Evidence that AR-based augmentation can shape self-evaluative outcomes further suggests that technology use can become socially charged, which increases the likelihood that normative pressure overrides

personal appraisal (Cowan *et al.*, 2021). External pressure can also crowd out intrinsic enjoyment, which implies a weaker translation of hedonic attitude into desire when normative social influence is high (Deci and Ryan, 1985; Ryan and Deci, 2000). These arguments motivate the following hypothesis:

H3. The greater the normative social influence, the weaker will be the influence of (a) hedonic attitude and (b) utilitarian attitude toward AR on desire to use AR.

Informational social influence reflects reliance on others' information and observed behavior as evidence that supports evaluation and problem-solving (Bearden *et al.*, 1989; Deutsch and Gerard, 1955; Jang *et al.*, 2024). Informational cues can raise confidence in one's evaluation by reducing uncertainty, which should strengthen the extent to which hedonic enjoyment and utilitarian usefulness become motivationally diagnostic, as seen in Lee *et al.* (2011), who show that informational social influence strengthens the relationship between attitude toward online shopping and intention to shop online. The same mechanism should, therefore, strengthen the attitude-to-desire relationship in this research, where desire forms when appraisals become reasons to act and informational cues, in turn, can reinforce those reasons:

H4. The greater the informational social influence, the stronger will be the influence of (a) hedonic attitude and (b) utilitarian attitude toward AR on desire to use AR.

Figure 1 illustrates the conceptual model. AR shapes hedonic and utilitarian attitudes, which predict desire to use AR. Informational and normative social influence condition the attitude-to-desire relationship, positioning the effects within a phygital, human-centric lens that links customer experience to phygital and social impacts.

3. Methodology

Causal attribution requires balancing contextual realism with experimental control (Dolnicar *et al.*, 2026). Since a single study would privilege one side of that trade-off while leaving a design-specific threat unresolved, two studies were conducted. Study 1 uses a quasi-experimental, between-subjects comparison of Sephora Virtual Mirror versus a non-AR Sephora mobile site in a setting that approximates how consumers encounter AR in retail apps. Study 2 replicates the same AR-versus-non-AR contrast using Ikea Place versus a non-AR Ikea mobile site while shifting from a hedonic, public-facing, non-durable category (context: cosmetics) to a utilitarian, private-facing, durable category (context: furniture) and from students to working adults (sampling frame). Convergent patterns across these designs reduce the likelihood that the findings are artifacts of a single context or sampling frame.

4. Study 1

Study 1 tests the model in a non-durable category, cosmetics, using Sephora Virtual Mirror as the AR stimulus and Sephora's non-AR mobile site as the control condition. The sampling frame targets young women below 30 years old, a segment that engages with cosmetics early and frequently, which makes AR try-on strategically relevant in this category (Hardcastle, 2024).

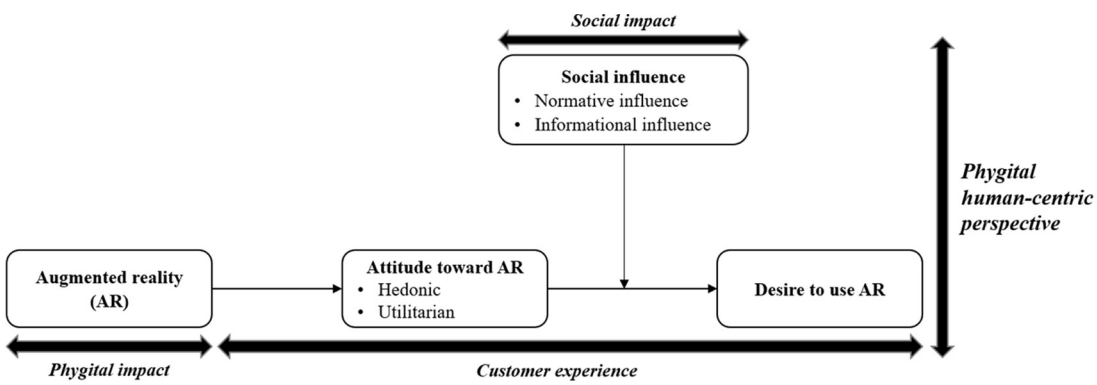
4.1 Procedure

Purposive sampling via a campus-intercept approach recruited university students during their free time. The task required comfort with smartphone-based interfaces, which supports the use of a student sample for a technology-mediated shopping task (Lee, 2014; Lee *et al.*, 2006). Participants were assigned to an AR app condition or a non-AR mobile site condition.

Participants in the AR condition downloaded Sephora Virtual Mirror and used the try-on feature to explore facial makeup options of their choice. Participants in the control condition browsed Sephora's mobile site without AR features while completing the same product exploration task. Each session lasted approximately 15 min. All participants completed the questionnaire through a link. Usable responses totaled 224, with 108 in the AR condition and 116 in the control condition. Table A2 reports participant characteristics.

Data were analyzed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS *v.*4 (Ringle *et al.*, 2024). The analysis targets explained variance in desire to use AR and estimates moderation through latent-variable interaction terms, which favors a variance-based estimator with a prediction focus (Hair *et al.*, 2016). Bootstrapping supports

Figure 1 Conceptual model



Source: Authors' own work

inference on direct and interaction effects without relying on multivariate normality, aligning with the study design and sample sizes (Lim, 2025). Prior methodological comparisons also report that PLS-SEM and covariance-based SEM (CB-SEM) can yield comparable substantive conclusions under similar specifications, which reduces concern that estimator choice drives the findings (Astrachan *et al.*, 2014; Hair *et al.*, 2011).

4.2 Measurement model

Measures were drawn from established scales and adapted to the brand and category context. Hedonic attitude and utilitarian attitude used the four-item scales from Voss *et al.* (2003). Normative social influence and informational social influence used the Bearden *et al.* (1989) scale, operationalized with seven normative items and four informational items. Desire used a four-item scale from Perugini and Bagozzi (2001). Table A3 provides measurement items.

The measurement model met standard thresholds for internal consistency, convergent validity and discriminant validity. Cronbach's alpha and composite reliability exceeded 0.70 (Hair *et al.*, 2016), indicating internal consistency (Lim, 2025). Outer loadings exceeded 0.70 and average variance extracted (AVE) exceeded 0.50, signaling convergent validity (Hair *et al.*, 2016; Lim, 2025). Fornell and Larcker (1981) criterion and heterotrait-monotrait (HTMT) checks supported discriminant validity, with each construct's square root AVE exceeding its correlations and HTMT values below 0.90 (Henseler *et al.*, 2015). Table A4 reports these diagnostics.

4.3 Structural model

Bootstrapping with 10,000 resamples estimated path significance. The base model explained a moderate share of variance in desire, with $R^2 = 0.42$, which aligns with common benchmarks in marketing studies (Hair *et al.*, 2011, 2016). AR experience increased hedonic attitude, supporting *H1a*, while the effect on utilitarian attitude was not significant, failing to support *H1b*. Hedonic attitude and utilitarian attitude each predicted desire, supporting *H2a* and *H2b*. Figure 2 summarizes the base model.

The interaction model added normative social influence and informational social influence as moderators. Explained variance in desire increased by 12 percentage points to the base model. Normative social influence negatively moderated the hedonic attitude to desire link, supporting *H3a*, but not the utilitarian attitude to desire link, failing to support *H3b*. Informational social influence did not moderate either attitude path, failing to support *H4a* and *H4b*. Figures 3 and 4 report the interaction estimates and plots.

4.4 Discussion

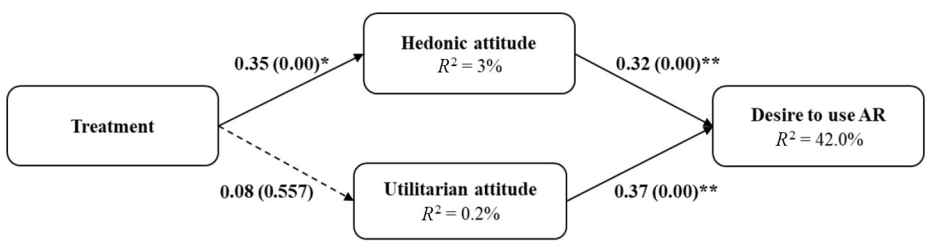
Study 1 provides direct evidence for hedonic primacy in a non-durable category. AR experience strengthened hedonic attitude without producing a comparable increase in utilitarian attitude. This pattern challenges a common assumption in technology acceptance work that AR earns adoption mainly by improving decision-making (Soon *et al.*, 2023). One plausible account follows from category characteristics. Cosmetic selection often depends on taste and situational context, which can limit the incremental decision support that AR provides beyond a well-designed mobile site. Under this logic, AR's primary contribution becomes experiential rather than diagnostic, which aligns with the observed asymmetry across the two attitude dimensions.

Normative social influence weakened the translation of hedonic attitude into desire. Higher normative pressure can shift motivation toward perceived social acceptance, which reduces the extent to which personal enjoyment remains motivationally diagnostic. Self-determination theory supports this displacement logic, since external pressure can dampen intrinsically enjoyable motives (Deci and Ryan, 1985; Ryan and Deci, 2000). Public visibility also tends to intensify normative concerns, which is consistent with prior evidence that socially visible consumption strengthens social influence effects (Bearden and Etzel, 1982; Kulviwat *et al.*, 2009). Cosmetic AR use can activate these dynamics given that evaluation often occurs with reference to peers, appearance norms and anticipated judgments, which increases the chance that normative pressure overrides enjoyment when forming desire.

5. Study 2

Study 2 tests whether the pattern observed for a non-durable category in Study 1 generalizes to a durable category using Ikea Place as the AR stimulus and Ikea's non-AR mobile site as the control condition.

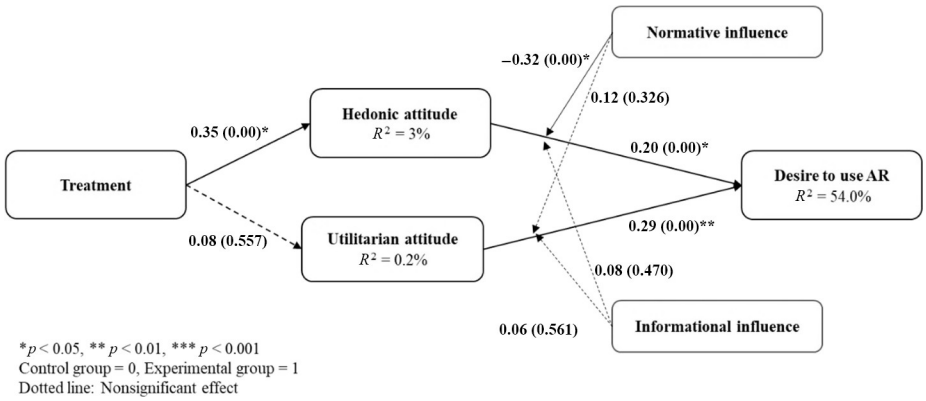
Figure 2 Structural model (base model) results for Study 1



*$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Control group = 0, Experimental group = 1
Dotted line: Nonsignificant effect

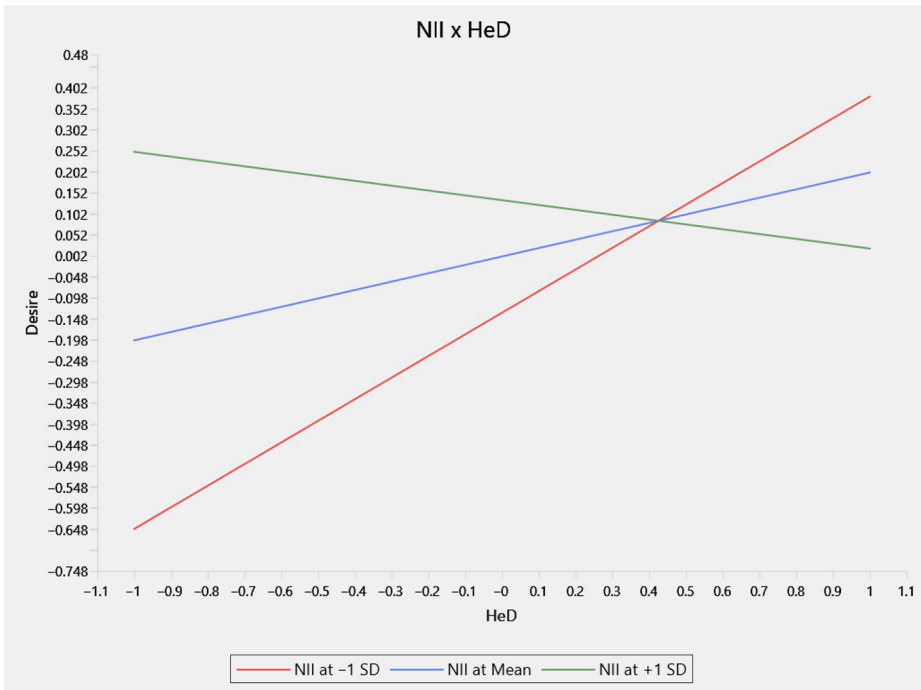
Source: Authors' own work

Figure 3 Structural model (with interaction effects) for Study 1



Source: Authors' own work

Figure 4 Significant interaction effect for Study 1



Note(s): NII = Normative social influence. HeD = Hedonic attitude
Source: Authors' own work

5.1 Procedure

A sample of working adults aged 25–45 years old was recruited from a private university, a group that captures a core segment of furniture buyers (Eaton, 2020). Participants were assigned to an AR app condition or a non-AR mobile site condition. Participants in the AR condition downloaded Ikea Place, scanned their home or office environment, and placed virtual furniture of their choice into the scanned space. Participants in the control condition browsed Ikea's mobile site to view and select furniture of their choice. Each session lasted approximately 15 min, followed by the questionnaire link. Usable responses totaled 194, with 97 in each condition. Table A2 reports participant characteristics.

5.2 Measurement model

All measures were identical to Study 1. Reliability, convergent validity and discriminant validity met the same criteria, with Cronbach's alpha and composite reliability above 0.70, outer loadings above 0.70 and AVE above 0.50 (Hair *et al.*, 2016; Lim, 2025). Fornell and Larcker (1981) criterion and HTMT checks did not indicate discriminant validity concerns (Henseler *et al.*, 2015). Table A5 reports these diagnostics.

5.3 Structural model

Bootstrapping with 10,000 resamples estimated the structural paths. The base model explained a moderate share of variance in desire, with $R^2 = 0.475$ (Hair *et al.*, 2011, 2016). Results

replicated Study 1 for *H1* and *H2* (Figure 5). AR experience increased hedonic attitude, supporting *H1a*, while the effect on utilitarian attitude was not significant, failing to support *H1b*. Hedonic attitude and utilitarian attitude each predicted desire, supporting *H2a* and *H2b*.

Moderation results differed from Study 1. Normative social influence did not moderate either the hedonic attitude path or the utilitarian attitude path, failing to support *H3a* and *H3b*. Informational social influence positively moderated the hedonic attitude to desire link, supporting *H4a*, but not the utilitarian attitude to desire link, failing to support *H4b*. The inclusion of moderators increased explained variance in desire by approximately three percentage points. Figures 6 and 7 report the interaction estimates and plots.

5.4 Discussion

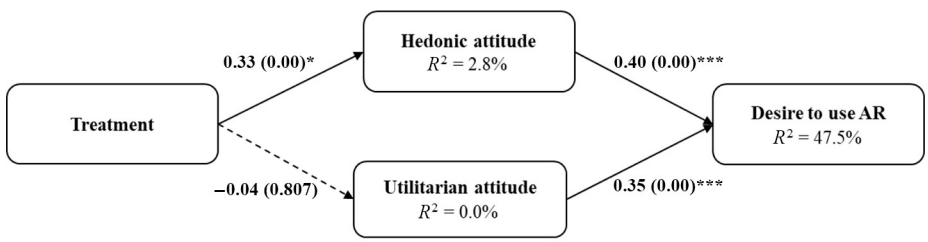
Study 2 replicates hedonic primacy in a durable category, which strengthens the claim that AR functions primarily as an experience enhancer rather than a decision-utility tool in these settings. The durable context, however, changes the boundary conditions. Informational social influence strengthened the hedonic attitude to desire link. Informational cues can reduce uncertainty and legitimize reliance on one's evaluation, which allows enjoyment to convert into motivational commitment with greater force. In this sense, informational social influence does not replace hedonic evaluation, it amplifies its motivational diagnosticity by stabilizing the consumer's appraisal under uncertainty.

Normative social influence showed no moderation effects in Study 2. Two category features make that null effect plausible. First, furniture decisions often have lower public observability than appearance-related decisions, which can weaken compliance-based motives relative to privately formed evaluations (Bearden and Etzel, 1982; Kulviwat *et al.*, 2009). Second, the Ikea task centers on spatial fit and configuration in a private environment, which can shift social cues from approval seeking toward information seeking. This logic fits the observed result that informational social influence, rather than normative social influence, conditions the conversion of hedonic attitude into desire in the durable category.

6. Conclusion

Competitive service markets push firms to differentiate through supplementary services rather than through core products alone. Immersive technologies such as AR now appear as part of many phygital journeys, yet service marketing research still offers limited evidence on what AR changes in consumer evaluation and which mechanisms convert that evaluation into technology use. Framing AR as a supplementary service

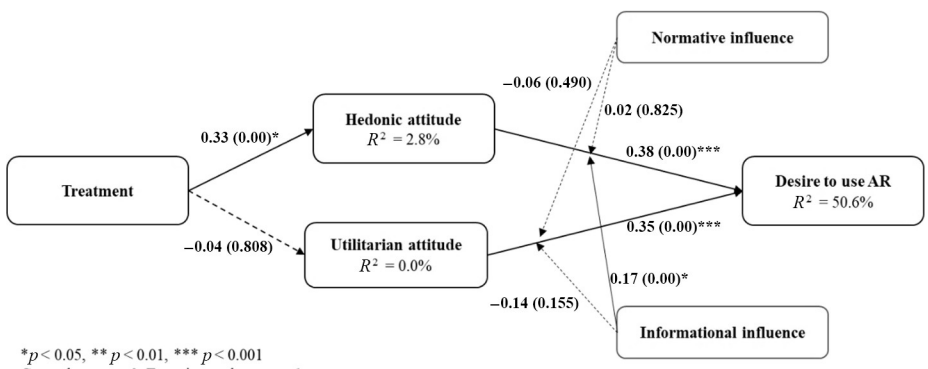
Figure 5 Structural model (base model) results for Study 2



*p < 0.05, ** p < 0.01, *** p < 0.001
Control group = 0, Experimental group = 1
Dotted line: Nonsignificant effect

Source: Authors' own work

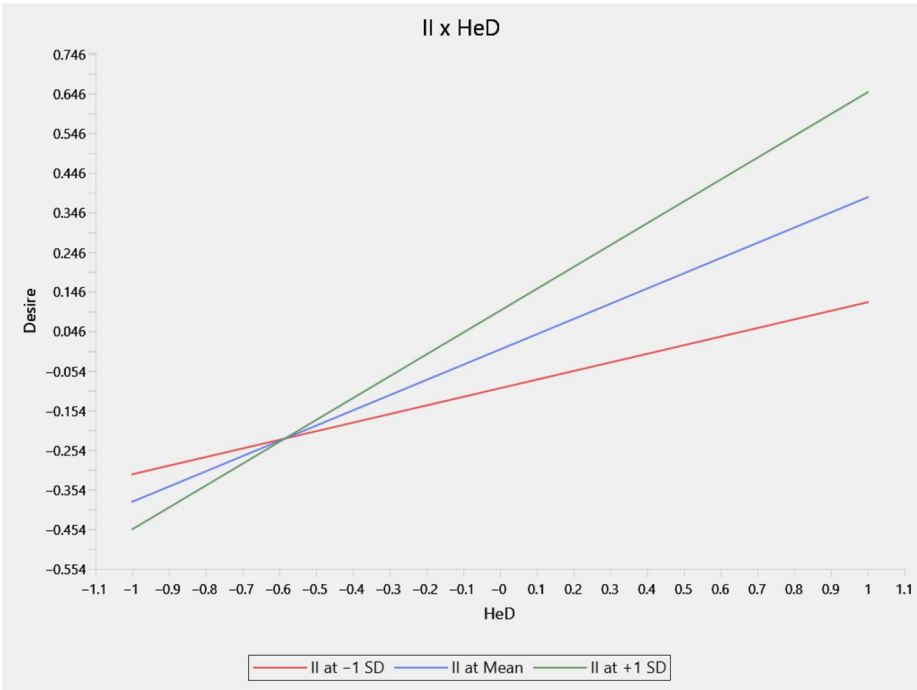
Figure 6 Results of Study 2 structural model with interaction effects



*p < 0.05, ** p < 0.01, *** p < 0.001
Control group = 0, Experimental group = 1
Dotted line: Nonsignificant effect

Source: Authors' own work

Figure 7 Significant interaction effect for Study 2



Note(s): II = Informational social influence. HeD = Hedonic attitude
Source: Authors' own work

clarifies the strategic logic as value depends on the evaluations and motivations AR creates around the core product, not on the presence of the feature itself (Frow *et al.*, 2014; Grönroos *et al.*, 2000).

This research examines AR as a supplementary service in phygital retail and models desire as the motivational mechanism that converts evaluation into use. Three noteworthy observations follow. *First*, across cosmetics (a hedonic, public-facing, non-durable category) and furniture (a utilitarian, private-facing, durable category), AR strengthens hedonic attitude without a comparable increase in utilitarian attitude, which positions AR as an experience enhancer rather than a decision tool (Soon *et al.*, 2023). *Second*, hedonic attitude and utilitarian attitude each predict desire to use AR, which supports the self-regulation claim that motivational commitment links evaluation to action in voluntary technology use settings (Bagozzi, 1992). *Third*, social influence operates as a boundary condition on the attitude to desire relationship, yet the direction depends on the type of influence and the category context. In particular, normative social influence weakens the hedonic attitude to desire link in cosmetics, which is consistent with the possibility that public-facing evaluation heightens approval concerns that can dilute the motivational force of personal enjoyment. In contrast, informational social influence strengthens the same link in furniture, which is consistent with the possibility that durable decisions heighten uncertainty reduction goals and increase reliance on others' evidence. This split pattern refines prior app adoption work that treats important others as uniformly beneficial (McLean *et al.*, 2020), since the present evidence indicates that social cues can suppress or amplify motivation depending on whether influence is normative or informational and on which category context makes that influence salient.

6.1 Theoretical implications

Service research recognizes supplementary services as strategically important, yet theory remains underspecified on how technology-based augmentation reorganizes what consumers value in use (Grönroos, 2020). This research responds by theorizing AR as a supplementary service in a phygital journey and testing a self-regulation mechanism that translates evaluation into desire (Bagozzi, 1992). Two experiments show that AR does not raise evaluation uniformly, instead shifting which evaluative dimension becomes salient and motivating. Service theory benefits from this distinction, as competitive advantage hinges on which aspect of the augmented offering becomes diagnostic for action.

First, this research refines how attitude should be theorized in AR-based service augmentation. Most AR work models attitude as a single evaluation, which assumes one dominant basis for appraisal (Khan and Fatma, 2024; Pantano *et al.*, 2017; Plotkina *et al.*, 2021; Rauschnabel *et al.*, 2019; Rese *et al.*, 2017; Yim and Park, 2019). AR violates that assumption given that an interaction can deliver both experiential gratification and decision support. Nevertheless, the results show that AR strengthens hedonic attitude without a comparable increase in utilitarian attitude across cosmetics and furniture. That asymmetry supports hedonic primacy as a feature of AR-based augmentation rather than an effect confined to a single product category. The implication for supplementary service theory is

direct. Prior works treat supplementary services as capable of delivering functional and experiential value (Grönroos, 1990, 2020; Lovelock, 1995). AR, in contrast, appears to shift consumer evaluation mainly through experiential appraisal, even when the core category is framed as utilitarian and durable. A theory of technology-enabled supplementary services, therefore, needs a more discriminating view of value creation, where augmentation can increase experiential value without necessarily increasing utility.

Second, this research extends self-regulation theory into phygital journeys by specifying the motivational conversion step. Self-regulation theory treats desire as the motivational bridge that converts evaluation into readiness to act (Bagozzi, 1992; Perugini and Bagozzi, 2001). The present model clarifies that bidimensional attitude can feed that bridge. Notably, hedonic attitude and utilitarian attitude both predict desire, which supports the claim that motivation can be grounded in affective appraisal and instrumental appraisal (Voss *et al.*, 2003). Nevertheless, the treatment effect concentrates on hedonic attitude, which implies that AR changes the evaluative input that carries the most weight in desire formation. That distinction matters for theory given that it separates two questions that prior AR work often conflates, whereby one question asks whether consumers view AR positively and the other asks which type of evaluation becomes motivationally decisive once AR is introduced.

Third, this research advances understanding of social influence in technology-based services by showing that social cues do not operate uniformly. The results reveal that normative social influence weakens the hedonic attitude to desire relationship in the cosmetics context, whereas informational social influence strengthens the same relationship in the furniture context. Opposing signs imply that social influence does not (merely) raise or lower adoption propensity, rather, social influence can shift the basis of motivation. In particular, normative cues can redirect motivation away from personal enjoyment toward approval management, which is consistent with self-determination arguments that external pressure can erode intrinsic motivation (Deci and Ryan, 1985; Ryan and Deci, 2000). In contrast, informational cues can strengthen the translation of enjoyment into desire by lowering uncertainty and reinforcing reasons to act. The category contrast is consistent with the possibility that public-facing, non-durable purchases heighten approval concerns while durable purchases heighten uncertainty reduction needs. That interpretation, nevertheless, warrants caution, since consumption visibility and purchase horizon are inferred, not manipulated directly. Yet, even with that caution, the empirical pattern still supports a theoretical correction – namely, design prescriptions that treat social proof as uniformly enabling are likely to misfire given that normative cues and informational cues can move motivation in opposite directions.

Finally, this research strengthens phygital service research by turning human-centricity into a testable claim (Batat, 2026), where desire captures motivational commitment (individual appraisal; Bagozzi, 1992) while normative social influence and informational social influence operationalize consumer susceptibility to interpersonal influence and test the social embeddedness of evaluation (social appraisal; Bearden *et al.*, 1989). Indeed, service marketing already treats social influence as consequential, as heterogeneity and intangibility raise decision difficulty and increase reliance on reference groups (Mourali *et al.*, 2005). Yet, Table A1 indicates that prior AR studies have relied mainly on consumer, product or technology moderators, which leaves social influence largely unmodeled as a boundary condition. Introducing normative social influence and informational social influence, therefore, addresses that omission and clarifies what human-centricity requires once AR becomes part of the service layer – specifically, a human-centric lens cannot stop at individual appraisal, given that consumers also manage social approval and seek evidence that legitimizes their choices. In this regard, normative social influence functions as social push, which may redirect motivation toward approval management and weaken the hedonic attitude to desire link, as seen in the cosmetics setting, whereas informational social influence functions as social pull, which may reinforce enjoyment as a reason to act by lowering uncertainty and strengthen the same link, as seen in the furniture setting. These patterns, in turn, reframe human-centricity as a design requirement rather than a passing aspiration, since AR features that amplify social push may suppress motivation in some categories while AR features that amplify social pull may strengthen motivation in others.

6.2 Practical implications

Practical implications follow from two empirical patterns: *first*, AR functions as a supplementary service that increases desire largely through hedonic attitude while utilitarian attitude remains stable and, *second*, social influence determines whether hedonic evaluation translates into motivation, which elevates normative social influence and informational social influence from inherent conditions to managerial levers. Cosmetics as a hedonic, public-facing, non-durable category suggests higher exposure to approval dynamics that can mute desire under normative pressure. Furniture as a utilitarian, private-facing, durable category suggests higher uncertainty stakes that can make informational cues more valuable, strengthening the hedonic attitude to desire link. The recommendations that follow translate these patterns into choices about access, service blueprinting and social feature design.

First, AR has the potential to widen access to experiential supplementary services, which can support brand democratization through scale. Noteworthily, estimates suggest smartphone use approaches 90% of the global population (Howarth, 2024) and that penetration, in turn, allows AR-enabled supplementary services to reach consumers who lack time, mobility or proximity to physical retail. Yet, access alone does not guarantee inclusion, as inclusive impact depends on design choices (Lim and Soon, 2026) that reduce friction for lower-end devices, limit data intensity and provide clear privacy safeguards. Therefore, managers seeking human-centricity should treat technical accessibility as part of the service promise, not as a background condition.

Second, AR strengthens hedonic attitude without a comparable increase in utilitarian attitude across cosmetics and furniture. That pattern implies AR earns its keep mainly as an experience enhancer within the supplementary service bundle. Hence, managers should evaluate AR investments using metrics that capture experiential lift, not only decision efficiency. The media selection model aligns with this

emphasis, since attention and stimulation are central quality factors when evaluating a medium for marketing communication (Coulter and Sarkis, 2005). Practical execution, in turn, can follow a service blueprint logic, where AR is positioned as a supporting service at pre-purchase and purchase touchpoints, with post-purchase reinforced with content that sustains enjoyment and familiarity. Therefore, competitive differentiation, which sets brands apart in crowded, saturated markets, will depend on integration quality across touchpoints, not on feature presence alone.

Third, AR design should treat social influence as a controllable layer of the phygital environment rather than a generic demand-side characteristic. Servicescape thinking typically highlights environmental cues and design elements (Lovelock *et al.*, 2004) while phygital work adds socialization as a core ingredient of experience creation (Batat and Hammedi, 2022). Service marketing also recognizes that reference groups matter when heterogeneity and intangibility raise decision difficulty (Mourali *et al.*, 2005). These premises, in turn, imply that AR interfaces and campaigns should specify which social cues are being activated and then match the cue type to the category context. More importantly, normative social influence and informational social influence should not be bundled into a single social proof tactic, given that the results herein show opposing effects.

Fourth, cosmetics as a hedonic, public-facing, non-durable category calls for strategies that protect intrinsic enjoyment from approval pressure. Normative social influence weakens the hedonic attitude to desire to use AR link in this setting, which suggests that overt approval-oriented prompts may dilute motivation. In this regard, campaigns should prioritize user-generated content that showcases playful experimentation and personal expression while avoiding heavy-handed endorsement frames that signal social evaluation. Product and interface design should also support this approach through private exploration features, low-stakes trials and frictionless sharing to a chosen small audience. Direct messaging and controlled visibility settings should further encourage voluntary sharing without turning the try-on into a performance for a wider audience.

Fifth, furniture as a utilitarian, private-facing, durable category supports a different emphasis. Informational social influence strengthens the hedonic attitude to desire to use AR link in this setting, which is consistent with the possibility that durable purchases heighten uncertainty reduction needs. Hence, managers should build informational infrastructure around AR use, including comparison tools (e.g. peer examples) and community question and answer (Q&A) that translate visualization into decision confidence. Design features that pair enjoyment with evidence should also help, such as saved room states, side-by-side alternatives, measured fit indicators and curated peer submissions showing similar spaces. Social cues, in this sense, should read as decision support rather than as approval seeking.

Finally, implementation should rely on disciplined experimentation. A/B testing can vary normative prompts versus informational prompts and subsequently track downstream outcomes such as engagement depth, conversion and repeat use. Analytics should also separate experiential metrics from efficiency metrics, given that the demonstrated pathway runs primarily through hedonic attitude. Iteration should also focus on cue fit by category, rather than assuming one social design improves performance across contexts.

6.3 Limitations and future research directions

A dual-study design strengthens confidence in the pattern, yet each design choice imposes boundary conditions on what the evidence can support. Claims in this research, therefore, should be read as evidence about AR used as a supplementary service in two categories within one national context, with self-reported motivation as the primary endpoint. Targeted follow-on studies can tighten causal attribution and widen generalizability by addressing the limitations that map directly onto validity and scope.

First, the empirical scope is limited to app-based mobile AR try-on while browser-based web AR is absent. Web AR is receiving managerial attention and may introduce different access friction, sharing affordances and privacy cues that can reshape evaluation and social influence dynamics (Sáez Martínez, 2023). Replications that compare app-based AR and browser-based web AR under matched tasks would clarify whether hedonic primacy and the moderation pattern persist when consumers encounter AR through a different delivery channel.

Second, sampling across different age bands in the two studies (under 30 and 25–45) and testing two product categories with two AR applications introduces a limitation: age is partially confounded with product category and the AR manipulation is partially confounded with platform type (app versus mobile website). Moderation patterns may vary by age, product type or their interaction, thus, future research should adopt a fully crossed design that recruits multiple age groups and exposes each group to the same product categories, enabling clearer attribution of effects. From an ecological validity perspective, comparing an AR-enabled app with a mobile website reflects marketplace practice, where AR features are typically delivered through apps rather than websites. Caution, however, remains warranted when attributing effects solely to AR, given the platform confound. Future research should, therefore, isolate the AR effect by holding the platform constant, assigning the experimental group to an app with AR enabled and the control group to the same app with AR disabled. Cross-national replications and stratified sampling through panels should also help test whether normative social influence and informational social influence remain stable boundary conditions across demographic segments, rather than reflecting features of a narrow sampling frame.

Third, the research interprets cosmetics as hedonic, public-facing, non-durable and furniture as utilitarian, private-facing, durable. These attributes motivate the discussion, yet the studies do not directly manipulate or measure consumption visibility, purchase horizon or perceived uncertainty. Future work should operationalize these contextual features individually through experimental manipulations and validated measures, then test whether the push mechanism of normative social influence and the pull mechanism of informational social influence track those features as theorized. That step would convert plausible category-based explanation into a stronger boundary condition claim.

Fourth, the outcome focus privileges motivational commitment rather than realized behavior. Desire is theoretically appropriate for the self-regulation logic, yet survey-based desire remains a proximal outcome that can diverge from sustained use under effort, habit and situational constraints (Bagozzi, 1992; Perugini and Bagozzi, 2001). Longitudinal designs that combine behavioral logs, repeat exposure and post-purchase follow-ups would test whether hedonic primacy predicts continued engagement and whether the observed social influence effects persist, decay or reverse as novelty fades.

Fifth, the empirical setting covers two AR implementations that represent self-augmentation and environmental augmentation within first-party retail apps. Third-party ecosystems such as social media filters and other immersive modalities such as VR may elicit different evaluative bases and different forms of social cueing. Comparative studies across immersive technologies and platform ecosystems can, therefore, test whether the proposed mechanism captures a general phygital pattern or a pattern specific to mobile, first-party AR try-on.

Finally, field experiments in live retail journeys would complement the current evidence by observing behavior under authentic constraints such as purchase stakes, social observation and time pressure. Such designs can also test whether interventions that alter normative cues and informational cues change engagement in the predicted directions, which would move the social embeddedness argument from interpretation toward stronger causal evidence.

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Data availability

Data can be made available on reasonable request.

Credit author statement

Pei-Shan Soon (Conceptualization, Investigation, Methodology, Data curation, Formal analysis, Writing – Original draft, editing and reviewing). Weng Marc Lim (Conceptualization, Investigation, Writing – Original draft, editing and reviewing).

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Appendix

Table A1 AR Studies with moderators in marketing

Empirical study	AR context	Theory	Key construct(s)	Moderator(s)	Key finding(s)
Hilken *et al.* (2017)	Eyewear, makeup	Situated cognition theory	AR augmentation, spatial presence, utilitarian value, hedonic value, decision comfort, purchase intention, word-of-mouth (WOM) intention	Style-of-processing, awareness of privacy practices	AR-enabled augmentation increases spatial presence, which increases decision comfort. Verbal (versus visual) style of processing strengthens the effect of spatial presence on utilitarian value. Privacy concerns weaken the positive effect on decision comfort
Watson *et al.* (2018)	Makeup	Stimulus-organism-response model	AR augmentation, positive affective responses, purchase intention	Hedonic shopping motivation	AR augmentation increases purchase intention via positive affective response. Hedonic shopping motivation strengthens the effect of AR augmentation on positive affective response
Yim and Park (2019)	Eyewear	Body image theory	Media usefulness, media enjoyment, interactivity, media irritation, media novelty, attitude towards medium, intention to adopt	Perceived body image	Compared with web-based presentations, AR-based presentations generate more favorable evaluations among consumers with negative perceived body image. Consumers with positive perceived body image show no meaningful difference across presentation types
Javornik *et al.* (2021)	Makeup	Self-concept	Ideal-actual attractiveness gap, ideal self-congruence, variety seeking;	Appearance self-esteem	Appearance self-esteem conditions responses to AR mirrors. Higher self-esteem widens the ideal-actual attractiveness gap for AR mirrors (versus regular mirrors), reduces variety seeking, and lowers ideal self-congruence. Ideal self-congruence mediates the effect of mirror type on the ideal-actual attractiveness gap
Plotkina *et al.* (2021)	Shoes, garments, AR city exploration, AR in-store exploration	Signaling theory	Perceived AR app experience (pleasure and playfulness), attitude toward the AR app, perceived brand personality	Consumer characteristics: innovativeness with information technology and shopping orientation	Virtual try-on and non-location AR apps generate higher pleasure and playfulness, which improve attitudes toward the AR app. Innovativeness with information technology and adventure-oriented shopping orientation strengthen positive effects on perceived brand personality
Alimamy and Gnoth (2022)	Furniture	Value co-creation	Perceived personalization, perceived trust, perceived risk, intention to co-create	Perceived value	Perceived personalization increases value co-creation intention in website-based shopping, but not in AR-based shopping. Perceived value conditions the relationship between personalization and perceived risk across both shopping modes
Sun *et al.* (2022)	3D suitcase, eyewear, desk lamp	Product uncertainty	Perceived informativeness, sense of presence, mental imagery, product uncertainty reduction (quality and fit), product attitude	Product involvement, need for sensory richness, self-brand connection	AR reduces quality and fit uncertainty via perceived informativeness, sense of presence, and mental imagery, which improve product attitude. Product involvement, need for sensory richness, and self-brand connection condition the links between perceived AR features and uncertainty reduction

(*continued*)

Table A1

Empirical study	AR context	Theory	Key construct(s)	Moderator(s)	Key finding(s)
Zanger *et al.* (2022)	Floor lamp, nail polish	Affect-as-information theory	Study 1: Enjoyment, inspiration, product attitude, purchase intention Study 2: Enjoyment, inspiration, brand attitude, purchase intention, WOM intention	Product knowledge and AR familiarity in Study 2	Study 1 shows that AR increases enjoyment and inspiration, which enhance product attitude and then purchase intention. Inspiration also shows a direct positive effect on purchase intention. Study 2 shows that AR increases inspiration but decreases enjoyment while AR familiarity conditions the effect of AR on enjoyment. Inspiration improves brand attitude and purchase intention while brand attitude increases purchase and WOM intention
Pfaff and Spann (2023)	Furniture	Perceptual and conceptual processing fluency	Processing fluency, perceived product quality, purchase intention	Design uniqueness of AR product, reduced perceptual salience of the AR context	Visually complex AR contexts reduce processing fluency, perceived product quality, and purchase intention. Design uniqueness and lower contextual salience mitigate these negative contextual effects
Khan and Fatma (2024)	E-commerce, eyewear	Brand engagement	Brand engagement, attitude towards the brand's AR app, brand co-creation, brand love, online review intention	Brand experience	Brand engagement increases brand love, brand co-creation, and online review intention via attitude toward the brand's AR app. Brand experience strengthens these indirect effects at higher levels of AR app experience
Soon and Lim (2025)	Eyewear, makeup	Stimulus-organism-response model and valence theory	Positive and negative emotions, desire to use AR, purchase decision involvement, purchase intention	Consumer characteristics: materialism, narcissism, personal innovativeness	Positive emotions increase desire to use AR try-on, which increases purchase decision involvement and purchase intention. Materialism and narcissism strengthen the effect of positive emotions on desire for durable products (eyewear)
Wang *et al.* (2025)	Lamp, sunglasses	Psychological ownership theory and flow theory	Perceived value (functional and emotional), flow experience, psychological ownership of product and technology	Perceived control	Functional value reduces psychological ownership of the product and the technology, whereas emotional value increases psychological ownership. Flow experience mediates the effects of perceived value on psychological ownership. Perceived control conditions the links between perceived value and psychological ownership
The present research	Makeup, furniture	Self-regulation theory	Hedonic and utilitarian attitude, desire to use AR	Normative social influence, informational social influence	AR strengthens hedonic attitude more than utilitarian attitude. Normative social influence weakens the attitude-to-desire relationship for a non-durable product (makeup), whereas informational social influence strengthens the relationship for a durable product (furniture). Hedonic and utilitarian attitudes increase desire to use AR

Note(s): AR = Augmented reality
Source(s): Authors' own compilation

Table A2 Profile of participants

Demographic	Category	Frequency ($n = 224$)	(% = 100)
Panel A: Study 1 (Sephora)			
Age	Below 20 years	161	71.9
	20–24 years	57	25.4
	25 years and above	6	2.7
Ethnicity	Chinese	162	72.3
	Malay	15	6.7
	Indian	11	4.9
	Others	36	16.1
Demographic	Category	Frequency ($n = 194$)	%
Panel B: Study 2 (Ikea)			
Age	25–29 years	28	14.4
	30–34 years	57	29.4
	35–39 years	64	33.0
	40–45 years	45	23.2
Ethnicity	Chinese	126	65.0
	Malay	35	18.0
	Indian	30	15.5
	Others	3	1.5
Gender	Female	148	76.3
	Male	46	23.7
Highest education	Secondary	5	2.6
	Undergraduate	113	58.2
	Postgraduate	76	39.2
Marital status	Single	65	33.5
	Married	126	65.0
	Divorced	3	1.5
	Separated	0	0.0
	Widowed	0	0.0
	Others	0	0.0
Monthly income	Less than RM2,500	13	6.7
	RM2,501–RM5,000	92	47.4
	RM5,001–RM7,500	59	30.4
	RM7,501–RM10,000	23	11.9
	More than RM10,000	7	3.6
Occupation	Junior executive	49	25.3
	Senior executive	68	35.0
	Professional	56	28.9
	Self-employed	5	2.6
	Unemployed	0	0.0
	Others	16	8.2

Note(s): US$1 = RM4.04 as of December 25, 2025
Source(s): Authors' own work

Table A3 Measurement items

Construct and items	Source
Hedonic attitude • Fun • Exciting • Delightful • Enjoyable	Voss *et al.* (2003)
Utilitarian attitude • Effective • Helpful • Functional • Practical	Voss *et al.* (2003)
Normative influence • It is important that others like the products and brands I buy • When buying products, I generally purchase those brands that I think others will approve of • If other people can see me using a product, I often purchase the brand they expect me to buy • I like to know what brands and products make good impressions on others • I achieve a sense of belonging by purchasing the same products and brands that others purchase • If I want to be like someone, I often try to buy the same brands that they buy • I often identify with other people by purchasing the same products and brands they purchase	Bearden *et al.* (1989)
Informational influence • To make sure I buy the right product or brand, I often observe what others are buying and using • If I have little experience with a product, I often ask my friends about the product • I often consult other people to help choose the latest alternative available from a product class • I frequently gather information from friends or family about a product before I buy	Bearden *et al.* (1989)
Desire • I want to use Sephora's / Ikea's virtual try-on / mobile website to select the right facial cosmetics / furniture in the near future • I desire to use Sephora's / Ikea's virtual try-on / mobile website to select the right facial cosmetics / furniture in the near future • I am eager to use Sephora's / Ikea's virtual try-on / mobile website to select the right facial cosmetics / furniture in the near future • My desire to use Sephora's / Ikea's virtual try-on / mobile website to select the right facial cosmetics / furniture in the near future can be described as (no desire–extremely strong desire)	Perugini and Bagozzi (2001)

Note(s): Measured on a 7-point Likert scale unless indicated otherwise
Source(s): Adapted from Bearden *et al.* (1989), Perugini and Bagozzi (2001), and Voss *et al.* (2003)

Table A4 Measurement model for study 1 (Sephora)

Construct	Convergent validity		Internal consistency		Discriminant validity				
	Factor loading	AVE	α	CR	Hedonic attitude	Utilitarian attitude	Normative influence	Informational influence	Desire to use AR
Hedonic attitude	0.905 (H1) 0.927 (H2) 0.921 (H3) 0.929 (H4)	0.848	0.940	0.957	*0.921*	[0.858]	[0.280]	[0.379]	[0.648]
Utilitarian attitude	0.918 (U1) 0.912 (U2) 0.841 (U3) 0.870 (U4)	0.785	0.908	0.936	0.792	*0.886*	[0.232]	[0.444]	[0.668]
Normative influence	0.804 (NI1) 0.854 (NI2) 0.859 (NI3) 0.828 (NI4) 0.898 (NI5) 0.783 (NI6) 0.833 (NI7)	0.702	0.929	0.943	0.264	0.218	*0.838*	[0.238]	[0.337]
Informational influence	0.800 (II1) 0.820 (II2) 0.860 (II3) 0.836 (II4)	0.688	0.849	0.898	0.342	0.388	0.203	*0.829*	[0.460]
Desire to use AR	0.942 (DES1) 0.945 (DES2) 0.916 (DES3) 0.847 (DES4)	0.835	0.933	0.953	0.608	0.618	0.318	0.418	*0.914*

Note(s): AVE = Average variance extracted. α = Cronbach's alpha. CR = Composite reliability. Numbers in italic on the diagonal are square roots of AVEs. Non-bold numbers below the diagonal are construct correlations. Non-bold bracketed numbers above the diagonal are heterotrait–monotrait (HTMT) ratios
Source(s): Authors' own work

Table A5 Measurement model for study 2 (Ikea)

	Convergent validity		Internal consistency		Discriminant validity				
Construct	**Factor loading**	**AVE**	α	**CR**	**Hedonic attitude**	**Utilitarian attitude**	**Normative influence**	**Informational influence**	**Desire to use AR**
Hedonic attitude	0.909 (H1) 0.931 (H2) 0.945 (H3) 0.938 (H4)	0.867	0.949	0.963	*0.931*	[0.776]	[0.105]	[0.292]	[0.693]
Utilitarian attitude	0.870 (U1) 0.914 (U2) 0.877 (U3) 0.842 (U4)	0.768	0.899	0.930	0.719	*0.876*	[0.101]	[0.129]	[0.692]
Normative influence	0.803 (NI1) 0.825 (NI2) 0.864 (NI3) 0.808 (NI4) 0.824 (NI5) 0.779 (NI6) 0.829 (NI7)	0.671	0.922	0.935	0.106	−0.064	*0.819*	[0.485]	[0.089]
Informational influence	0.714 (II1) 0.768 (II2) 0.852 (II3) 0.788 (II4)	0.612	0.789	0.863	0.257	0.121	0.438	*0.782*	[0.285]
Desire to use AR	0.885 (DES1) 0.923 (DES2) 0.877 (DES3) 0.854 (DES4)	0.783	0.907	0.935	0.646	0.631	0.091	0.247	*0.885*

Note(s): AVE = Average variance extracted. α = Cronbach's alpha. CR = Composite reliability. Numbers in italic on the diagonal are square roots of AVEs. Non-bold numbers below the diagonal are construct correlations. Non-bold bracketed numbers above the diagonal are heterotrait–monotrait (HTMT) ratios
Source(s): Authors' own work

About the authors

Pei-Shan Soon is an Assistant Head of Department of Marketing Strategy and Innovation and a Senior Lecturer of Sunway Business School at Sunway University, where she also served as the Program Leader for the Bachelor of Science (Honours) in Marketing. Her research focuses on augmented reality, artificial intelligence and digital marketing. She has presented at academic conferences by the *American Marketing Association* (AMA) and the *American Phygital Association* (APA) and published in reputed international journals such as *Journal of Business Research*, *Journal of Consumer Behaviour*, *Journal of Macromarketing*, *Journal of Services Marketing* and *Psychology and Marketing*. Prior to joining academia, she held a position as a marketing executive at a digital interactive agency, where she focused on marketing analytics and strategic planning.

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