Antecedents and Consequences of Brand Engagement in Social Networks: A Meta-Analysis

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Abstract

In the wake of the Internet's proliferation, social media platforms have emerged as sophisticated interactive tools, empowering brands to fortify their engagement and cultivate deeper relationships with customers, transcending geographical boundaries. While consumer engagement with brands via social media channels has evolved into a norm for a segment of the audience, the exploration of the precursors and repercussions of such brand interactions presents a formidable challenge for marketers. Consequently, the necessity to undertake a study that rigorously and methodologically evaluates the findings of extant research in this domain is paramount. This study aims to amalgamate the empirical outcomes of various hypotheses derived from antecedent research in the realm of brand engagement, employing a meta-analytical approach. Adhering to the protocols of systematic and methodical review, an initial assessment was conducted on all pertinent studies concerning brand engagement. Of these, 64 studies fulfilled the criteria stipulated by the algorithm. Subsequent to identifying the antecedents and consequences of brand engagement, the statistical data from the vetted studies were extracted using CMA2 software, yielding distinct effect sizes for each variable. The research findings elucidate that the antecedents of brand engagement encompass perceived communications, brand community dynamics, gamification strategies, the overall brand experience, customer engagement levels, and various social influencers. In contrast, the consequences of brand engagement manifest as heightened customer loyalty, augmented electronic word-of-mouth, reinforced repurchase intentions, elevated trust, enhanced satisfaction, improved quality of brand relationships, increased brand equity, and robust brand advocacy.

Keywords: Brand Engagement, Social Networks, Effect Size, Meta-Analysis.

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Introduction

The intense competitive landscape, coupled with the proliferation of product and brand choices, alongside the burgeoning development of digital technologies, has impelled marketers to acknowledge that customer contributions to brands and companies extend far beyond mere transactional purchases (Hung et al, 2023). In the current market milieu, which is distinctly shaped by rapid technological progressions and the omnipresence of social media, corporations are afforded the opportunity to foster engagements with their clientele beyond the traditional confines of brick-and-mortar purchasing environments, such as through blogging or participation in virtual communities. This paradigm shift enables customers to seamlessly interact not only with the brands themselves but also engage with fellow consumers beyond the direct utilization of brand services (Miao et al, 2023). In this evolved scenario, the consumer's role transcends the act of acquisition, encompassing activities like advocating the brand to potential customers, voicing their experiences and perceptions of the brand or company on various social media platforms, or contributing insights and feedback regarding the company's array of products or services (Khan & Fatma, 2024).

The contemporary paradigm of interaction between consumers and enterprises on social media and various digital platforms signifies a transformative shift in the marketing landscape. (Lee et al, 2023). In contrast to previous decades, where online brand managers predominantly relied on pull or push strategies to augment brand growth, the present-day challenge for corporations encompasses fostering profound brand engagement and facilitating synergistic collaborations with consumers. Essentially, these entities are endeavoring to cultivate dynamic, interactive relationships with their clientele to intensify brand engagement. (Marmat, 2021) This novel marketing epoch emphatically highlights the imperative for corporations to not only retain their customer base but also to metamorphose these individuals into fervent brand advocates or, in more colloquial terms, staunch brand champions (Kumar et al., 2022).

Indeed, the consumers' intent to pursue objectives that are either beneficial, hedonistic, or social in nature through their active engagement with brands paves the way for more seamless brand integration. This process consequently mitigates perceived risks and cultivates a foundation of trust (Hung et al, 2023). As such, the quintessence of brand engagement, setting it apart from other relational constructs such as involvement and commitment, becomes increasingly paramount. Hence, given the escalating consumer participations and the associated leverage of brand bargaining power, the significance of brand engagement in today's market is more pronounced than ever before (Tran Xuan et al, 2023).

In the past several years, there has been a marked escalation in interest surrounding the concept of brand engagement, culminating in the introduction of various nuanced forms of engagement, such as customer engagement, customer-brand engagement, and customer engagement behaviors (Lee et al, 2023). This trend underscores the increasingly pivotal role of brand engagement. Brand engagement is essentially conceptualized as a psychological state that manifests through the customer's dynamic and innovative interactions with a central entity or object (for instance, a particular brand) within the ambit of service-oriented relationships (Daoud et al, 2023).

Studies conducted in the year 2021 reveal that enterprises exhibiting robust brand engagement are characterized by reduced customer acquisition costs and an elevated customer lifetime value, both of which are integral to the sustenance of long-term organizational prosperity. Furthermore, in the milieu of the pandemic, a significant majority of the firms that attained high rankings on the customer engagement index surpassed their projected revenue targets. This phenomenon highlights the distinct competitive edge that customer engagement with a brand confers upon enterprises (Hung et al, 2023).

Since the onset of the 2000s, with the initial conceptualization of brand engagement as a distinct construct within the realm of marketing literature, a plethora of scholarly inquiries have been undertaken by leading experts to dissect its multifaceted impacts. For instance, Goldsmith and colleagues (2011), employing an integrative mixed-method research paradigm, delved into the interplay between materialistic inclinations and brand engagement as catalysts for consumer purchasing motivations. Their findings elucidated a positively correlated nexus between the inclination to purchase and the integration of brand engagement within the consumer's self-concept and materialistic values, ostensibly elucidating the positive linkage between brand engagement and purchasing propensities. In a similar vein, Killian and associates (2017) harnessed a quantitative methodology to scrutinize the influence of brand engagement on the nature of social media posts, discerning that brand-centric posts, crafted by corporations, wield significant sway over consumer behaviors on platforms like Facebook, with interactive posts emerging as the pivotal stimulants for brand engagement behaviors. Advancing into more contemporary research landscapes, the narrative has evolved. For example, Hegberg and colleagues (2019) embarked on an exploration into the genesis of brand engagement through the prism of gamified customer experiences within brick-and-mortar retail environments. Their research shed light on how gamification imbues a hedonic value to consumer activities, an effect that can be partly attributed to its affirmative influence on brand engagement dynamics.

This investigation embraced an approach grounded in the utilization of extensive data sets, while in a separate analysis, Berlow and colleagues (2020) delved into the influence of virtual reality (VR) posts by brands on the dynamics of brand engagement. Their findings revealed that the allure of products is significantly amplified within the VR domain, thereby eliciting a pronounced emotional response from consumers and subsequently enhancing their engagement with the brand. Moreover, McLin and associates (2022) embarked on a thorough examination of the implications of voice assistants, equipped with artificial intelligence, on the modulation of brand engagement. Their research deduced that interactions between consumers and brands, mediated through artificial intelligence, substantially affect the level of engagement with the brand as well as the consumers' intentions regarding brand usage. The methodologies adopted in these studies were predominantly quantitative in nature, underscoring a discernible divergence in the research approaches employed.

In the existing corpus of studies, there are discernible deficiencies. For instance, in certain analyses, the construct of brand engagement has not been meticulously measured, and the statistical data have been ineffectively extracted and inadequately reported. Further, some

studies have employed less than optimal statistical methodologies, with a notable lack of consideration for both validity and reliability. Variations and occasional inaccuracies in sample sizes and sampling methodologies are also evident across different studies. A predominant reliance on covariance-based software is observed in the majority of these investigations. Comparative analysis of these studies reveals variances in outcomes, suggesting the existence of a potential moderating factor. Despite the growing propensity for employing meta-analysis in academic literature, a distinct void remains in research specifically targeting brand engagement within social networks, with existing studies primarily oriented towards temporal empirical mapping over intervals of 2 to 3 years, aimed principally at bridging gaps in the theoretical framework of this field. This underscores a pronounced research gap in this realm. Considering the enhanced precision afforded by meta-analysis over primary studies, this research is centered on leveraging this technique and utilizing the CMA2 software to determine the effect sizes of identified factors. Thus, the research endeavours to resolve the query: What are the predominant antecedents and consequences associated with brand engagement in social networks?

1.1. Theoretical Framework
1.1.1. Social Media and Branding

Social media are "a group of web 2.0 technology-based applications that allow the creation of user-generated content". In fact, social media are recognized as interactive and participatory media (Juliana et al, 2023). This interaction facilitates online engagement and has altered the way individuals engage and communicate with each other and with companies and brands, directly linking companies and brands with consumers in a bidirectional manner. Consumers are not only recipients of content but also active creators of brand information, brand value, and influencers. Consequently, power has shifted from brands to consumers, and brand owners no longer have complete control over the content of their brand messages. This shift has led to numerous challenges and opportunities for companies (Chahal et al, 2020).

Social media platforms, defined as "a suite of Web 2.0 technology-driven applications that enable the generation of user-centric content," (Chung et al., 2021) are recognized as inherently interactive and participatory digital mediums. Scholars such as Desart (2017), Frimpong et al. (2018), McManus et al. (2020), and Farhat et al. (2021) have underscored their role as transformative communication channels. These platforms have significantly redefined online engagement dynamics, altering the conventional modes of interaction and connection among individuals, as well as between consumers and corporations or brands. This evolution has established a bidirectional conduit between brands and their consumers, as highlighted by Farhat et al. (2021). In this digital ecosystem, consumers have transcended the role of mere content recipients to become active contributors and influential arbiters of brand information and brand value. This paradigm shift has effectively redistributed the locus of power from brands to consumers, challenging brand owners' traditional hegemony over the narrative and dissemination of their brand messages. This transformation has consequently precipitated an array of challenges and opportunities for corporate entities, as identified by McManus et al. (2020).

1.1.2. Factors Influencing Brand Engagement in social media

Engagement has been scrutinized hrough the lenses of multiple academic disciplines, encompassing marketing, management, organizational behavior, education, sociology, psychology, information systems, and political science. Although a diversity of terminologies has been employed to delineate various facets of participation (e.g., customer engagement, consumer involvement, employee engagement) and interaction aspects (e.g.,brand engagement,organizational commitment), they all converge on a similar conceptual notion, applicable across a spectrum of different entities. (Juliana et al, 2023)

The construct of engagement, particularly within the marketing discipline, has seen a significant surge in scholarly interest, primarily post-2005 (Hollebeek, 2011). This heightened focus is attributed to the fact that brand engagement embodies a relational framework, capturing the intricate and interactive essence of the consumer-brand relationship. (Odoom et al., 2017)

In the realm of marketing literature, three distinct methodological approaches have emerged in the conceptualization of the brand engagement construct. A segment of researchers, exemplified by Hollebeek & Chen (2014), espouse a more constrained perspective, categorizing engagement as a unidimensional construct, encompassing either cognitive, affective, or behavioral dimensions. Conversely, other scholars, such as Loureiro et al (2017), advocate for a bidimensional understanding of brand engagement. The third strand of this intellectual discourse includes studies adopting a more expansive viewpoint, as demonstrated by the works of Khan et al. (2016) and McLin (2018). These studies characterize engagement as a multifaceted construct, integrating

cognitive, affective, and behavioral dimensions. This approach delineates the dimensions of brand engagement as "the degree of a consumer's motivational mental state in relation to a brand, anchored in the cognitive realm of the consumer, and is invoked by distinct levels of cognitive, affective, and behavioral activities during interactions with the brand.

In essence, brand engagement represents a dynamic and recurrent process within the context of brand service relationships, contributing significantly to brand value creation. Cognitive activities, for example, denote the extent of consumer engagement and concentrated attention on the brand. Affective activities epitomize the generation of positive emotional responses during consumer interactions with the brand. Behavioral activities encompass actions that extend beyond direct commercial transactions (such as generating referrals, engaging in word-of-mouth promotion, blogging, making recommendations, composing reviews, and providing customer ratings), all of which bolster the marketing endeavors of a company. (Syrjälä et al., 2020)

The most holistic approach is attributed to So et al (2021). They advocate a multifaceted perspective on brand engagement, which encapsulates five distinct components, spanning cognitive, affective, and behavioral activities. These elements comprise: Identification (reflecting the consumer's sense of belonging and attachment to the brand), Enthusiasm (indicating the consumer's excitement and interest in the brand), Level of Attention (pertaining to the consumer's focused engagement and connection with the brand), Absorption (relating to the consumer's level of concentration, immersion, and engagement with a brand), and Interaction (encompassing the consumer's active participation with the brand or other

consumers in the sharing and exchange of information).

1.1.3. Brand Engagement

Engagement is universally acknowledged as an integral aspect of consumer behavior. Despite the diversity in its definitions, there is a consensus among researchers that engagement is intrinsically tied to individual communication dynamics. Zaichkowsky (1994) articulates engagement as "an individual's perceived relevance of the object, grounded in their inherent needs, values, and interests." (Farhat et al., 2020) In a similar vein, Celsi and Olson (1988) posit that "the intensity of a consumer's involvement with an object, situation, or action is contingent upon the extent to which they personally resonate with that concept." (Chung et al., 2021)

The concepts of brand engagement and brand involvement are inextricably linked, both serving as relational variables that prognosticate consumer behavior. Nonetheless, there exist nuanced distinctions in their conceptualization: while the former is generally defined within the realms of cognitive, affective, or motivational levels, or in relation to perceived connectivity, the latter is characterized by encompassing cognitive, affective, and behavioral dimensions, a heightened level of commitment, and an interactive, dynamic relationship. (Gomez et al., 2019)

2.Research Methods

The process of conducting a systematic review can be delineated as a meticulous scrutiny of extant evidence, pivoting around a delineated query. This approach encompasses methodical and unambiguous procedures for the identification, selection, and critical examination of pertinent research. These steps facilitate the extraction, comprehensive analysis, and subsequent incorporation of data into the review. This methodological paradigm is inherently replicable, grounded in scientific rigor, and epitomizes transparency. Its primary objective is to rigorously curtail bias across the spectrum of literature explorations. (Rosado & Louriero, 2020). Systematic reviews are conducted based on meticulously defined transparent protocols, encompassing detailed elements such as the specific research questions the study aims to address, the targeted population or sample group that forms the study's focus, the strategic methodologies employed for identifying pertinent studies, and the evaluative criteria applied in analogous research endeavors. (So et al., 2021).

This investigation confines the temporal scope of brand engagement analysis to a 15-year span (2009-2023), aiming to meticulously track the progression of knowledge and pinpoint pivotal concepts. The year 2009 was selected as the commencement point, marking a seminal shift in the domain of customer management research, as evidenced by the Third Thought Leadership Conference on Customer Management in 2009, which significantly galvanized the field of brand engagement research. This epochal conference also served as the catalyst for the special issue on content marketing, as published in the Journal of Service Research (Verhoef et al., 2010). The year 2009 is frequently cited as the foundational juncture for extensive research in brand and customer engagement. (Hao, 2020) The subsequent chart delineates the quantity of relevant studies commencing from the year 2009.
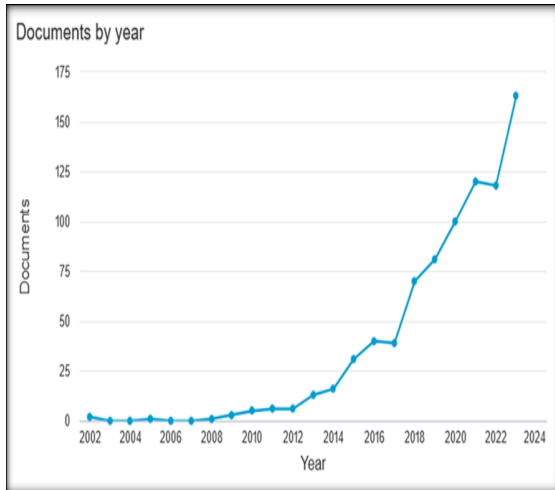
Chart 1: Number of Articles Published on Brand Engagement in a
Database Years 2002 to 2023 (Source: Scopus Database)

As is discernible from the data, there exists a pronounced upward trajectory in the publication of articles, emphatically underscoring the critical necessity for undertaking research focused on brand engagement within the realm of social networks.

2.1. Research strategy

In its quest to elucidate the antecedents and ramifications of brand engagement, this scholarly endeavor commenced by pinpointing "brand engagement" as the pivotal keyword, derived from the core research query. In an effort to circumvent potential biases in citation and study selection, a carefully curated ensemble of six preeminent databases was selected: ScienceDirect, Emerald, SagePub, ProQuest, Wiley, and Taylor & Francis. These repositories were judiciously chosen due to their significant aggregation of studies featuring this critical keyword, coupled with their renowned stature in the academic sphere from a qualitative perspective. Furthermore, to obviate any inherent biases of the researcher in the selection

process of pertinent studies, a meticulously developed standard protocol was employed. This protocol was extracted from the scholarly work titled "Systematic Review and Meta-Analysis Studies Protocol: A Global Researchers Survey," authored by Tawfik et al. (2020), which boasts an impressive 6360 citations, thereby lending it considerable academic gravitas.

In accordance with this meticulously formulated protocol, any research that failed to disclose essential statistical metrics (such as the statistical sample size, validity, and reliability indices including composite reliability, mean, and variance), correlation coefficients, among other pertinent statistical parameters, or those that did not adhere to rigorous statistical methodologies, were systematically excluded. Furthermore, this protocol also excluded all qualitative and mixed-methodology studies that either neglected to report statistical metrics or erroneously utilized the construct of customer engagement measurement in lieu of brand engagement for the validation of their research hypotheses. Pursuant to this stringent protocol (as depicted in Figure 2), from an initial pool of 499 studies focusing on brand engagement, a mere 66 studies were deemed suitable for inclusion in the comprehensive analytical framework.

3.Results and Discussion

In the scope of this investigation, from the meticulously curated collection of 66 studies, there comprised 3 doctoral theses, 1 master's thesis, and 64 scholarly articles published across the designated databases. Moreover, the aggregated statistical sample under examination tallied up to 24,485 individuals, of which 13,242 were male and 11,243 female. Considering the research problem and objectives, all studies were inherently focused on social networks, with a

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breakdown revealing 27 studies dedicated to brand pages on Facebook, 11 investigations centered around Instagram, and 28 studies conducted within web-based environments. In the analytical segment, the research methodologies utilized included 37 studies employing Partial Least Squares (PLS) software, 23 studies utilizing Analysis of Moment Structures (AMOS), and 6 studies applying the Statistical Package for the Social Sciences (SPSS). Thus, it is evident that covariance-based analytical techniques have garnered significant prominence in this research domain. The ensuing table meticulously encapsulates all the descriptive data pertaining to the studies undertaken.

Table 1- Description of the research sample

Indicator	Factor	Number	Percent	total
type of study	PhD Thesis	3	4.5%	
	Senior thesis	1	1.5%	64 Study
	Article	60	94%	
Gender of the statistical population	Female	11243	45.5%	24485 People
	Man	13242	54.1%	
Study base	Facebook	27	40.9%	
	Instagram	11	16.6%	64 Study
	Web	26	42.5%	
Type of software for analysis	PLS	37	56%	
	AMOSE	21	34.8%	64 Study
	SPSS	6	9.3%	

Furthermore, in alignment with the insights gleaned from the chosen scholarly texts, the discerned antecedents and consequences of brand engagement have been concisely aggregated in the subsequent table. It is pertinent to note that a portion of these studies encompassed discussions on both dimensions, whereas others concentrated exclusively on either one.

Table2- Antecedents and Consequences of Brand Engagement in Social Networks

	Identified factors	Source (screened studies)
Antecedents	Perceived relevance	(Álvareza et al, 2020) (Cillán et al, 2017) (Gómezet al, 2019) (McLean, 2018) (Razmus et al, 2017) (Leckie et al, 2021) (Florenthal, 2019) (Cheung et al, 2021) (Hanaysha, 2021) (Odoom et al, 2017) (Bezy et al, 2019) (Kumar et al, 2019) (Godinho et al, 2018) (Adhikari et al, 2019) (Simon et al, 2016) (Ramon et al, 2021) (Hamzah et al, 2021) (Haverila et al, 2020) (Islam et al, 2020) (Hsieh et al, 2020) (Touni et al, 2020)[1] (Farhat et al, 2021) (Guizon et al, 2021) (Oliveir et al, 2021) (Nefretiri Cooley-Broughton, 2022) (Loureiro et al, 2018)
	Brand Community	(Chahal et al, 2020) (Gómez et al, 2019) (Farhat et al, 2020) (Laurence, 2017) (Leckie et al, 2022) (Dessart et al, 2019) (Farhataet al, 2020) (Dessart et al, 2019) (Cheung et al, 2022) (Hanaysha, 2021) (Lin et al, 2016) (Bazi et al, 2020) (Kumar et al, 2019) (Adhikari et al, 2019) (Simon et al, 2019) (Kumar, 2020) (Gupta,et al, 2018) (Haverila et al, 2020) (Islam et al, 2020) (Bhattachary & Anand, 2020) (Brandão et al,2019) (Tawfik et al, 2020) (Ranjbaran et al, 2022) (Samala & Katkam, 2020)

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	Gamification	(Hollebeek and Macky, 2019) (McLean, 202) (Syrjäläa et al, 2020) (Farhat etal, 2020) (Dessart et al, 2019) (Hanaysha, 2021) (Marmat, 2022) (Adhikari et al, 2019) (Lin et al, 2016) (Gupta,et al, 2018) (Haverila et al, 2020) (Brandão et al, 2019) (Bhattachary & Anand, 2020) (Taiminen & Ranaweera, 2019) (Syrjälä et al, 2020) (Jami et al, 2021)
	brand experience	(Leckie et al, 2022) (Farhataet al, 2020) (Kumar et al, 2019) (Wong & Merrilees, 2015) (Van Doorn et al, 2010) (Sara et al, 2016)
	Customer Engagement	(Cheung et al, 2022) (Chahal et al, 2020) (Florenthal, 2019) (Dessart et al, 2019) (Cheung et al, 2021) (Marmat, 2022) (Adhikari et al, 2019) (Simon et al, 2016) (Bhattachary, Anand, 2020) (Hao, 2020) (Frimpong & McLean, 2018) (Arianna McKay, 2017) (Cheung et al, 2022) (Gómez et al, 2019) (Högberg et al, 2019)
	Social Factors	(Agnès et al, 2019) (Cooley-Broughton, 2022) (Huerta-Álvarez et al, 2020) (Jami Pour et al, 2021) (Kumar et al, 2022) (Marmat, 2022) (Oliveira & Fernandes, 2020) (McManus et al, 2020) (Samala and Katkam , 2020) (Zeph et al, 2023) (Anita & Pranay, 2021) (Brandão et al, 2019) (Brodie et al, 2011) (Farhat et al, 2020) (Frimpong & McLean, 2018)
Consequences	Loyalty	(Anita & Pranay, 2021) (Dhaoui & Webster, 2021) (Bazi et al, 2020) (Bhattachary & Anand, 2020) (Islam et al, 2018) (Farhat et al, 2020) (Kumar, 2021) (Vikas & Kaushik, 2020) (Zeph et al, 2023) (Sprott et al, 2009) (Adhikari et al, 2019) (Simon et al, 2019) (Kumar, 2020) (Gupta,et al, 2018) (Haverila et al, 2020)
	Electronic Word-of-mouth	(Farhat et al, 2020) (Frimpong & McLean, 2018) (Gómez et al, 2019) (Hamzah et al, 2021) (Harinder Hari etal, 2021) (Högberg et al, 2019) (Hollebeek et al, 2019) (Huerta-Álvarez et al, 2020) (Islam et al, 2018) (Arianna McKay, 2017) (Bazi et al, 2020) (Bhattachary & Anand, 2020) (Bilro et al, 2018) (Brandão et al, 2019) (Verhoef et al, 2010) (Vikas & Kaushik, 2020) (Zeph et al, 2023)
	Repurchase intention	Hanaysha, 2021) (Lin et al, 2016) (Bazi et al, 2020) (Kumar et al, 2019) (Adhikari et al, 2019) (Simon et al, 2019) (Kumar, 2020) (Gupta,et al, 2018) (Haverila et al, 2020) (Islam et al, 2020) (Bhattachary & Anand, 2020) (Brandão et al,2019) (Kumar et al, 2022) (Marmat, 2022) (Oliveira & Fernandes, 2020) (McManus et al, 2020) (Osei-Frimpong, 2019) (Samala and Katkam , 2020) (So et al, 2021) (Sprott et al, 2009) (Verhoef et al, 2010) (Vikas & Kaushik, 2020) (Zeph et al, 2023)
	Trust	(Cooley-Broughton, 2022) (Dhaoui & Webster, 2021) (Farhat et al, 2020) (Frimpong & McLean, 2018) (Gómez et al, 2019) (Hamzah et al, 2021) (Agnès et al, 2019) (Algesheimer et al, 2005) (Anita & Pranay, 2021) (Arianna McKay, 2017) (Bazi et al, 2020) (Bhattachary & Anand, 2020) (Simon et al, 2019) (Kumar, 2020) (Gupta,et al, 2018) (Haverila et al, 2020) (Islam et al, 2020)
	Satisfaction	(Hamzah et al, 2021) (Harinder Hari etal, 2021) (Högberg et al, 2019) (Hollebeek et al, 2019) (Vikas & Kaushik, 2020) (Zeph et al, 2023) (Simon et al, 2019) (Kumar, 2020) (Gupta,et al, 2018) (Haverila et al, 2020) (Islam et al, 2020)
	Brand communication quality	(Högberg et al, 2019) (Hollebeek et al, 2019) (Huerta-Álvarez et al, 2020) (Islam et al, 2018) (Arianna McKay, 2017) (Bazi et al, 2020) (Bhattachary & Anand, 2020) (Bilro et al, 2018) (Brandão et al, 2019) (Verhoef et al, 2010) (Vikas & Kaushik, 2020) (Zeph et al, 2023)
	Brand Equity	(Jami Pour et al, 2021) (Farhat et al, 2020) (Kumar, 2021) (Zeph et al, 2023) (Osei-Frimpong, 2019) (Samala and Katkam , 2020) (So et al, 2021) (Sprott et al, 2009)
	Brand advocate	(Ramon et al, 2021) (Hamzah et al, 2021) (Haverila et al, 2020) (Islam et al, 2020) (Hsieh et al, 2020) (Touni et al, 2020) (Farhat et al, 2021) (Guizon et al, 2021) (Oliveir et al, 2021) (Leckie et al, 202) (Álvareza et al, 2020)

In an overarching analysis derived from the collated data, it is discerned that the antecedents of brand engagement encompass a spectrum of elements, namely perceived communications, the dynamics within brand communities, the implementation of gamification strategies, the overall experiential aspect

of the brand, the depth of customer engagement, and various social influencing factors. Concurrently, the sequels of brand engagement manifest as an array of outcomes: enhanced loyalty, fortified brand support, augmented brand equity, the quality of brand-related communications, heightened consumer satisfaction, established trust, an increased propensity for repurchase intentions, and the proliferation of electronic word-of-mouth endorsements. Considering the heterogeneity in effect sizes reported across the individual studies, the ensuing stage of this research will entail a rigorous computation of the effect size for each determinant, utilizing the comprehensive capabilities of the CMA2 software.

3.1. Inferential Statistics (Utilization of Meta-Analysis Methodology)

Conforming to the theoretical framework articulated by Rosenthal (1998), it becomes paramount to establish a uniform metric for the comparability and synthesis of studies that, despite their adherence to standardized protocols, diverge in aspects such as geographical and cultural contexts, the proficiency of researchers, methodologies for data collection in various markets, operational procedures in fieldwork, the magnitude of sample sizes, methodologies of sampling, and the diversity of software used. Consequently, the concept of 'effect size' emerges as the cornerstone of the meta-analysis methodology (Wotsina, 2021), bearing the responsibility of harmonizing these variances. The investigator employs a sophisticated and versatile software, Comprehensive Meta-Analysis (CMA) Version 2, for the purpose of importing the raw data extracted from these studies, which have been meticulously synthesized into comprehensive documents. Each study is subsequently transformed into a quantifiable effect size within the non-probability sampling framework of the investigation. In the final analytical stage, these studies are amalgamated in the research sample based on the effect size criterion and subjected to rigorous evaluation through dual statistical analysis models: fixed effects and random effects. Acknowledging the distinct influence exerted by each factor, separate calculations for both fixed and random effects sizes are conducted for each respective factor. During the computation of the effect size, the data gleaned from antecedent studies are taken into consideration, and in certain identified factors, a triad of discrete tests is utilized to deduce the effect size. Furthermore, owing to the continuous nature of the data and the causal presuppositions of the research hypotheses, the employment of the effect size r is deemed essential.

Table 3 - Effect Size of Each Study and Combined Statistical Analysis of Effect Sizes

	Agents	effects	Effect size	Upper limit	lower limit	p-value	z-value	Number of studies
Antecedents	Perceived relevance	Fix	0.271	0.289	0.253	0.00	23.100	28
		Random	0.260	0.349	0.289	0.00	6.188	
	Brand Community	Fix	3.277	3.478	2.995	0.00	30.718	31
		Random	3.420	3.478	2.995	0.00	6.580	
	Gamification	Fix	3.277	3.539	2.942	0.00	24.862	16
		Random	4.743	0.647	2.601	0.00	5.079	
	brand experience	Fix	0.330	0.360	0.299	0.00	19.499	9
		Random	0.314	0.546	0.037	0.00	2.213	
	Customer Engagement	Fix	0.169	0.198	0.140	0.00	11.270	13
		Random	0.166	0.215	0.115	0.00	6.329	
	Social Factors	Fix	2.644	2.886	2.423	0.00	21.795	14
		Random	2.851	4.269	1.903	0.00	5.083	
Consequences	Loyalty	Fix	2.290	2.540	2.06	0.00	15.660	13
		Random	3.355	5.673	1.984	0.00	4.516	
	Electronic Word-of-mouth	Fix	1.222	1.552	0.902	0.01	1.644	3
		Random	1.222	1.552	0.902	0.01	1.644	
	Repurchase intention	Fix	1.304	1.473	1.163	0.00	4.472	9
		Random	1.304	1.473	1.163	0.00	4.250	
	Trust	Fix	1.283	1.488	1.107	0.01	3.300	6
		Random	1.283	1.488	1.107	0.01	3.300	
	Satisfaction	Fix	1.839	2.196	1.540	0.00	6.722	5
		Random	1.839	2.196	1.540	0.00	6.722	
	Brand communication quality	Fix	1.910	2.220	1.643	0.00	8.431	8
		Random	1.864	2.706	1.284	0.00	3.275	
	Brand Equity	Fix	1.354	1.642	1.116	0.02	3.074	4
		Random	1.354	1.642	1.116	0.02	3.074	
	Brand advocate	Fix	2.728	2.728	2.444	0.00	16.082	11
		Random	3.096	3.096	1.560	0.00	3.231	

Pursuant to the outcomes of this research, it has been discerned that the most pronounced effect sizes within the antecedents are attributed to the gamification index, while within the outcomes, the indices of loyalty and brand support exhibit paramount significance.

Upon the transformation of each individual study into a unified metric, designated as the effect size, and as elucidated by Rosenthal in 1998, such a metric can be interpretatively applied to each study (Cooper, 2009, p. 86). The contemporary amalgamated analysis, having evolved over a centennial timeline, introduces two distinct models of effect size - fixed and random effects - for the synthesis of these sizes. Jefferson (2013) articulates a common pitfall among researchers: the oversight of one of these two models. The fixed effects model inherently computes more precise values by maintaining constancy across diverse factors, necessitating the presumption of a stable, uniform effect size. This presumption consequently implies that variances amongst studies are exclusively derivative of sampling methodologies, leading to an inferred homogeneity within the studies. Conversely, the random effects model fundamentally opposes this approach, positing that studies inherently possess a multitude of variances across several dimensions that necessitate averaging. Fundamentally, this theoretical stance

acknowledges and accounts for the heterogeneity present among the studies encompassed within the analytical ambit. (Jefferson, 2013)

Indeed, these postulated hypotheses function as overarching meta-hypotheses for the realm of secondary studies. As delineated by Wipsy and Wilson (2014), the researcher, transcending the scope of primary investigators, endeavors to amalgamate the collective outcomes of all relevant studies, thereby arriving at a conclusive determination regarding the rejection or validation of this hypothesis within the aggregate corpus of studies sharing thematic intersections with these hypotheses. (Wipsy & Wilson, 2014) Fortuitously, both the fixed effects model, incorporating effect size, and the random effects model exhibit only marginal variances within the research sample. Utilizing advanced inferential statistical methods and projecting these onto the intended population, particularly in light of the p-value and z-value – both offering

divergent interpretative lenses of a singular statistical entity (Moradi & Miralmassi, 2020) – the null hypothesis is conclusively refuted at a 99 percent confidence interval, thereby rendering the alternative hypothesis H1 as statistically significant. Consequently, this implies that the research hypotheses receive corroboration under both the fixed and random effects composite analytical models.

To determine which among the two models – fixed effects and random effects – yields more dependable outcomes, notwithstanding their negligible variances, a thorough investigation into the homogeneity of the studies subjected to analysis was undertaken. For this endeavor, three critical indices are employed: the p-value, I-squared (I^2), and Tau-squared (τ^2). The subsequent table delineates the specified indices alongside the analytical outcomes pertaining to the factors investigated in this research.

Table 4- Tests of inhomogeneity and heterogeneity

Indicator	Conditions	Results	A more reliable answer
Q value	Less than zero	heterogeneous	Random effect
	More than zero	Homogenous	Fixed effects
Tau square	Less than and equal to 25	Low heterogeneity	Fixed effects
	Between 25 and 50	Medium heterogeneity	Fixed effects
	50 to 75 and more	Very heterogeneous	Random effect
I square	up to 0.19	Low heterogeneity	Fixed effects
	up to 0.33	Medium heterogeneity	Fixed effects
	up to 0.67 and more	Very heterogeneous	Random effect

Table 5- Tests of inhomogeneity and heterogeneity of studies

|		P-Value	I square	Tau square	Results	A more reliable answer	the number of Results	Prioritizing effect size
Antecedents	Perceived relevance	0.00	94.496	0.712	heterogeneous	Random effect	0.260	5
	Brand Community	0.00	95.800	1.032	heterogeneous	Random effect	3.420	2
	Gamification	0.00	98.81	0.121	heterogeneous	Random effect	4.743	1
	brand experience	0.00	98.568	0.191	heterogeneous	Random effect	0.319	4

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	Customer Engagement	0.01	65.456	0.006	heterogeneous	Random effect	0.166	6
	Social Factors	0.00	94.682	0.549	heterogeneous	Random effect	2.851	3
Consequences	Loyalty	0.00	95.976	0.886	heterogeneous	Random effect	3.355	1
	Electronic Word-of-mouth	0.454	0.000	0.00	Homogenous	Fixed effects	1.222	8
	Repurchase intention	0.00	6.070	0.002	heterogeneous	Random effect	1.304	6
	Trust	0.959	0.00	0.00	Homogenous	Fixed effects	1.283	7
	Satisfaction	0.457	0.00	0.00	Homogenous	Fixed effects	1.839	4
	Brand communication quality	0.00	83.161	0.237	heterogeneous	Random effect	1.864	3
	Brand Equity	0.796	0.00	0.00	Homogenous	Fixed effects	1.354	5
	Brand advocate	0.00	96.752	1.297	heterogeneous	Random effect	3.096	2

Numerous academicians and connoisseurs within the meta-analytical sphere, such as Rosenthal or Cohen, harbor a substantial degree of skepticism towards these tests, due to their propensity at times to yield starkly contradictory conclusions. For example, one particular test might suggest a state of homogeneity among studies, whereas another might contradictorily indicate heterogeneity. Conversely, other experts, adopting a pragmatic perspective, contend that any instrument facilitating the researcher in the resolution of problems is deemed invaluable (Langhen et al., 2012). Per the data presented in Table 5, the p-value test emerges as the paramount determinant in assessing the homogeneity of studies, with its findings holding primacy over those of other tests. Analogous to the chi-square test in its nature, the p-value's significance lies not in its intrinsic interpretability but rather in its capacity to scrutinize the underlying statistical hypothesis. The results of this test, along with a hierarchy of the impact magnitudes, are elucidated in the aforementioned table. Corroborated by these findings, gamification exhibits the most substantial effect size amongst the antecedents, while loyalty commands the apex effect size within the consequences of brand engagement.

Continuing with the rigorous quality evaluation of the systematic review via meta-analytical methodology, the investigator, acknowledging the random effects model as a more substantiated method for synthesizing the outcomes of various studies, progresses to the intricate interpretation of the forest plot. Esteemed authorities in the field, such as Snyder (2019), Lee (2016), and Calden (2020), emphasize that the forest plot is an integral component of the meta-analysis quality assessment framework. Furthermore, it serves as the foundational basis for the exploration of publication bias, representing the culminating analytical phase in a meta-analytical project. Due to the large number of these diagrams (14 diagrams for 14 hypotheses), only one diagram is analyzed at this stage. (The other diagrams are in the appendix.)

Chart 3- Meta-analysis of the impact of customer engagement on brand engagement
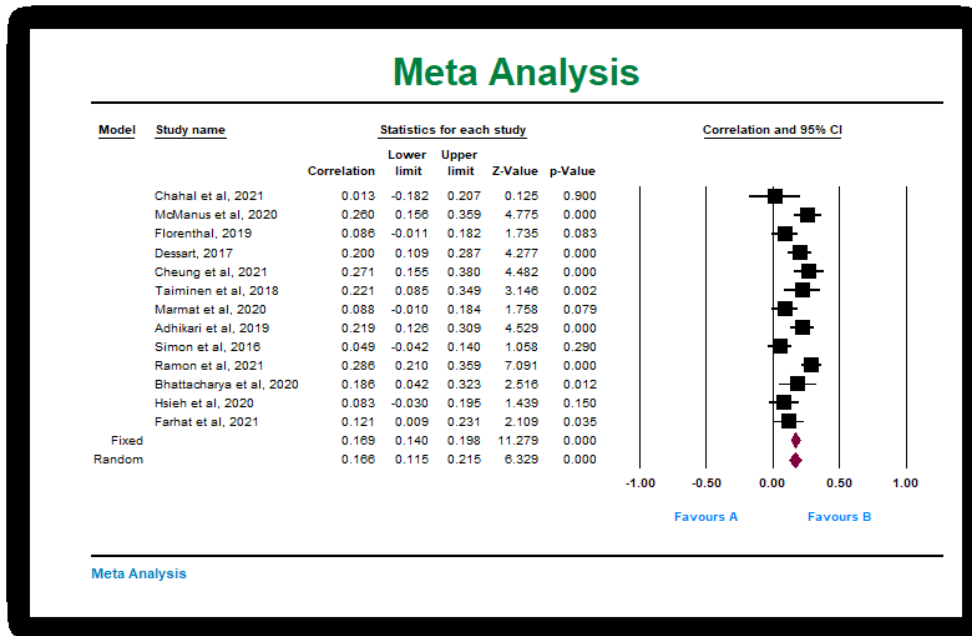
As deduced from the meta-analytical evaluation and evidenced by the forest plots, the scrutinized studies are encompassed within a defined parameter range, wherein the upper boundary, the aggregated effect, and the lower boundary of both the fixed and random effects models are distinctly discernible. Consequently, the selected studies do not fall outside the purview of the theoretical frameworks being examined, and there is an absence of any lost or unaccounted-for studies in this review.

Proceeding further with the intricate quality assessment of a systematic review, the ultimate and most pivotal aspect entails the scrutiny of publication bias, which is conducted through the implementation of funnel plots. The funnel plots corresponding to the identified constructs are delineated as follows:

Chart 4- Classical funnel plot in random measurement mode to identify diffusion for brand communities.

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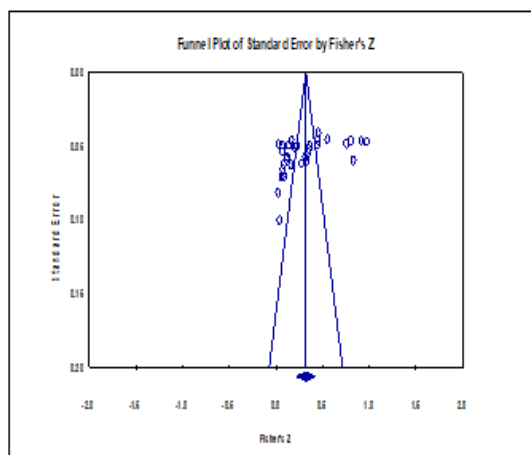
As can be discerned, a significant aggregation of studies is notably concentrated at the apex of the funnel, evidencing the lack of upper-level error. Furthermore, the dense clustering of methodologically robust studies within a confined area at the top of the funnel, coupled with the observable symmetry in this upper segment, strongly suggests the absence of any studies that might have been overlooked or omitted.

4. Conclusion

This investigation delves into the antecedents and repercussions of brand engagement within social networking platforms. Consistent with the procedural rigor characteristic of systematic and structured reviews, an initial assessment encompassed all pertinent studies related to brand engagement, which were subsequently sifted through a meticulously chosen research protocol. Of the entire gamut of studies undertaken, 64 satisfied the comprehensive set of conditions and were subjected to in-depth analysis. Post the identification of the antecedents and consequences of brand engagement, the statistical data derived from these studies were individually processed for each discerned factor using the CMA2 software, enabling the calculation of the respective effect sizes. As per the findings, the antecedents of brand engagement encompass facets such as perceived communications, brand communities, gamification, the experiential dimension of the brand, customer engagement, and social factors. Furthermore, the outcomes of brand engagement manifest as customer loyalty, the proliferation of electronic word-of-mouth endorsements, the inclination towards repurchase, trust, customer satisfaction, the caliber of brand communications, intrinsic brand value, and overall brand support. Consequently,

this research proposes the adoption of the ensuing model:

Fig 4 - Proposed Research Model (Based on Studies from the Last 15 Years)
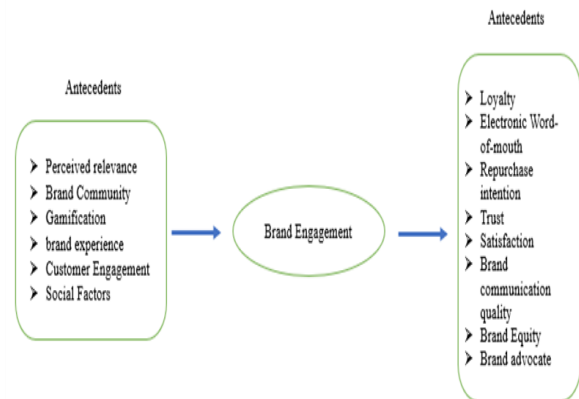
As per the analytical outcomes, the predominant effect size within the antecedents is discernibly attributed to the gamification index, while in the realm of consequences, the loyalty and brand support indices exhibit substantial prominence.

In the subsequent phase, both fixed and random effects models were meticulously applied to each scrutinized variable. According to the findings, there was a notable proximity between the fixed and random effects across numerous studies. To determine the more precise model for each variable, a triad of indices - the p-value, I-squared (I^2), and Tau-squared (τ^2) - were employed. The results indicated a prevalent heterogeneity among the studies, thereby rendering the random effects model more suitable for these analyses. This suggests the existence of a controlling variable within all the causal linkages between the antecedents and consequences of brand engagement. The investigator identified the presence and absence of two controlling variables: the

perceived planning of customer engagement by brand managers and customers with a historical engagement with the brand. These variables were not examined due to their exclusion from the research's ambit. Consequently, it is recommended that future scholars explore the influence of these controlling variables.

The role of user-generated content was consistently acknowledged in all studies, highlighting its direct impact on both the antecedents and consequences of brand engagement. Furthermore, the research affirmed the significant effect size of the gamification variable, suggesting that future research should concentrate on the influence of this factor and devise algorithms to incentivize consumer commentary through gamification strategies.

Additionally, this research advocates for the development of sophisticated artificial intelligence algorithms and augmented reality applications aimed at enhancing customer engagement with brands.

4.1. Discussion

This research provides a comprehensive understanding of the antecedents and consequences of brand engagement within social networking platforms. The methodical approach, involving the use of CMA2 software for effect size calculation, underscores the importance of gamification and user-generated content in influencing brand engagement. Notably, the significant effect sizes associated with gamification in antecedents and loyalty in consequences suggest these areas as critical factors in enhancing brand engagement strategies.

4.2. Recommendations

1. Further Research on Controlling Variables: Future studies should explore the impact of controlling variables such as the planning of customer engagement by

brand managers and historical engagement of customers with the brand. These aspects could provide deeper insights into the dynamics of brand engagement.

2. Focus on Gamification: Given the prominent effect size of gamification, subsequent research should delve into how gamification influences consumer behavior and engagement. Developing strategies and algorithms to leverage gamification in brand interactions could be beneficial.

3. Utilization of AI and Augmented Reality: The development of advanced AI algorithms and augmented reality applications could significantly enhance customer engagement. These technologies offer new ways for brands to interact with and engage their audience.

4. Investigation of User-Generated Content: The role of user-generated content in influencing brand engagement is evident. Further studies should focus on understanding how this content impacts consumer perceptions and behaviors towards brands.

4.3. Limitations

1. Exclusion of Controlling Variables: The exclusion of certain controlling variables like the strategic planning of engagement and historical engagement levels limits the scope of the research. These variables could have provided additional insights into the mechanisms of brand engagement.

2. Model Specificity: The reliance on fixed and random effects models, despite their thorough application, could have constrained the research. Other models or analytical approaches might offer different perspectives on the data.

3. Heterogeneity of Studies: The noted heterogeneity among the studies suggests variations in methodologies, samples, and contexts. This diversity, while enriching,

could affect the generalizability of the findings.

4. Focus on Social Networking Platforms: The research's focus on social networking platforms means the findings may not be directly applicable to other digital or offline marketing channels.

In summary, this research significantly contributes to understanding brand engagement on social networking platforms, highlighting critical factors like gamification and user-generated content. However, future research should address the identified limitations and explore the impact of other variables and technologies on brand engagement.

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