

CONSUMER BRAND ENGAGEMENT: REFINED MEASUREMENT SCALES FOR PRODUCT AND SERVICE CONTEXTS

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ABSTRACT

Consumer brand engagement (CBE) has attracted significant attention amongst academics and practitioners; yet, myriad conceptualizations and operationalizations exist. This research conceptualizes Service-Dominant Logic-informed CBE as a consumer's psychological state and behavioral manifestations that occur through the process of value co-creation, involving resource integration and service exchanges in consumer-brand interactive service systems. This research develops and validates two CBE scales specifically for product and service brand contexts. The CBE scale refinement process resulted in a 29-item scale in product (smartphone) context that comprises of two dimensions: affection and reasoned behavior, and a 20-item scale in service (social media) context, which consist of four dimensions: affection, identification, absorption and social connection. The two refined scales demonstrate good psychometric properties. This research's findings offer managers and scholars insight on how consumers engage and experience services and products. This study provides an overview of theoretical and managerial implications.

Key words: consumer brand engagement, scale development, product brands, service brands, smartphone, social media.

1. INTRODUCTION

Over the past decade, studies that focus on consumer brand engagement (CBE) have received significant attention from both scholars and practitioners (Algharabat et al., 2020; Brodie, Löbler & Fehrer, 2019). CBE is characterized by interactions and/or interactive experiences between consumers, the focal brand, and other actors (Brodie et al., 2013; Hollebeek, Srivastava & Chen, 2019). Theoretically, CBE is established in service dominant (S-D) logic that emphasizes the narrative of value co-creation (Vargo & Lusch, 2016). S-D logic informed CBE features voluntary resource integration and mutual service exchanges by value co-creating actors in coordinated interactive service systems (Hollebeek et al., 2019; Vargo & Lusch, 2017).

The increased attention on CBE is influenced by the benefits firms accrue, including enhanced consumer-brand relations and positive firm performance reflected through customer retention, increase in sales, better competitive edge and profitability (Fernandes & Moreira, 2019; Hepola, Karjaluoto & Hintikka, 2017). Research shows that engaged consumers are an asset, as they directly and indirectly contribute value to the firm (Kumar et al., 2019). Engaged consumers are loyal repeat purchasers, who bring value to the firm and are dedicated to the brand beyond their acts of advocacy (Rosetta Consulting, 2014); thus, CBE is an important strategic focus for long term sustainability of firms.

Despite much attention on CBE and its contributions, research on the conceptualization and measurement of this concept remains highly debated, fragmented and inconsistent (Hollebeek et al., 2019; Islam & Rahman, 2016). Two factors may account for the disparity among conceptualizations: dimensionality (Islam et al., 2019) and measurement. With regard to dimensionality, some scholars conceptualize CBE as a unidimensional construct that is characterized by behavioral manifestations (Bergel, Frank & Brock, 2019; Dwivedi et al., 2016; van Doorn et al., 2010); however, CBE is mostly conceptualized as

multidimensional - comprising emotional, behavioral and cognitive dimensions (Bowden et al., 2017; Islam, Rahman & Hollebeek, 2018).

With regard to measurement, several scales have been developed and are used across a variety of contexts. Most CBE scales were developed in Western (Eurocentric) contextual cultures, neglecting a wider cultural view. Furthermore, most engagement scales were developed in service contexts (e.g. Dessart, Veloutsou & Morgan-Thomas, 2016; Hollebeek, Glynn & Brodie, 2014), yet are commonly generalized to product contexts (e.g. Brandão, Pinho & Rodrigues, 2019; Srivastava & Sivaramakrishnan, 2021).

This paper proposes that as products and services differ fundamentally due to the attributes of tangibility and intangibility, and as CBE is considered to be context-specific (Hollebeek et al., 2019), that the dimensions of CBE for product brands are different to those of a service brand context. The primary objective of this research is thus to develop multidimensional CBE scales that can be applied in product and service contexts, respectively.

This paper makes the following contributions. The first contribution is the advancement of empirical understanding of the measurement of CBE through a scale refinement process. Second, this research develops two CBE scales to be used in the product and service contexts respectively (in the technology sphere), to avoid the over generalization of service context scales in other contexts. Third, from a marketing practice perspective, this research provides managers with tools and insights about S-D logic informed CBE. The incorporation of S-D logic informed CBE to the firm's consumer engagement and consumer relationship management (CRM) strategies could assist managers to consider consumers as invaluable actors in the value co-creation process.

This paper is structured as follows. A literature review and theoretical framework exposition is followed by the methodology, item refinement and factorability and CBE scale

validation. The paper concludes with the discussion of theoretical and managerial implications, limitations and future research directions.

2. LITERATURE REVIEW

2.1 Consumer brand engagement (CBE)

Early research on CBE was inherently conceptual (Brodie et al., 2011; Gambetti, Graffigna & Biraghi, 2012; Hollebeek, 2011a). Different propositions were made and potential drivers and outcomes were identified (Hollebeek, 2011a, 2011b). Its theoretical establishment was explored, with S-D logic and relationship marketing emerging as key theoretical frameworks for its underpinning (Brodie et al., 2013; Vivek et al., 2014).

The Marketing Science Institute (MSI), since 2010, repeatedly has declared CBE as a vital research priority, and it remains one now (MSI, 2020). Indeed, research on CBE is cross-national with myriad studies being conducted in Australasia, Asia, Europe, the USA (as per the review by Islam & Rahman, 2016), and to a lesser extent in the non-Western world (e.g. Asante, Fang & Darko, 2020; Glavee-Geo et al., 2019; Maree & Van Heerden, 2021). Despite universal agreement on the importance of CBE, there are disparities with regards to its conceptualization.

2.1.1 Conceptualizations of CBE

There is no one consistent definition for CBE, as marketing scholars have differing perspectives on its nature, dimensions, and theoretical roots (Dessart, Veloutsou & Morgan-Thomas, 2015; Islam et al., 2019; Vivek et al., 2014). Table 1 presents an outline of prominent conceptualizations of CBE.

From Table 1 it can be inferred that the scope of conceptualizing CBE is broad, including defining CBE as a psychological state (Brodie et al., 2011; Hollebeek, 2011a; Mollen & Wilson, 2010), behavioral manifestations (Bergel et al., 2019; van Doorn et al., 2010), an ecosystem (Maslowska et al., 2016), a process (Bowden, 2009; Sashi, 2012), or

represented by cognitive, emotional and behavioral factors (e.g. Brodie et al., 2013; Hollebeek et al., 2014).

Early work by Van Doorn et al. (2010) present CBE as unidimensional, capturing only a behavioral element. Building upon Van Doorn et al.'s (2010) perspective, a majority of scholars conceptualizes CBE as a multi-dimensional construct that includes behavioral, affective, and cognitive elements (Brodie et al., 2013; Dwivedi, 2015; Gambetti et al., 2012; Hollebeek et al., 2014, 2019). Similarly, the practitioner's view considers the consumer's behavior, feelings and values (Rosetta Consulting, 2014).

These broader elements are represented in other CBE studies' (Baldus, Voorhees & Calantone, 2015; Dwivedi, 2015; So et al., 2016; Vivek et al., 2014) dimensions such as absorption, dedication, vigor, enthusiasm, attention, and social connection since overlap between the conceptualization of the various dimensions (and how they are measured) exist.

Thus, a majority of studies (e.g. Bowden et al., 2017; Hollebeek et al., 2019; Kumar et al., 2019; Oliveira & Fernandes, 2020) agree that CBE is a multidimensional construct that involves the consumer's behavioral involvement and psychological connection with the brand rather than a unidimensional approach that focuses on only behavioral manifestations (So et al., 2014).

Based on this conclusion, this research proposes an integrated definition of CBE as a *consumer's psychological state and behavioral manifestations that occur through the process of value co-creation involving resource integration and service exchanges in consumer-brand interactive service systems.*

2.1.2 Considering context

Extant literature shows that CBE is context specific; thereby substantiating the varying conceptualizations and scales amongst scholars (Ferreira, Zambaldi & Guerra, 2020). The nature of the context and contextual conditions influences CBE levels (Brodie et al., 2011;

Hollebeek et al., 2019). The context-specificity of CBE is illuminated through the development of several context-specific scales (Islam & Rahman, 2016) including tourism (So et al., 2014), social media (Hollebeek et al., 2014), online brand communities (Balduš et al., 2015; Dessart et al., 2016), and retail and technology contexts (Vivek et al., 2014).

However, despite the common feature of multidimensionality, there is still lack of consensus on the key dimensions to measure CBE in specific contexts. This paper argues that context should play an important role in the CBE scale development process.

The frequent occurrence of generalizing scales that were developed in service contexts (Hollebeek et al., 2014) to product contexts (e.g. Hepola et al., 2017; Nyadzayo, Leckie & Johnson, 2020) is questionable considering that products and services are different in reference to the value created by the tangible and intangible attributes (Kuijken, Gemser & Wijnberg, 2017).

The intangible and tangible characteristics inherently found in a service or product affect the extent to which a consumer interacts with or experiences the particular product or service. Significantly, the consumers might not see the value of intangible elements of a product nor the tangible elements of a service (Kuijken et al., 2017). Yet, Ding and Keh (2017) assert that consumers may evaluate a service brand based on tangible and intangible aspects. This paper suggests that dimensions to measure CBE for product and service contexts may vary due to the intangibility and tangibility elements of the respective contexts.

The scale refinement process used in this study combined and refined three prominent, multi-dimensional and widely used CBE scales (Hollebeek et al., 2014; So et al., 2014; Vivek et al., 2014) to develop two CBE scales specifically for product and service contexts.

The focal contexts included smartphone (product) and social media (service) brands. The smartphone context was chosen because consumers interact with and use mobile phone

devices everywhere for multitasking purposes, which allows for improvement in productivity as people can complete tasks on the go (Deloitte, 2017). Accordingly, smartphones enable consumers to communicate and participate in online activities including online banking, social media, information gathering and for entertainment (Wang, Xiang & Fesenmaier, 2016). The social media context was chosen as it is an interactive tool used for various purposes (Ngai, Tao & Moon, 2015). Additionally, social media provides an ecosystem for online communities to flourish (Dessart, 2017) and has transformed consumers from being passive to active participants who share valuable information with brands, resulting in value co-creation (Dolan et al., 2016). It may also be argued that value co-creation is facilitated more easily in the online environment (Barger et al., 2016; Schivinski et al., 2016).

3. THEORETICAL FRAMEWORK

There is consensus CBE involves mutually beneficial interactions (Pansari & Kumar, 2017; Rosetta Consulting, 2014) between a subject (consumer) and a focal object (brand, other consumers, website, brand community and others) (Brodie et al., 2019; Dwivedi, 2015; Storbacka et al., 2016). The consumer and other actors - including the brand - exist in an interactive service ecosystem that is governed by institutions and their arrangements (rules and norms of engagement) (Alexander, Jaakkola & Hollebeek, 2018).

Consumers provide resources beyond transactional exchanges, leading to augmented offerings and value outcomes that benefit all parties including the focal firm and/or other stakeholders (Jaakkola & Alexander, 2014). Accordingly, engaged consumers are inclined to invest many resources in brand interactions, thereby co-creating value through service exchange (Hollebeek et al., 2019).

S-D logic presents a cohesive framework that considers service-for-service exchange as central to the narrative of value co-creation, and re-envision(s) service(s) as a process rather

than an “... intangible-unit-of-output” (Vargo & Lusch, 2017, p. 47). S-D logic has five axioms that can be summarized as follows: 1) the fundamental root of exchange lies in service; 2) multiple actors (inclusive of the beneficiary) co-create value; 3) social and economic parties are considered to be resource integrators; 4) the beneficiary determines the value; and 5) actor-generated institutions and their arrangements coordinate co-creation of value (Vargo & Lusch, 2017).

The conceptualization of CBE in this research acknowledges the *process of value co-creation* inclusive of *integration of resources* and *service exchanges* within *consumer-brand* relationships, and asserts that CBE expresses both *psychological* and *behavioral* relations, in agreement with the widely-held multi-dimensional view of CBE. Moreover, the research favors a *context-specific* approach. This conceptualization relates to the axioms of S-D logic, as it concurs with the alignment of various co-creating actors as integrators in the consumer-brand relationship (axioms 2, 3 and 5), considers co-creation as a process rooted in service exchange across different contexts (axiom 1), and sees the consumer’s (beneficiary’s) psychological and behavioral manifestations as arising from value co-creation (axiom 4).

Accordingly, the scale refinement process was approached from a multi-dimensional view, considering the roles played by actors such as the consumer, their peers, and the organization as represented by the brand. Additionally, the source measures used for the refinement aligned with our conceptualization of CBE. Therefore, S-D logic informed both the conceptualization of CBE in this paper, and also the scale refinement process.

4. METHODOLOGY

This study considered the measures of three scale developing studies including Hollebeek et al. (2014), So et al. (2014) and Vivek et al. (2014) for the scale refinement process. These

three studies' scales were chosen because their focal engagement object was the brand, they are the initial CBE scales following conceptual studies (Brodie et al., 2011, 2013; Hollebeck, 2011a, 2011b; Vivek, Beatty & Morgan, 2012), measured CBE in different contexts (e.g. social media, tourism, retail and technology brands), and are often adopted in CBE research.

The 10-item scale by Hollebeck et al. (2014), which has been adopted most often in CBE research (Fernandes & Moreira, 2019; Harrigan et al., 2018; Hepola et al., 2017; Islam et al., 2019) relative to other CBE scales, represent three dimensions: affection, cognitive processing and activation.

The 25-item CBE scale by So et al. (2014) has mostly been adopted in tourism studies (Harrigan et al., 2017; Rasoolimanesh et al., 2019; So et al., 2016), and feature five dimensions: absorption, attention, enthusiasm, identification, and interaction. Three dimensions are conceptualized in Vivek et al.'s (2014) 10-item CBE scale (conscious attention, enthused participation, and social connection). This scale was developed considering retail and technology contexts, and has also been adopted in other studies (Ferreira et al., 2020; Rather, Hollebeck & Islam, 2019).

4.1 Scale development

The CBE dimensions of the source scales represent elements of the broader psychological and behavioral dimensions of CBE. The dimensions overlap in conceptualization (for example So et al.'s *attention* and Vivek et al.'s *conscious attention*), as do some items. A thorough review of the dimension definitions, the items and the literature supporting these, led to the generation of the preliminary item pool consisting of 41 items. These represent 10 CBE dimensions as proposed by the sources, as well as a new behavioral dimension capturing consumers' behavioral manifestations developed from an industry report (Rosetta Consulting 2014). Refer to Table 2.

The preliminary item pool and the dimensions they represent (as drawn from the source scales), were considered in reference to our conceptualization of CBE. The initial dimensions displayed in Table 2 fit the psychological (mental) state (cognitive processing, affection, conscious attention, enthusiasm, absorption, and identification) and behavioral (activation, social connection, interaction, and behavioral) aspects of our view.

All 41 items were reviewed and revised to assess a consumers' engagement with a focal brand. Consistent with scale development practice, seven experts who are academic members of staff from the Department of Marketing Management (subject experts) and Human Resource Management (scale development experts) evaluated the 41-item pool for clarity, redundancy, face validity and conciseness (DeVellis, 2012; Worthington & Whittaker, 2006). In evaluating the items, experts responded (*not working, maybe and yes*) to seven questions: (De Klerk, 2014) a) Do the definitions of different dimensions mirror the overall definition of CBE? b) Are the definitions of the different dimensions clear and comprehensible? c) Is the content of the items reflective of the dimension they represent? d) Are there poorly worded items? e) Are there any double-barreled items? f) Are there problematic items that are not easy to understand?, and g) Are there ambiguous items? In addition to rating each item, experts provided open-ended comments for each item. The feedback of the experts was analyzed and problematic items identified. Based on the feedback, some items required revision to align them to the set definitions of the CBE dimensions, to split double-barreled items into two items, and to clarify items that were unclear. This process led to deletion of three items and addition of seven items. The experts deemed the three deleted items to be unrepresentative of their particular dimensions (social connection, conscious attention, enthusiasm). Further, the experts suggested that items needed to be added to the behavioural and interaction dimensions in order to improve validity. Subsequently, four items for behavioural and three for interaction was added. The four behavioural items added focused

on how consumers engage behaviourally with the brand, while the three interaction items captured how consumers interact with the brand.

Further, after careful consideration, we revisited the wording of the items to ensure simpler language that is more easily understandable and could be relevant to smartphone (product) as well as social media (service) brands. We also re-assessed each item and the dimension it represented to decrease ambiguity. A substantial overlap was found between interaction and social connection dimension items, and these were merged into one-dimension, social connection. The resultant set of items was subsequently used in the refinement study.

5. STUDY 1: ITEM REFINEMENT AND SCALE FACTORABILITY

The primary objective of study 1 was to explore how the CBE structure will realize within two contexts of smartphone (product) and social media (service); symbolizing tangible and intangible attributes in reference to the product-service continuum.

5.1 Study 1 Methodology

Study 1 involved an online survey of smartphone and social media users to assess their respective CBE. We specified the sample profile as South African residents with equal gender presentation. Qualtrics, a market research company, used convenience-sampling techniques to identify participants from their panel and hosted the surveys from their online servers. Prior to participating in the survey, each participant gave an informed consent to voluntarily participate in the study, with an opt-out option at any point of the survey. A total of 420 smartphone and 428 social media responses were received.

The survey consisted of three sections: a) introduction to the study, informed consent, screening questions and the options of preferred smartphone or social media brands that respondents own/use; b) the 45 CBE 5-point Likert statements 1 (strongly disagree) to 5

(strongly agree) randomized to avoid common method biases (Podsakoff et al. 2003), and c) demographic information including age, gender and ethnicity.

For both samples, the realized gender distribution was relatively equal (smartphone 50% each; social media 49.3% male, 50.7% female) and the majority of respondents were¹ Black Africans (50.7% smart phone; 50.5% social media), followed by White (32.9% and 30.6%), Colored (11% and 12.4%), and Indian/Asian (5.5% and 6.1%).

The three top smartphone brands are: Samsung (40%), Huawei (26%), and Apple (16%); five other brands (Sony, Nokia, LG, Xiaomi, Microsoft) were each mentioned by less than 3% of participants; 10% mentioned “other brands.” The three top social media brands are: Facebook (54%), Instagram (21%), and YouTube (14%); two other brands (Twitter and LinkedIn) were mentioned by 7% and 4%, respectively.

5.2 Analyses

EFA (Principal Axis Factoring) with Promax rotation were used to extract the dimensions of CBE for the two samples. The study used oblique rotations (Promax) because they allow factors to correlate relative to orthogonal techniques that yield uncorrelated factors (Osborne, 2014). The factors and items relative to each factor were determined using the following sequence: (a) total variance explained by each factor; (b) eigenvalues (>1); (c) scree test (d) communalities (>.5); (e) deletion of cross loadings and items below 0.5; (f) inter-item correlations. Reliability was determined through Cronbach’s Alpha and composite reliability (CR).

5.3 Study 1 Results - smartphone

5.3.1 EFA Results: smartphone sample

The data were factorable, as evidenced by a KMO of 0.973 and the significant Bartlett’s test of sphericity ($p=0.000$). Initially, the EFA resulted in three factors with eigenvalues above

¹ The ethnic classification is according to Statistics SA’s framework.

one, explaining 66.49% of the total variance. A review of the scree test, communalities and the pattern matrix (factor loadings < 0.5), resulted in the removal of 16 items. We reran the EFA on the 29 items and two factors emerged explaining 64.22% of total variance. Factor 1 (20 items) explained 55.52% and Factor 2 (9 items), 8.70% of the variance.

After establishing the factor structure of CBE in the smartphone context, the factors were given meaningful names that reflect their features (Hair et al., 2014). In naming the factors, consideration was given to items with higher loadings in each factor (Neill, 2008). The following names with specific descriptions were given to the factors:

- **Reasoned Behavior (RB)** - refers to consumers' level of brand-related sustained active mental states and behavioral manifestations in specific brand interactions.
- **Affection (AFF)** - A consumer's passionate positive feelings towards a focal brand in specific consumer-brand interactions (Hollebeek et al. 2014).

These two dimensions relate to our conceptualization of CBE in that they represent both psychological (cognition and affection) and behavioral aspects of the consumer's brand engagement. Table 3 shows the loadings on the two factors.

Considering the final factor structure that emerged, the items that were removed based on the results of the first EFA appear to be redundant as the retained items loaded strongly and cleanly on one of two final factors, and there are sufficient items per factor. Items were removed as they double-loaded or were below the cut-off point of 0.5. These included three for cognitive processes (Hollebeek et al. 2014), two for enthusiasm, one for absorption (So et al. 2014), and the items representing the behavioral dimension derived from the Rosetta Consulting industry report (Rosetta Consulting 2014). We surmise that these items did not load due to a lack of theoretical fit, and also the possible influence of the research context, which is different from the contexts where these scales were developed.

5.3.2 Reliability and Validity

The measurement properties of the scale were analyzed for reliability, convergent- and discriminant validity. The results for reliability and convergent validity show that the CBE dimensions are reliable, with the Cronbach's alpha (RB=0.969; AFF=0.938) and CR scores (RB=0.963; AFF=0.944) above the recommended minimum 0.7 (Hair et al., 2014). The AVE scores (RB=0.568; AFF=0.657) exceed the recommended minimum level of 0.5 (Fornell & Larcker, 1981), demonstrating convergent validity.

Discriminant validity is determined by comparing the AVE scores with the squared correlation between a pair of constructs in the measurement model (Wepener & Boshoff, 2015). The squared correlations between the two dimensions were below the AVE scores (Fornell & Larcker, 1981) indicating discriminant validity for these two dimensions. Thus, the two-factor 29-item CBE scale was then adopted for validation in Study 2.

5.4 Study 1 Results – social media

5.4.1 EFA Results: social media sample

The KMO (0.943) and significant ($p=0.000$) Bartlett's test of sphericity indicated suitability of factor analysis. Following the same process as in section 5.3.1, 25 items were deleted. Four factors emerged with 20 items explaining 62.88% of the total variance. Factor 1 has seven items (46.16% variance); Factor 2 has six items (8.66% variance); Factor 3 has four items (4.55% variance), and Factor 4 has three items (3.51% variance).

Subsequently, we reviewed the items to establish how they are associated with the previously conceptualized dimensions. New factors were labelled as per the same process used for the smartphone sample. Factor 1 included items from social connection and behavioral dimensions. The social connection items had higher loadings as compared to the behavioral items, thus the factor is labelled social connection. Factor 2 consisted of items from affection, cognitive processing and enthusiasm dimensions. It was labelled affection because the affection items loaded highest. The items of Factors 3 and 4 represented the

identification and absorption dimensions (respectively) as previously conceptualized. The following are the labels of the factors with specific descriptions:

- **Social connection (SC):** Social connection refers to participation of connected and networked actors to co-create value in specific brand interactions (Gambetti et al., 2012; Hollebeek et al., 2019; Vivek et al., 2014).
- **Affection (AFF):** A consumer's passionate positive feelings towards a focal brand in specific consumer-brand interactions (Hollebeek et al. 2014).
- **Identification (ID):** The extent to which a consumer perceives self as one with or belonging to the brand (So et al., 2014).
- **Absorption (ABS):** A consumer's state of deep immersion, complete concentration to the extent of losing track of time when interacting with the object of engagement (Dwivedi 2015; So et al., 2014).

The four dimensions found here relate to our conceptualization of CBE in the following manner: the consumer's psychological states are primarily represented by affection, identification and absorption; whereas social connection span both psychological and behavioral aspects. Table 4 presents the final 20 items loaded onto their respective factors. In Table 4 it can be seen that for the final four-factor structure that emerged, the retained items loaded strongly and independently on the respective factors. Similar to the findings in the smartphone sample, the items retained in the factor structure appears to represent the dimensions found adequately. Similar to the smartphone context, several items from the previous published scales were removed as they double-loaded or were below the cut-off point. The deleted items included two for cognitive processes, three for activations (Hollebeek et al. 2014), five for attention, one for social connection (Vivek et al. 2014), two for absorption and four for enthusiasm (So et al. 2014). Similar to the smartphone context, most of the behavioral items derived from Rosetta Consulting (2014) did not load, perhaps

due to a lack of theoretical fit. It may be that the sample, which consisted of African respondents, may have a different engagement experience of the brand than the Western samples used for the development of the source scales.

5.4.2 Reliability and Validity

The reliability (Cronbach's α : SC=0.916, AFF=0.898, ID=0.880, AB=0.817; CRs: SC=0.901, AFF=0.885, ID=0.854, AB=0.777) and convergent validity (AVEs: SC=0.569, AFF=0.568, ID=0.598, AB=0.538) results were acceptable. Similarly, the results demonstrated discriminant validity.

6. STUDY 2: CBE SCALE VALIDATION

This study follows the best practices of scale development (Worthington & Whittaker, 2006) through conducting a CFA to validate the scale after initially assessing it through an EFA. CFAs were conducted using Mplus in order to confirm the dimensionality of the scales (Muthén & Muthén, 2017) in two contexts (smartphone and social media). The following fit indices were used to assess model fit: RMSEA (Root Mean Square Error of Approximation) < 0.08; CFI (Comparative Fit Indices) and TLI (Tucker Lewis Index) >0.9; SRMR (Standardized Root Mean Square Residual) < 0.08; Chi-square value (χ^2); Degrees of freedom (df); Scaling Correction Factor for MLM; Satorra-Bentler χ^2 /df ratio < 3 (Hair et al., 2014; Malhotra, 2010).

For the validation studies, two new convenience samples of adult South African respondents were drawn from the Qualtrics panel. Respondents provided informed consent and then voluntarily completed online-self completion surveys representing smartphone and social media contexts, respectively. Prior to data collection, pilot studies were conducted for each sample, to assess the feasibility of the main study through establishing the suitability

and effectiveness of the sample frame (Eldridge et al., 2016). The realized sample sizes were 503 for smartphone, and 491 for social media.

The Study 2 surveys consisted of three sections: a) introduction, informed consent, screening questions, and the options of preferred smartphone or social media brands; b) CBE measure (smartphone: 29 items; social media: 20 items) on 5-point Likert scale statements, ranging from 1 (strongly disagree) to 5 (strongly agree), randomized to avoid common method biases, and c) demographic information including age, gender, home language and population group.

The gender distribution was almost equal (male 50.3%, female 49.7% for both samples). The respondent pools were ethnically diverse as the majority of respondents were Black Africans (43.7% smart phone; 43.2% social media), followed by White (36.8% and 36.1%), Colored (11.7% and 13.8%), Indian/Asian (6.8% and 5.1%).

The three most preferred smartphone brands were Samsung (39%), Huawei (27%) and Apple (18%), with HTC, LG, Microsoft, Nokia, Sony and Xiaomi representing less than 2% each of the remainder, and “Other” brands 8.3%. Facebook (47%) was the most preferred social media brand, followed by YouTube (22%), Instagram (19%), Twitter (9%), and LinkedIn (3%).

6.1 Confirmatory factor analyses (CFAs)

The refined scales from Study 1 present CBE as a second-order construct: smartphone dimensions include reasoned behavior and affection; social media dimensions feature absorption, social connection, identification and affection.

The Kolmogorov-Smirnov and the Shapiro-Wilk tests were statistically significant for items in both data sets, which indicates that the data did not exhibit univariate normality and models could not be estimated using maximum likelihood (ML). Thus, the MLM estimator that produces parameter estimates with standard errors and a mean-adjusted chi-square test

statistic (the Satorra-Bentler chi-square), which are robust in cases of non-normality (Muthén & Muthén 2017), was used.

6.1.1 Confirmatory factor analysis results: Smartphone sample

A CFA was conducted on the proposed two-dimensional, 29-item CBE scale. The model fit results considered in aggregate (RMSEA=0.065, CFI = 0.919, TLI = 0.913, SRMR = 0.053, $\chi^2=1194.004$, $df=376$, $\chi^2/df=3.17$), show acceptable model fit.

6.1.2 Reliability and validity

The validity and reliability results for the measurement model are presented in Table 5. Table 5 shows factor loadings greater than 0.5 and statistically significant (Hair et al., 2014), and there is sufficient evidence of internal consistency reliability and convergent validity. Additionally, there is sufficient evidence of discriminant validity as the AVEs (AFF=0.856; RB=0.768) for each dimension is greater than the squared correlation between the two dimensions (0.597). These results confirm the validity of the CBE scale in the smartphone context.

6.1.3 Confirmatory factor analysis results: social media sample

A CFA was conducted on the proposed four-dimensional, 20-item CBE scale, and the model fit results (RMSEA=0.047, CFI = 0.954, TLI = 0.946, SRMR = 0.049, $\chi^2=344.078$, $df=376$, $\chi^2/df=2.1$) show acceptable model fit.

6.1.4 Reliability and validity

The validity and reliability results for the measurement model is presented in Table 6. The results in Table 6 show that all factor loadings are > 0.5 and statistically significant, and there is sufficient evidence of internal consistency reliability. Only the AVE for social connection is slightly below the 0.5 threshold; therefore holistically, the results indicate adequate evidence of convergent validity.

There is evidence of discriminant validity with the exception of identification and social connection, thus these were further examined for discriminant validity with the procedure suggested by Shiu et al. (2011). As the MLM estimator is utilized, the Satorra-Bentler Chi-square difference test is used. The results are presented in Table 7. The difference in Chi-square value exceeds 3.84 in all instances, suggesting that the pair of constructs being tested are distinct from one another, indicating discriminant validity. There is thus sufficient evidence to confirm the validity of the CBE scale in the social media context.

A summative comparison of the two scales developed in this research, and those of the source scales used for the refinement process, is presented in Table 8. Table 8 shows that psychometric properties of the scales developed in this study compare well to the source scales utilized in the scale refinement processes.

7. DISCUSSION AND IMPLICATIONS

Our conceptualization of CBE supports the extant literature's broader perspective of CBE as a multidimensional construct characterized by psychological and behavioral elements (Hollebeek et al., 2019), and the paper has shown how these elements are reflected by the sub-dimensions. Hence, this research presents a complete view of CBE, which incorporates the consumer's state of mind, emotions and actions. However, the composition of these dimensions and their meaning in this research are distinct from those in prior studies (Hollebeek et al., 2014; So et al., 2014; Vivek et al., 2014), advancing the on-going discussion about the dimensionality of CBE.

As prior research has been reliant on fragmented theoretical establishment of CBE (Hollebeek et al., 2019), this research proposes an S-D logic informed CBE definition, thereby supporting the association between CBE and S-D logic in the growing CBE/S-D

logic theoretical development research. Our conceptualization of CBE emphasizes the S-D logic's narrative of value co-creation as a central component of the CBE definition, and acknowledges multi-actor resource integration and service exchange processes within the consumer-brand relationship.

Existing research on CBE predominantly present a Western (Eurocentric) view, and tend to generalize scales developed in service contexts to product brand contexts. Following a rigorous scale refinement process adapted from Churchill (1979) and DeVellis (2012), this research developed two multi-dimensional CBE measures for product (smartphone) and service (social media) contexts, both showing internal consistency reliability and validity. By developing measurement tools for two distinct brand contexts, this research answers calls for the development of a valid CBE measure that can be used across different contexts (Islam & Rahman, 2016) in a novel manner. The goal of this research is not to further fragment CBE research through presenting two CBE scales, but to provide stability on the measurements to use in particular contexts. Theoretically, this research therefore provides direction and understanding about the measurement of CBE in product and service contexts.

The scales, developed in an African context, present a much-needed non-Western measurement perspective on CBE, which is lacking in extant literature. Consequently, they provide a broader international scope to the CBE academic conversation as they extend beyond Eurocentric views. The sub-dimensions found for each of the scales can assist managers in focused strategic planning for brand engagement for product- and service brands. Additionally, measuring CBE as a first-order construct allows the examination and prediction of brand-related outcomes specific to the sub-dimensions.

It should be noted that the scales as presented in this research self-evidently reflect the specific context under study (e.g. smartphone or social media). Although the refinement process had a focus on the technology sphere, we believe that the scales are suitable for use in

contexts beyond technology brands. To test and improve generalizability into other brand categories within the product or service contexts beyond technology brands, the items are adaptable. For example, should research on supermarket retailers (thus service context) be conducted, the Absorption item “Time flies when I am on [X]” could be adapted as “Time flies when I am shopping at [X]”.

The study findings have important managerial implications. First, this paper provides managers with a conceptualization of CBE theoretically established in S-D logic, highlighting value co-creation between consumers and the brand. This view proposes that managers should consider consumers as active value co-creators with the brand, whose input is valuable. In addition, this article posits that managers should view CBE from a psychological and behavioral perspective, which would enable them to have a holistic understanding of the thoughts, feelings and actions of engaged consumers. This emphasizes that managers should include CBE as a central focus in their marketing strategies.

This research also provides managers with two validated multidimensional CBE scales to assess consumers’ engagement with a brand in a product or service context. The scales allow firms to measure and quantify the extent at which the consumer engages the brand. Consequently, these scales offer managers valuable tools to gauge the levels of CBE over a period and to gain insights about the dynamic consumer-brand relations in product and service contexts.

This study found that consumers engage product and service brands differently. For the product brand context, consumers engage the brand through affection and reasoned behavior. Whereas, for the service brand context, consumers engage the focal brand through affection, absorption, identification and social connection. These findings highlight the significance of context in CBE research for brand managers. This insight could be used to inform, evaluate and benchmark the effectiveness of the firm’s CBE and CRM strategies. From a marketing

communication perspective, the dimensions of CBE in a particular product or service brand context should allow practitioners to fine-tune communication messages to align with the dimension of CBE that is prevalent in a particular market segment.

7.1 Implications for product brands

This paper recommends the development of marketing strategies and programs of action that focus on the enhancement of consumers' affection and reasoned behavior toward the product brand. Consumers who engage the brand in these ways are valuable to the firm as their emotional attachment and cognitive connection may likely translate to positive actions. Accordingly, managers can create reciprocal marketing initiatives that draw the consumer's positive feelings, enthusiasm, love, thoughts and action towards the brand. Managers could conduct CBE surveys frequently to inform their strategies on product innovation and improvement.

Despite the significance of the brand in the product context, this research suggests that consumers seem to have a propensity to engage more with the tangible (functionalities/utilities of the smartphone) attributes of a product than the intangibles (brand name). The brand name may be secondary in the product context, as the primary engagement focus is the utility delivered by the product. Therefore, informed by consumers' input, it is important for brand managers of products like smartphones to deliver quality products with utility functions that enhance the reputation of the brand. Brand managers in product contexts are faced with a challenge to invest in consumer-brand systems that will enhance consumers' affection and reasoned behavior.

7.2 Implications for service brands

For a service brand context, managers could focus on enhancing the four CBE dimensions (affection, absorption, identification and social connection) when developing CBE strategies. To enhance affection, an emotional relationship between the brand and its consumers has to

be created, through brand awareness programs that incorporate consumer learning, development of brand knowledge and delivering quality service that leaves a positive feeling in the consumer. Further, the strategy of the firm could be to get consumers absorbed in the brand through collaborative marketing activities. Such activities can enable consumers to integrate their resources and engross themselves with the brand resulting in value co-creation.

In addition, managers need to build a reputable brand identity that consumers are able to identify with, which differentiates the brand from competitors. Effective marketing communication is key in this regard. Firms could benefit from consumers who identify with the brand because they act as brand ambassadors, who invest their resources (for example, buying firm branded merchandise) to align their individual and social identities with the brand's image. Additionally, firms need to provide social connection platforms for consumers to participate and network with other actors about the brand. The platforms can be in the form of online brand communities, brand fan clubs, brand networks, brand forums and others that allow consumers to participate and connect socially around the brand. Assessing the social connection dimension, managers gain insight about the consumers' network in the engagement process.

Overall, the proposed CBE scales contribute value to the firm (particularly in the technology space), as they enable managers to measure the effectiveness of CRM strategies, the levels at which consumers engage with the brand and provide insight on the different dimensions of CBE. Summarily, as a strategic indicator of success for firms, this study recommends regular measurement of CBE using the proposed validated multidimensional scales for product and service brand contexts. Results of such measurements should strengthen strategic decision-making and direct targeted communication plans.

8. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Despite its theoretical and practical contributions, this research also has a number of limitations. First, convenience sampling was used; therefore, the results of this research are not generalizable. Second, this research is cross-sectional in nature; hence, the results only capture a snapshot of CBE at a single point in time. Thus, future research studies on CBE could follow a longitudinal research design, as consumer perceptions about particular brands can change over time depending on the state of the relational exchanges between the consumer and the brand.

Third, the CBE scales for this research only focus on positive facets of CBE, thus future studies may consider developing a CBE scale that has negative aspects, as that would provide insight about the impact of negative brand engagement towards firm performance. Fourth, the two CBE scales require further validation in other nomological networks including other brand related constructs in product and service brand contexts, as well as validation in other cultures, especially non-Western. For example, future research could test the product scale in non-technological contexts such as clothing brands, and the service scale in the restaurant or retail contexts. Such studies will assess the scales' generalizability beyond the smartphone and social media contexts. Fifth, future research studies may also consider investigating the influence of CBE on firm performance. Sixth, despite establishing CBE on S-D logic, future research studies should continue advancing the theoretical development of S-D logic and CBE, or consider other theoretical views.

In conclusion, this research developed and validated two CBE scales for use in the product and service brand contexts respectively. This paper suggests a context-specific multidimensional view of CBE established in S-D logic, which provides a complete perspective of the construct for application in academia and practice.

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Table 1: Conceptualizations of CBE

Source	Term	Definition	Dimensions / facets	Approaches / contexts	Theoretical view
Brodie et al. (2011, p. 260)	Consumer engagement	“Psychological state that occurs by virtue of interactive, co-creative consumer experiences with a brand in focal service relationships”.	Cognitive, Emotional, Behavioral.	Conceptual paper	Service-dominant logic
Brodie et al. (2013, p. 107)	Consumer engagement	“A multi-dimensional concept comprising cognitive, emotional and/or behavioral dimensions, and plays a central role in the process of relational exchange where other relational concepts are engagement antecedents and/or consequences in iterative engagement processes within the brand community”	Cognitive, Emotional and Behavioral.	Service (online brand community); Western (New Zealand)	Service-dominant logic
Dessart et al. (2016, p. 409)	Consumer engagement (brand and community)	"the state that reflects consumers' individual dispositions toward engagement foci, which are context-specific. Engagement is expressed through varying levels of affective, cognitive, and behavioural manifestations that go beyond exchange situations".	Affective, Cognitive, Behavioral with sub-dimensions: Enthusiasm, Enjoyment, Attention, Absorption, Sharing, Learning, Endorsing.	Scale development; Service (online brand communities); Western (European).	Social identity theory
Dwivedi (2015, p. 100)	Consumer brand engagement	“Consumers’ positive, fulfilling, brand-use-related state of mind characterized by vigour, dedication and absorption”	Vigor, Dedication, Absorption.	Product (mobile phones); Eastern (India)	Not specified
Gambetti et al. (2012, p. 668)	Consumer brand engagement	“Multi-dimensional concept that combines elements including attention, dialogue, interaction, emotions, sensorial pleasure and immediate activation which is aimed to create a complete brand experience with consumers”.	Cognitive, emotional and conative, experiential, social.	Grounded theory approach, practitioner's views; Western (Italy)	Not specified

Hollebeek (2011a, p. 790)	Customer brand engagement	“The level of an individual customer’s motivational, brand-related and context dependent state of mind characterized by specific levels of cognitive, emotional and behavioral activity in brand interactions.”	Cognitive, Emotional, Behavioral.	Conceptual paper	Not specified
Hollebeek et al. (2014, p. 151)	Consumer brand engagement	“A consumer’s positively valenced cognitive, emotional and behavioral brand-related activity during or related to specific consumer/brand interactions”	Affection, Cognitive processing, Activation.	Scale development; Service (social media); Western (New Zealand)	Consumer culture theory, S-D logic, relationship marketing
Hollebeek et al. (2019, p.166)	Customer engagement	“A customer’s motivationally driven, volitional investment of focal operant resources (including cognitive, emotional, behavioral and social knowledge and skills), and operant resources (e.g., equipment) into brand interactions in service systems.”	Cognitive, Emotional, Behavioral and Social	Conceptual paper	Service-dominant logic
Maslowska, Malthouse and Collinger (2016, p. 469)	Consumer engagement ecosystem	“A conceptual model that encompasses brand action, other actors, customer brand experience, shopping behaviours, brand consumption and brand dialogue behaviours”	Components: customer brand experience, brand dialogue behaviors, brand consumption, shopping behaviors.	Conceptual paper	S-D logic, stakeholder theory, regulatory fit theory, uses-and-gratifications theory.
Mollen and Wilson (2010, p. 922)	Online engagement	“Consumer’s cognitive and affective commitment to an active relationship with the brand as personified by the website or other computer mediated entities designed to communicate brand value.”	Active cognitive processing, Instrumental value, Experiential value.	Conceptual paper (practitioner and academic views)	Stimulus-organism-response model
Rather (2019, p. 119)	Consumer engagement	“CE can thus be defined as the emotional bond established between consumer and brand, as a consequence of the accumulation of consumer experiences that assumes a favorable and proactive psychological state.”	Psychological, emotional and behavioral	Hospitality industry-hotels (India)	Social exchange theory and expectation disconfirmation theory

Rosetta Consulting (2014, p. 3)	Customer engagement	“A personal connection between a consumer and a brand that is strengthened over time, resulting in mutual value”.	Not specified	Industry white paper (practitioner view); Product and service brands (variety); Western (United States)	Not specified
Sashi (2012, p. 264)	Consumer engagement	A process that converts consumers into fans by progressing through the stages of the consumer engagement cycle.	Engagement cycle stages: connection, interaction, satisfaction, retention, loyalty, advocacy, engagement.	Conceptual paper (practitioner views)	Not specified
So, King and Sparks (2014, p. 311-312)	Customer engagement	“CE is defined as a customers’ personal connection to a brand as manifested in cognitive, affective, and behavioral actions outside of the purchase situation.”	Enthusiasm, Attention, Absorption, Interaction, Identification.	Scale development; Service (tourism - hotel and airline brands); Western (Australia)	Regulatory engagement theory, Social identity theory.
van Doorn et al. (2010, p. 253)	Consumer engagement behaviors	“Customers’ behavioral manifestations toward a brand or firm beyond purchase resulting from motivational drivers”	Valence, Form or modality, Scope, Nature of its impact, Customer goals.	Conceptual paper	Not specified
Vander Schee, Peltier and Dahl (2020, p. 243)	Online consumer engagement	“A multi-dimensional consumer–brand relational construct incorporating affective, cognitive, and behavioral elements of consumer–brand interactions that may originate from consumer-to-consumer or brand-generated experiences.”	Affective, cognitive and behavioral	Conceptual paper	Not specified
Vivek et al. (2014, p. 406)	Customer engagement	“The level of the customer’s (or potential customer’s) interactions and connections with the brand or firm’s offerings or activities, often involving others in the social network created around the brand/offering/activity.”	Conscious attention, Enthused Participation, Social Connection.	Scale development; Product (Apple brand products) and service (retail brands); Western (United States)	Service-dominant logic
This study	Consumer brand engagement	A consumer’s psychological state and behavioral manifestations that occur through the process of value co-creation involving resource integration and service exchanges in consumer-brand interactive service systems.	<i>Product context:</i> affection, reasoned behavior. <i>Service context:</i> affection, identification, absorption, social connection.	Scale development; Product (smartphones) and service (social media); African (South Africa)	Service-dominant logic

Table 2: Preliminary pool: Sources, dimensions and number of items

Source	Dimensions	Definitions	Items
Hollebeek et al. (2014)	Cognitive processing	"A consumer's level of brand-related thought processing and elaboration in a particular consumer/brand interaction".	Using [brand X] gets me to think about [brand X]
			I think about [brand X] a lot when I'm using it.
			Using [brand X] stimulates my interest to learn more about [brand X]
	Affection	"A consumer's degree of positive brand-related affect in a particular consumer/brand interaction"	I feel very positive when I use [brand X]
			Using [brand X] makes me happy
			I feel good when I use [brand X]
			I'm proud to use [brand X]
	Activation	"A Consumer's level of energy, effort and time spent on a brand in a particular consumer/brand interaction".	I spend a lot of time using [brand X], compared to other [category] brands.
			Whenever I am using [category], I usually use [brand X].
[Brand X] is one of the brands I usually use when I use [category]			
Vivek et al. (2014)	Conscious attention	"The degree of interest the person has or wishes to have in interacting with the focus of their engagement."	I like to learn more about [brand X]
			I pay a lot of attention to anything about [brand X]
			I keep up with things related to [brand X]
			Anything related to [brand X] grabs my attention.
	Social connection	"Enhancement of the interaction based on the inclusion of others with the focus of engagement, indicating mutual or reciprocal action in the presence of others."	I love using [brand X] with my friends
			I enjoy using [brand X] more when I am with others
			I will attend any social event organised by [Brand X]
			When I want to know more about [Brand X], I go to the brand's social media pages.
			I share my knowledge about [Brand X] with other users of the brand
So et al. (2014)	Enthusiasm	"An individual's strong level of excitement and interest regarding the focus of engagement, such as a brand"	I feel excited about the brand
			I am heavily into [brand X]
			I am passionate about [brand X]
			My days would not be the same without [brand X]
			I love this brand
			I am enthusiastic about the brand
	Absorption		When I am interacting with the brand, I forget everything else around me

		"A pleasant state which describes the customer as being fully concentrated, happy, and deeply engrossed while playing the role as a consumer of the brand"	Time flies when I am interacting with the brand
			When I am interacting with the brand, it is difficult to detach myself
			When I am interacting with brand, I get carried away
	Identification	"The degree of a consumer's perceived oneness with or belongingness to the brand"	When someone criticises this brand, it feels like a personal insult
			When I talk about this brand, I usually say we rather than they
			This brand's successes are my successes
			When someone praises the brand, it feels like a personal compliment
	Interaction	"A customer's online and off-line participation with the brand or other customers outside of purchase"	I like to get involved in discussions about [Brand X]
			I am someone who enjoys interacting with other [brand X] users
			I thoroughly enjoy exchanging ideas with [brand X] users
Rosetta Consulting (2014)	Behavioral	"A personal connection between a consumer and a brand that is strengthened over time, resulting in mutual value".	I appreciate it when this brand reaches out to me
			I usually respond to this brand's promotional offers
			I generally upgrade regularly or purchase additional services from the brand
			I usually try a new product or service from the brand as soon as it becomes available
			I spend more money on this brand even when a competitor has a lower price

Table 3: EFA Pattern Matrix (Study 1 - Smartphone)

	Factors	
	1	2
	Reasoned behavior	Affection
I am proud to use [X] smartphone		0.901
[X] is one of the brands I usually use when I use a smartphone		0.895
I feel very positive when I use [X] smartphone		0.884
I spend a lot of time using [X] smartphone, compared to other smartphone brands		0.859
Whenever I am using a smartphone, I usually use [X]		0.832
I feel good when I use [X] smartphone		0.829
Using [X] smartphone makes me happy		0.803
I love [X]		0.632
I recommend [X] to friends and family members		0.602
When I talk about [X], I usually say “we” rather than “they”	0.894	
I forget everything else around me when I am using my [X] smartphone	0.887	
[X]’s successes are my successes	0.847	
In general, I like to get involved in discussions about [X]	0.842	
When someone criticises [X], it feels like a personal insult	0.831	
I participate in activities around [X]	0.799	
I concentrate on [X] when I am using my smartphone	0.793	
I am usually absorbed when I am using my [X] smartphone	0.788	
I get carried away when I am using [X] smartphone	0.774	
I like to actively participate when people talk about [X].	0.770	
I enjoy [X] smartphone more when I am with others	0.767	
It is difficult to separate myself from the brand when I am using [X] smartphone	0.760	
When someone praises [X], it feels like a personal compliment	0.739	
I exchange ideas with other people about [X]	0.722	
I keep up with things related to [X]	0.669	

I am deeply into [X]	0.659	
I pay a lot of attention to anything about [X]	0.656	
I am passionate about [X]	0.616	
I appreciate it when [X] reaches out to me	0.590	
I like to learn more about [X]	0.561	

Table 4: EFA Pattern Matrix (Study 1 - social media)

	Factors			
	1	2	3	4
	Social connection	Affection	Identification	Absorption
I feel good when I use [X]		0.872		
I am proud to use [X]		0.860		
I feel very positive when I use [X]		0.824		
Using [X] makes me happy		0.734		
Using [X] stimulates my interest to learn more about [X]		0.637		
I love [X]		0.535		
When someone praises [X], it feels like a personal compliment			0.908	
When someone criticises [X], it feels like a personal insult			0.795	
When I talk about [X], I usually say “we” rather than “they”			0.760	
[X]’s successes are my successes			0.599	
Time flies when I am on [X]				0.781
I am usually absorbed when I am on [X]				0.735
I get carried away when I am on [X]				0.680
I exchange ideas with other people about [X]	0.871			
In general, I like to get involved in discussions about [X]	0.822			
I participate in activities around [X]	0.759			
When [X] initiates discussions online, I take part	0.756			
I like to actively participate when people talk about [X]	0.749			
I use additional functions from [X]	0.668			
I respond to [X]'s promotional offers	0.627			

Table 5: Construct validity and reliability for smartphone measurement model (Study 2)

Constructs and items	Estimate	p-value	t-value	S.E. Est.	AVE	Cronbach α	Composite reliability
Affection					0.733	0.960	0.961
AFF1	0.902	0.0001	80.400	0.011			
AFF2	0.901	0.0001	75.305	0.012			
AFF3	0.901	0.0001	63.908	0.014			
AFF4	0.916	0.0001	91.861	0.010			
AFF5	0.781	0.0001	36.218	0.022			
AFF6	0.757	0.0001	29.378	0.026			
AFF7	0.788	0.0001	38.165	0.021			
AFF8	0.892	0.0001	56.325	0.016			
AFF9	0.850	0.0001	50.613	0.017			
Reasoned behavior					0.590	0.965	0.991
RB1	0.815	0.0001	49.496	0.016			
RB2	0.760	0.0001	33.631	0.023			
RB3	0.811	0.0001	43.356	0.019			
RB4	0.778	0.0001	42.953	0.018			
RB5	0.832	0.0001	52.653	0.016			
RB6	0.831	0.0001	59.870	0.014			
RB7	0.701	0.0001	31.552	0.022			
RB8	0.743	0.0001	36.818	0.020			
RB9	0.755	0.0001	35.521	0.021			
RB10	0.785	0.0001	47.866	0.016			
RB11	0.687	0.0001	28.630	0.024			
RB12	0.750	0.0001	40.729	0.018			
RB13	0.795	0.0001	41.253	0.019			
RB14	0.696	0.0001	28.763	0.024			
RB15	0.826	0.0001	56.639	0.015			
RB16	0.815	0.0001	50.177	0.016			
RB17	0.764	0.0001	31.574	0.024			
RB18	0.757	0.0001	33.207	0.023			
RB19	0.715	0.0001	29.176	0.024			
RB20	0.723	0.0001	28.711	0.025			

Note: Statistically significant at $p < 0.01$, two-tailed; AVE: Average variance extracted; AFF= Affection; RB= Reasoned behavior

Table 6: Construct validity and reliability for social media measurement model (Study 2)

Constructs and items	Estimate	p-value	t-value	S.E. Est.	AVE	Cronbach Alpha	Composite reliability
Affection					0.600	0.897	0.900
AFF1	0.702	0.0001	26.159	0.027			
AFF2	0.786	0.0001	38.702	0.020			
AFF3	0.812	0.0001	44.419	0.018			
AFF4	0.812	0.0001	36.910	0.022			
AFF5	0.741	0.0001	26.885	0.028			
AFF6	0.787	0.0001	34.462	0.023			
Absorption					0.548	0.782	0.784
ABS1	0.784	0.0001	26.522	0.030			
ABS2	0.720	0.0001	23.658	0.030			
ABS3	0.714	0.0001	21.794	0.033			
Identification					0.519	0.809	0.969
ID1	0.696	0.0001	22.569	0.031			
ID2	0.700	0.0001	22.263	0.031			
ID3	0.688	0.0001	21.286	0.032			
ID4	0.792	0.0001	28.587	0.028			
Social connection					0.485	0.868	0.868
SOC1	0.774	0.0001	36.938	0.021			
SOC2	0.755	0.0001	34.407	0.022			
SOC3	0.664	0.0001	21.557	0.031			
SOC4	0.708	0.0001	28.216	0.025			
SOC5	0.709	0.0001	26.539	0.027			
SOC6	0.649	0.0001	21.812	0.030			
SOC7	0.602	0.0001	18.947	0.032			

Note: statistically significant at $p < 0.01$, two-tailed; AVE: Average variance extracted; AFF: Affection; ABS: Absorption; ID: Identification; SOC: Social connection.

Table 7: Assessing discriminant validity for re-estimated model using the Satorra-Bentler Chi-square difference test

Construct pairs	Scaling factor freely estimated Model	Scaling factor fixed model	df free	df fixed	χ^2 free	χ^2 fixed	Satorra-Bentler Scaled Chi-Square	df	p- value
Identification and Social connection	1.377	1.386	43	44	89.697	215.196	98.564	1	0.0001

Table 8: Summative comparison of this study and the refinement source scales

	This study		Hollebeek et al. (2014)	So et al. (2014)	Vivek et al. (2014)	
	Product	Service				
No of items	29	20	10	25	10	
Dimensions (items)	Affection (9) Reasoned behavior (20)	Affection (6) Identification (4) Absorption (3) Social connection (7)	Affection (4) Cognitive processing (3) Activation (3)	Absorption (6) Attention (5) Enthusiasm (5) Identification (4) Interaction (5)	Conscious attention (3) Enthused participation (4) Social Connection (3)	
Context of development	Smartphones	Social media	Social media	Tourism services	Apple products and retailers	
Cultural context	Non-Western (African)	Non-Western (African)	Western (New Zealand)	Western (Australia)	Western (USA)	
Fit indices						
χ^2/df ratio	3.17	2.10	3.65	2.55	Apple: 2.05	Retail: 1.80
RMSEA	0.065	0.047	0.069	0.08	Apple: 0.07	Retail: 0.06
CFI	0.919	0.954	0.981	0.94	Apple: 0.99	Retail: 0.99
TLI / GFI / NFI²	TFI: 0.913	TFI: 0.946	GFI: 0.956	TLI: 0.94	NFI: Apple: 0.98	Retail: 0.98
SRMR	0.053	0.049	0.034	0.046	<i>Not reported</i>	

² Fit indices reported differed across the studies.