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A COMPREHENSIVE STUDY ON MODERATOR OF BIG DATA USAGE IN SHAPING CORPORATE IMAGE THROUGH MARKETING INITIATIVES IN CHINA'S ICT SECTOR

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ABSTRACT

This study examines big data utilization as a moderating cause in the connection between marketing initiatives and the development of corporate images. Quantitative methodology employed and 400 data set gathered from professionals that comes from three representative cities in China. This study examines five key marketing initiatives, digital marketing strategies, customer engagement, brand personality, innovation and technological advancements, and corporate social responsibility (CSR), with their impact on shaping corporate image. During data analysis and hypothesis testing, AMOS and SPSS were used to check reliability and validity for all variables. The findings indicate that each marketing initiative variable has direct relationship with development of corporate images. Regarding the indirect effect of big data usage as moderate variable between the variables, the results specified that it does not moderate the connection between digital marketing strategies and corporate image. However, the models confirmed that big data usage significantly moderates the relationships between other marketing initiatives and corporate image. Nonetheless, all moderation effects were negative, implying that the increased big data usage will diminish the positive impact of these variables on corporate image. Based on the research findings, implications for theory, practitioners and policy were examined. Limitations and recommendations for future research were outlined.

KEYWORDS: Big Data Usage, Corporate Image, Digital Marketing Strategies, Customer Engagement, Brand Personality, Innovation and Technology Advancement, Corporate Social Responsibility (CSR).

1. INTRODUCTION

In today's data-driven business world, more and more companies leverage big data analytics to improve their marketing strategies and improve corporate reputation. China's information and communication technology (ICT) sector offers a leading environment for analyzing the influence of data-driven marketing on corporate image. A strong corporate image, where the public's overall perception of a company, is recognized as a critical strategic asset influencing customer trust, loyalty, and competitive advantage. Marketing initiatives such as digital marketing, customer engagement, brand personality, innovation & technological advancements, and corporate social responsibility (CSR) are recognized as critical factor in the formation of corporate image among the stakeholders. At the same time, big data usage in marketing offers exceptional opportunities for personalization, insight generation, and performance optimization, where it has been affirmed as a "management revolution". However, the relationship between these marketing initiatives and big data remains underexplored. It is unclear whether how big data utilization might amplify or alter the effectiveness of traditional marketing initiatives in shaping a positive corporate image, especially in fast-evolving markets like China's ICT industry. This gap is significant, as Chinese companies are at the forefront of digital revolution, with massive volumes of consumer data available and cutting-edge adoption of technologies like artificial intelligence and analytics. Understanding the role of big data as a potential moderator is crucial for both scholars and practitioners, since it could reveal whether data-driven strategies strengthen corporate image or unintentionally undermine certain marketing efforts.

Despite extensive literature on big data analytics and on individual marketing strategies, limited research has addressed their combined impact on corporate image. Prior studies typically examine marketing initiatives in isolation with respect to outcomes like brand equity or customer behavior, and many highlights big data's potential for marketing decision-making. Yet scarce attention has been paid to how big data usage influences the effectiveness of multiple concurrent marketing initiatives on building corporate images. In other words, does heavy utilization of big data in marketing enhance the positive effects of marketing initiatives on corporate image? This question is especially significant in China's ICT sector, a diverse and rapidly changing market where digital

strategies and consumer behaviors are evolving quickly. Companies in this sector are early adopters of big data and digital marketing, yet they operate in a complex cultural and technological environment. Without clear empirical evidence, businesses may be unsure how to integrate big data into marketing in ways that genuinely support the development of their corporate image. Therefore, this investigation attends to inspect the research gap of the direct association between key marketing initiatives and corporate image and also evaluating big data moderating role in these relationships.

2. LITERATURE REVIEW

2.1. Theoretical Background

The classification of the marketing initiatives into digital marketing strategies, customer engagement, brand personality, corporate social responsibility, as well as innovations and technological advancements have been long used in past marketing literature. To develop a strong marketing initiative, all five types of variables need to be invested to ensure its competitive advantage. Resource-based View (RBV) proposes that an organisation's resources and capabilities drive its competitive advantage. Big data usage can be considered as a strategic resource because of its' capability of collecting, managing and analyzing functionality that supports company extract valuable insights (Kissi, 2024; Mazzei & Noble, 2020). Organizational learning highlights the importance of learning in an organization. Fanelli et al. (2023) found that big data analytics effectively guides organizational decision-making. Subsequently, big data is examined whether it moderates the marketing initiatives in shaping the corporate image. Corporate image and customer engagement play important roles for companies, and RBV supports organizations in gaining a competitive edge (Gong et al., 2023). As e-commerce and m-commerce adoption are becoming more mature these years, online customer engagement has been spread extensively. Digitalization has been adapted fast, and content marketing is becoming significant. Perez-Vega et al (2025) suggested that engagement on social media platforms can increase consumers' preferences towards the corporate image. However, there are other researchers proposed that corporates using social media to improve customer engagement seemed to be less impactful (Gong et al, 2023). Sustainability purchase intention demonstrates positives impacts on corporate social responsibility in various studies (Huo et al, 2022). Gong et al (2023) found that

consumers have been positively response to companies that actively participate in CSR activities. Several examples have been included in the following chapter as support for statements. Gong et al (2023) also shared that CSR have a direct connection to corporate image in his previous study. Therefore, digital marketing strategies, brand personality, customer engagement, CSR and technological advancement are chosen to be the marketing initiatives variables.

2.2. Key Hypotheses

The comprehensive of existing literature explains the hypotheses that compose in this investigation. First, to suggest that digital marketing strategies, customer engagement, brand personality, innovations and technological advancements, as well as corporate social responsibility employs positive influences on the shaping of corporate image (H1-H5). Second, assume and investigate that big data usage serves as a significant moderator in the relationship between these marketing initiatives and the development of corporate image (H6-H10).

2.2.1. Digital Marketing Strategies

Digital marketing is two-way interaction between business and the consumers, allowing the business to identify its target audience and their needs (Dimitrios et al, 2022). It enables communication happens without the constraints of geographical or time factor. It is accessible at all hours and anywhere in the world. Effective digital marketing strategies rely on quality data (Usercentrics, 2024). The more accurate data collected and managed, the higher the successful results from developing campaigns to attract and retain customers. Every online interaction generates data, and these data needs to be processed then turned into insights that serve to organization's managers for decision making. Big data analysis can deliver insights, for instance who your customers are, what they like, where they are and how they are being reached. Also examine and determine how customer loyalty being influences, as well as figure out what keeps customers coming back again. With the insights above, marketers can improve their current marketing strategies across the channels to get better progression and stay competitive in the market.

Therefore, according to the identified gap, the hypothesis is offer as following:

H1: If there is a relationship between digital marketing strategies and the corporate image.

2.2.2. Customer Engagement

According to most researchers, customer engagement (CE) is described by a multidimensional model consist of thought, responsive, and behavioral dimensions (Gong et al, 2023). Most corporations perceive customer engagement as a path for establishing and improving the customer-company associations, thus enhance the corporation performance (Bolton, 2011). Therefore, managers seek to foster customer engagement into the organization's marketing strategies. Verhoef et al, (2000) shared an example of customer engagement, where a leisure firm proactively asks recent customers to provide ideas and feedback. For example, Lays' chips asked customers to develop a new chips flavour in a competition, and the champion will obtain 1% of the turnover of the subsequent new product. This is an example of customer engagement experience develops the product involvement and accelerates the alteration of the customer into an active contributor to the company's marketing roles (Harmeling et al, 2016). Customer engagement shows an important role in promoting corporate's image as well as sales driving (Perez-Vega et al, 2025). Vivek et al, (2012) previously studied on customer contribution as experiences to customer engagement, where researcher tested value, belief, emotional devotion, word of mouth and loyalty as outcomes. To support marketers, leverage this concept and assist ongoing academic study, future research should establish a customer engagement scale and test its effectiveness in various settings (Vivek et al, 2012). Previous study shared that sustainable practices of a firm is to develop the brand ranking and retain customers for the long term (Gong et al, 2023). Corporate image and the commitment of customers are worthy for companies (Gong et al, 2023). One early investigation discovered that customers are more connected with fashion brands when they trust the brand have a convinced image within the corporation (Gong et al, 2023).

Therefore, this investigation proposes the hypothesis below:

H2: If there is a relationship between customer engagement and corporate image.

2.2.3. Brand Personality

Garcia-Salirrosas & Gordilo, (2021) suggested that brand name is being recognized as one of the most precious intangible assets that corporations have. It covers customer's experiences and feelings regarding products or services of an organization,

where the brand itself established deep connections with their consumers (Garcia-Salirrosas & Gordilo, 2021). A robust brand personality, that perceived by consumers will be corresponding with the representation of the corporate image. Brand equity is deeply correlated to corporate image. It is described as the influence created in the mind of the everyone about a corporation and is associated to its physical and interactive characteristics (Garcia-Salirrosas & Gordilo, 2021). A study by Lee and Kim (2009) showed that brand personality influences consumers' emotions and consumption behavior. Garcia-Salirrosas & Gordilo, (2021) studied that brand name is an asset that produces excellent advantages for corporation and improves the corporation's effectiveness. It is absorbed that brand equity is intensely correlated to corporate image, where corporations must establish and maintain a convinced image as it somehow would impact on the preference of consumers over their competitors. Previous literature, researchers has been focused on brand equity with consumer involvement, behavior, loyalty or even trust, while there's no or limited study mentioned the relationship between brand personality and corporate image. Therefore, ongoing revision and refinement of the concept is essential (Garcia-Salirrosas & Gordilo, 2021).

Based on the gap detected in this investigation, it presents the hypothesis below:

H3: If there is a relationship between brand personality and corporate image.

2.2.4. Innovation & Technology Advancement

Technology improvement refers to the expansion and employment of new ideas, techniques, devices, or processes marked at shifting the current existing practice (Suherlan & Okombo, 2023). In recent, Gartner (2024) webinar extracts the census of more than 2,500 managers, 38% specified that customer experience and retention is the key intention of their generative AI investments. The Artificial intelligence index (2024) stated that Ipsos proves that over 2023, the ratio of those who believe AI will significantly impact their lives in the coming five years has risen from 60% to 66%. According to Tran et al (2015) investigation in discovering the corporate image establishment development, research suggested there is a clear indication for scholars to explore and understand the impacts of technology. Tannady et al, (2022) revealed that product revolution influences the brand image, were better product innovation, the higher the corporate image. It explains the impact of paying more attention to the innovation when developing a

product as it will significantly influence the consumer's feeling of the creation being proposed (Tannady et al, 2022). Elziny & Mohamed (2021) exploration found that there was an indirect positive relationship between the variable of technological innovation and brand image. Findings revealed that technological collaboration and expertise are the key factors in the creation of technological innovations and have significant positive influences on brand image through two mediating variables which are customer's satisfaction such as security, easy to use, and perceived quality to improve their loyalty toward the brand. However, there is no study found on testing whether technological innovation has a direct relationship with the corporate image yet.

Therefore, according to the gap discovered in the past investigation, the hypothesis offers below:

H4: If there is a relationship between innovative & technological advancements and corporate image.

2.2.5. Corporate Social Responsibility (Csr)

According to Tang (2012), corporate ethics represents a branch of applied ethics that investigates ethical principles and challenges which may emerge within the business context. One of the benefits is participating CSR can enhance corporation's profitability and value. While advancing society and weakening the destructive effects on the environment, consumers are gradually willing to buy products and services from socially responsible corporations, which leads to a confident impression on organization's bottom line (Ganti, 2023). Some researchers believed CSR is substantially assessed by corporations obtaining to drive their corporate image (Yu & Hu, 2014), increase visibility and mitigating negatives exposure (Madina et al, 2014). Fombrun and Shanley (1990) directed out that CSR performance was an valuable factor to accomplish product variation and assemble corporate image. Other scholars proposed that the functioning of CSR can increase corporate image and yet increase the stock rate (Porter and Kramer, 2006). Yu and Hu (2014) found that scholars in China are taking attention on the association between CSR and corporate image lately, especially concentrating on how CSR behaviors preserve impact in gaining convinced corporate image. Virvilaite & Daubaraite (2011) studied that corporate image will influence the corporate reputation, where CSR provides consumer an opportunity to feel that he or she is making the right decision by selecting this product.

Some researcher asserts that the corporation's interest is to boost its shareholders benefit (Mandina et al, 2014). To elaborate this statement further, it is explained that CSR can strengthen the corporation's competitiveness, to gain market share in such competitive environment. Mandina et al (2014) studied that corporations can seek to improve their public image to acquire more customers, better staff and other benefits. However, there is no study mentioned if any related test is done in any ICT sector nor in China.

According to above, this research proposes the following hypothesis:

H5: If there is a relationship between corporate social responsibility and corporate image.

2.2.6. *Big Data as Moderator*

Big data describes a unique set of prospects and challenges for companies trying to preserve a competitive approach in the highly saturated markets (Ampanthong, 2024). Tran et al (2015) suggested there is a clear indication for researchers to understand the impact of websites, online presence and mobile to the corporate image. Marketing strategies driven by big data analytics allow businesses to not only respond to market trends but also to anticipate consumer needs and adjust their strategies accordingly (Ampanthong, 2024). These analytics are helpful in recognition the patterns and trends to identify the specific needs of different consumer segments. Powerful data-driven processes combined with big data offered an insight of analytics, where these data are converted into knowledge that drives value by improving management expertise through information creation (Pugna et al, 2019). It should be utilized continuously to track and monitor the organization performance as well as flagging potential risk and issues. Boakye et al (2025) shared that previous study has verified the important influence of integrating new technologies into digital marketing strategies, specifically to expand the expenditure and develop operational success. However, in Boakye et al (2025) research, AI -driven personalization is performed as a mediator variable, where no moderator variable is being tested. Baqleh & Alateeq (2023) highlighted that future studies may think of the moderating effect of big data analysis on performing rather than economic benefit. Mahmood et al (2022) tested the moderating influence of big data analytics, where its influence on corporation performance was not covered in the previous research, therefore it could explore further in future research. Ledro et al (2022) also shared that

future work can identify possible moderators to build a comprehensive and thorough understanding. Another researcher, Kaperonis (2024) proposed that future research should apply to various industry sectors, as it could solve sector-specific challenges and benefits that related to new technologies implementation in digital marketing. In summary, big data usage should be examined as a moderator variable. It is claimed that the big data usage can reinforce the correlation between marketing initiatives and corporate image.

According to the discussion above, the subsequent hypothesis is suggested:

H6: If the big data usage moderates the connection between digital marketing strategies and corporate image.

H7: If the big data usage moderates the connection between customer engagement and corporate image.

H8: If the big data usage moderates the connection between brand personality and corporate image.

H9: If the big data usage moderates the connection between innovative & technology advancements and corporate image.

H10: If the big data usage moderates the connection between CSR and corporate image.

2.3. *Conceptual Model*

Drawing on the theories of RBV, sustainable purchase intentions, organizational learning and big data phenomena, data driven decision-making as well as data driven performance management, the research recommends the association between various marketing initiatives and the perception of corporate image shown in Figure1. The marketing initiatives are conceptualized as a higher order concept, containing of digital marketing strategies, customer engagement, brand personality, innovations and technological advancements, as well as corporate social responsibility, representing as the independent variables (IVs) while corporate image represents the dependent variable (DV). Big data usage is the moderate variable (MD) in this research. RBV implies that a company's resources and capabilities drive its competitive advantage. Big data usage can be considered a strategic resource because of its' capability of collecting, processing and analyzing functionality that supports company extract valuable insights (Kissi, 2024; Mazzei & Noble, 2020). Organizational learning stresses the importance of learning and altering in an organization. Fanelli et al (2023) specified that

organizations use big data analytics in decision-making and it has been an effective tool that served as a guide for the decision-making process. Subsequently, big data was tested whether it moderates the marketing initiatives in shaping the corporate image. Brand image and customer engagement are worthy for corporations and RBV helps companies to achieve competitive advantage (Gong et al, 2023). As e-commerce and m-commerce adoption are becoming more mature these years, online customer engagement has been reached widely. Digitalization has been adapted rapidly, and content marketing is becoming significant. Perez-Vega et al (2025) suggested that engagement on social media platforms can expand consumers'

request towards the corporate image. However, there are other researchers proposed corporates using social media in their engagement seemed to be less impactful (Gong et al, 2023). Sustainability purchase intention demonstrates positives impacts on corporate social responsibility in various studies (Huo et al, 2022). Gong et al (2023) found that consumers have been positively response to companies that actively participate in CSR activities. Therefore, digital marketing strategies, brand personality, customer engagement, technological advancement and CSR are selected as one of the marketing initiatives variables in this study.

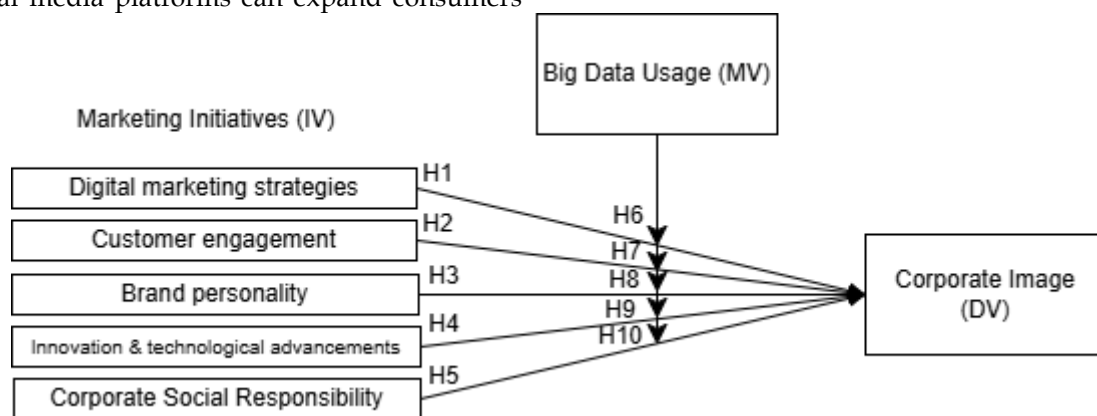


Figure 1: Research Conceptual Model.

3. METHODOLOGY

This section summaries the research methodology handled to investigate the impacts of marketing initiatives in shaping the corporate image, moderated by big data usage. This study applied quantitative, survey-based research design to investigate the connections among the variables. The approach is designed to match the research purposes and requests, to ensure that data gathered and investigation are reliable.

3.1. Research Design

This research applies quantitative research design to test the hypotheses focussed on the enhancement of corporate image, the application of big data analytics, and the effectiveness of five key marketing strategies. The study will assess the empirical connections relating the independent and dependent variables through statistical methods, including structural equation modelling. Quantitative methodology such as survey techniques are employed to gather information regarding the impact of marketing approaches on corporate reputation. The raw data from survey can

relate not only to the respondent's present behavior however also to their state of attitude or purposes (Awang, 2014). Questionnaires are given to respondents to obtain information for the study, as they are asked questions based on the information needed by the study (Awang, 2014). Using this approach, the data gathering process is swift, effective, and can be easily governed to a large sample. Survey allows researcher to assess a larger selection of behaviors and other occurrences than can be examined in a typical natural observation study (Asenahabi, 2019).

3.2. Population And Sampling

The target population involves ICT sector professionals within the selected Chinese ICT hub cities to capture insights from organizations at the forefront of big data and marketing innovation. Data was collected via a structured questionnaire distributed to industry professionals in Shenzhen, Beijing, and Shanghai city. These three cities are the major Chinese ICT hub that represents China's top three ICT cities in the industry. To ensure the sample mirrors the population, simple random

sampling method is employed, making sure the potential respondents are equally selected as this research sample. Previous study implied that there is a need for further investigation in different geographic areas to highlight the potential effects of big data use on marketing initiatives and the development of corporate image. Therefore, this research is targeted to the China ICT sector's employees from the cities mentioned above. With the selected areas and industry sector, Raosoft will be used as a guide in this study for determining the suitable sample size. According to Raosoft, it is recommended that 385 samples is required. Therefore, around 500 survey questionnaires were delivered, of which 400 acceptable responses were taken and used for analysis. The respondent profile covered a range of demographics and included various roles and departments within ICT companies, which could enhance the representativeness of the data.

3.3. Data Collection

The survey instrument was carefully developed through the instrument development process, including pre-testing, to confirm the content validity. Measurement items for each construct that covered corporate image, the five marketing initiatives and big data usage were adapted from previously validated scales and modified to suit the current investigation. The questionnaire data was gathered on respondents' perceptions of their company's performance on the five marketing initiatives and the overall corporate image of their firm, as well as the extent of big data usage in marketing operations. The demographic section assembled participants' details for instance age, gender, professional role, and years of working experience, facilitating further analysis of possible

moderating variables and evaluating the representativeness of the sample. The variables were operationalized through a comprehensive five-point Likert scale (ranging from 1 refers to Strongly Disagree to 5 indicates as Strongly Agree). The independent and moderator variable were measured based on four items adopted from previous investigation. The operationalization of the corporate image (CI) shaping was based on eight items. Responses were recorded and the survey also gathered relevant demographic and organizational information about the participants.

4. RESULTS

Collected data were analysed using a combination of descriptive statistics, factor analyses, and multivariate hypothesis-testing methods. First, data screening measures confirmed acceptable data quality and completeness to confirm minimal missing data especially to ensure no significant issues of inconsistency. The dimension model was authenticated through confirmatory factor analysis (CFA), where each variable's indicators showed strong factor loadings well above the 0.6 threshold, indicating good convergent validity and reliable measurement of the intended theoretical constructs. The overall KMO value of the questionnaire is 0.948 suggesting the sampling is adequacy and the data is highly suitable for factor analysis. The p-value is 0.000, which is less than 0.01, verifying that the variables are appropriately correlated. The various factors in this research demonstrated Cronbach's Alpha ranging from 0.795 to 0.943, surpassing 0.7, meeting the level of acceptance. This indicates strong consistency of the variables and confirming exceptionally high reliability of the survey results.

Table 1: Reliability Analysis for All Variables.

Dimension Variable	Cronbach's Alpha	Number of items
Corporate image	0.888	8
Digital marketing strategies	0.811	4
Customer engagement	0.809	4
Brand personality	0.795	4
Innovation & technological advancements	0.813	4
Corporate social responsibility	0.805	4
Big data usage	0.805	4
Overall Questionnaire	0.943	32

Table 2: KMO And Bartlett's Test for All Variables.

KMO Measure of Sampling Adequacy		0.948
Bartlett's Test of Sphericity	Approx. Chi-Square	5770.722
Degrees of Freedom (df)		496
Significance (Sig.)		0.000

The table below presented strong evidence of measurement quality across all the constructs in this study, with most of them demonstrating excellent validity and reliability standards. All the constructs had surpassed the suggested limit of 0.7 for constructs reliability (CR). The highest CR was 0.888 ranging from 0.796 to 0.888. For the average variance extracted (AVE), five constructs meet 0.5 threshold, indicating excellent validity. Corporate

image and brand personality were illustrated 0.499 and 0.493, which is slightly below but very close to the threshold and could be considered as acceptable. The highest AVE was 0.522, demonstrated by innovation & technological advancements. As a result, the outcomes support the use of these constructs for hypothesis testing in the research study.

Table 3: All Construct's AVE And Composite Reliability CR In AMOS.

Construct	Items	$\Sigma(\lambda^2)$	AVE	CR	Validity Conclusion
Corporate image	Q8-Q15	3.994	0.499	0.888	Good
Digital marketing strategies	Q16-Q19	2.076	0.519	0.812	Excellent
Customer engagement	Q20-Q23	2.073	0.518	0.811	Excellent
Brand personality	Q24-Q27	1.974	0.493	0.796	Acceptable
Innovation & technological advancements	Q28-Q31	2.087	0.522	0.813	Excellent
Corporate social responsibility	Q32-Q35	2.043	0.511	0.806	Excellent
Big data usage	Q36-Q39	2.034	0.509	0.805	Excellent

For hypothesis testing, the research involved Structural Equation Modelling (SEM) using AMOS software to examine the direct effects of the five marketing initiatives on corporate image within an

integrated model. This allowed the simultaneous estimation of relationships and measures the model fit indices to make sure the conceptual framework's robustness.

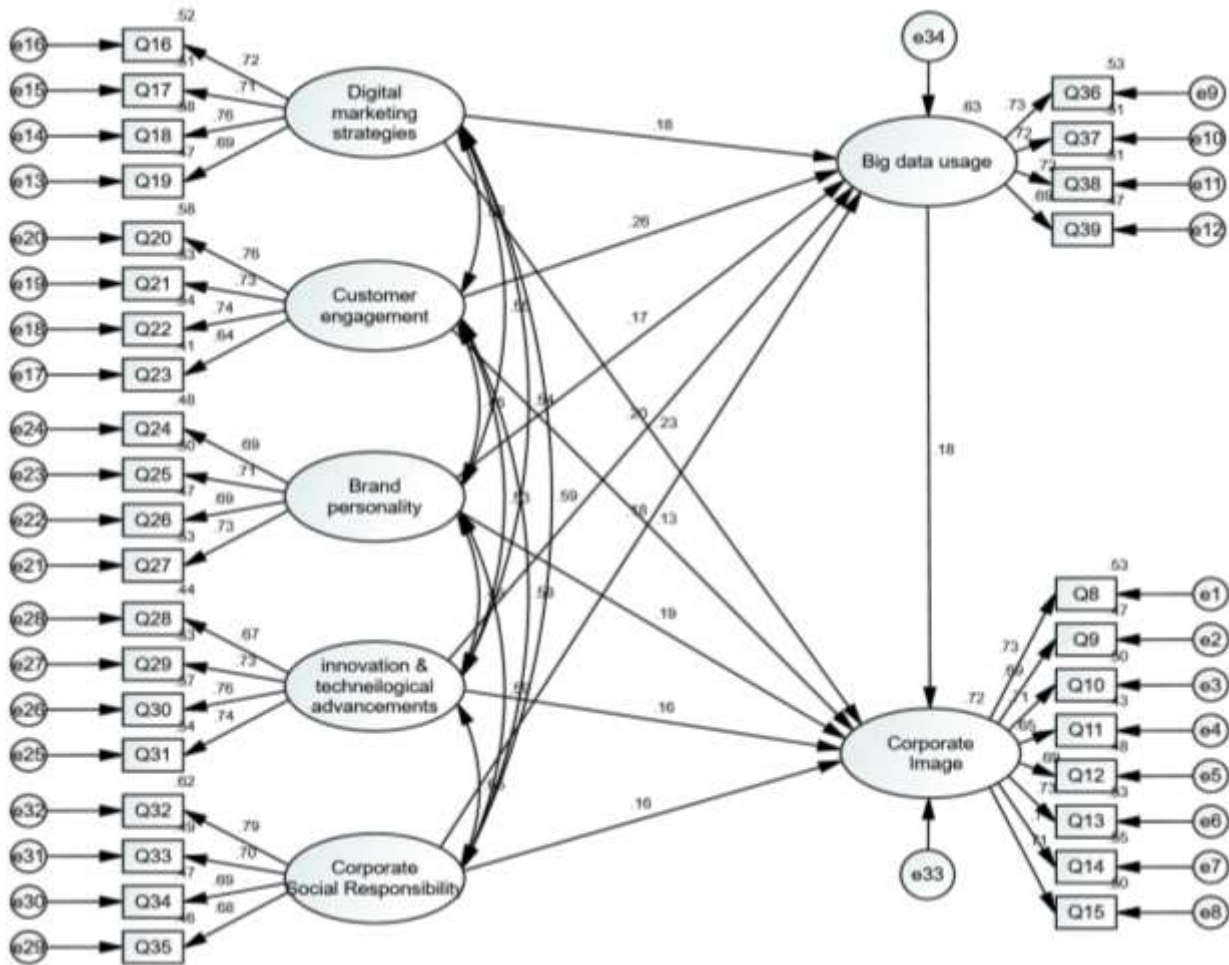


Figure 2: Sem Diagram of the Overall Measurement Model.

The results of the structural equation model fit analysis above indicate a good model fit, with all indices meeting acceptable standards: The Chisq/df value is 1.139, which is below 5; the RMSEA value is 0.019, below 0.08. The GFI and AGFI values are 0.930 and 0.916, correspondingly, both are above

0.9, indicating the model was well fits the data. The IFI and CFI values are both 0.989, above 0.9 and the PGFI value is 0.780, above 0.50. This reveals that the model fits the statistics and captures the variable associations effectually.

Table 4: GOF Indices of SEM Model for All Variables.

Name of category	Name on index	Index value	Level of acceptance	Comments
Absolute fit	RMSEA	0.019	RMSEA < 0.08	Excellent fit
Absolute fit	GFI	0.930	GFI > 0.90	Excellent fit
Incremental fit	AGFI	0.916	AGFI > 0.90	Excellent fit
Incremental fit	IFI	0.989	IFI > 0.90	Excellent fit
Incremental fit	CFI	0.989	CFI > 0.90	Excellent fit
Parsimonious fit	Chisq/df	1.139	Chisq/df < 5.0	Excellent fit
Parsimonious fit	PGFI	0.780	PGFI > 0.5	Excellent fit

The investigation contributed support to the direct influence of marketing initiatives on corporate image, as well as revealing the complex moderating role of big data usage. All five marketing initiatives were confirmed content significant positive impacts on corporate image, by showing $p < 0.05$ for each direct path. This specifies

that strategic efforts in digital marketing, customer engagement, building brand personality, participating in innovation and technological advancement, and contributing to corporate social responsibility, each delivered meaningfully to how consumer perceives the company.

Table 5: The Significance Analysis of the Direct Effects.

Path	Estimate	S.E.	C.R.	P	Hypothesis Result
DMS→CI	.375	.042	8.953	***	Supported
CE→CI	.302	.043	6.962	***	Supported
BP→CI	.327	.041	7.927	***	Supported
ITA→CI	.337	.042	7.944	***	Supported
CSR→CI	.346	.044	7.835	***	Supported

Note: * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Nevertheless, the moderation analysis provided detailed and complex findings. The role of big data usage as a moderator was partially supported. Result specifies that big data application did not significantly moderates the connection between digital marketing strategies and corporate image. Results suggested that the positive impact of digital

marketing on corporate image remains consistently regardless of the level of big data analytics employed. By contrast, for the other four marketing initiatives (customer engagement, brand personality, innovation & technological advancements, and CSR), big data usage emerged as a significant moderator on corporate image.

Table 6: The Significance Analysis of the Indirect Effects.

Path	coeff	S.E.	t	P	Hypothesis Result
DMS→BD→CI	-.040	.037	-1.077	.282	Not Supported
CE→BD→CI	-.1306	.0396	-3.2979	.0011	Supported
BP→BD→CI	-.1054	.0392	-2.6894	.0075	Supported
ITA→BD→CI	-.0884	.0381	-2.3228	.0207	Supported
CSR→BD→CI	-.1074	.0421	-2.5491	.0112	Supported

5. DISCUSSIONS

Intriguingly, all these moderation effects were negative. In other words, although higher levels of big data usage strengthen a company’s capabilities, but they were found to diminish the positive impact that customer engagement, brand personality, innovation efforts, and CSR have on corporate image. This counterintuitive result indicates that

when organizations in the ICT sector heavily leverage big data in their marketing operations, the marginal benefit of certain human-centric or innovation-driven initiatives on shaping a favourable corporate image is reduced.

These findings summarized in Table 8 below, emphasized that big data’s role is more complex than a straightforward “more data = better image” equation. Combining big data with traditional

marketing can boost efficiency but may reduce the image. personal or creative elements essential for public

Table 7: Key Findings, Theoretical and Practical Implications.

Key Finding	Theoretical Implications	Practical Implications
Each of the five marketing initiatives (digital marketing, customer engagement, brand personality, innovation & technological advancements, and CSR) have a significant effect on corporate image.	Determines marketing theory by proving that multiple marketing initiatives contributes to corporate image establishment. This indication connects the gaps in earlier research, which examined the factors in separation.	Enterprises in ICT sector should participate in various marketing strategies from digital marketing, innovation, CSR, customer engagement, and brand personality development, as each strategy improves the corporate image.
Big data usage does not significantly moderate the connection between digital marketing strategies and corporate image.	The effectiveness of digital marketing on shaping corporate image is confirmed significant in this research. The result also narrows the theoretical scope of big data's effect where it does not universally impact all marketing associations.	Managers can be convinced that data-driven tools will not undermine the positive impact of digital marketing on corporate image. Companies should continue leverage digital marketing campaigns to strengthen corporate image without concern that heavy analytics use will erode those campaigns' effectiveness. In practice, digital marketing and big data can comfortably co-exist, as data analytics neither enhances nor detracts from digital marketing's image-building power.
Big data usage significantly and negatively moderates the effects of customer engagement, brand personality, innovation & technological advancements, and CSR on corporate image (higher data utilization weakens the positive influence of these initiatives).	This finding confirmed that more data might not automatically enhances marketing effectiveness. It suggested possible diminishing returns where extensive data analytics might decrease the human creative, or interpersonal factors in shaping the corporate image. Theoretically, researchers should consider the balance between data-driven decision-making and practical marketing.	Managers should acknowledge that big data is not a one-off solution for every aspect of marketing, especially when developing customer relationships, brand identity, innovation perception, or CSR reputation. Business leaders must endeavour the balance. Managers can utilize the big data insights to personalize the marketing initiatives without overshadowing the creativity and human touch. For example, companies should ensure data analytics are used for strategy improvement rather on replaces the connection between the companies and their customers.

Simultaneously, managers should carefully utilize big data in their decision-making process. The finding of this study confirmed that the heavy rely on big data use can weaken the effectiveness of certain marketing efforts. Human elements remain essential. For example, big data analytics encourage companies to practice automated customer interactions by relying on algorithms for decision-making, however, the reliance may unintentionally weaken the personal connection between the company and their customers. As a result, it could decrease the positive impact of customer's connection on the company's image. Managers should strive a balance by using data analytics as references but avoid allowing data algorithms to completely replace creative branding judgment or actual human connection.

For companies in the Chinese ICT sector, the results propose an identical approach to technology adoption in current marketing strategies. Big data can assist marketers target the company's marketing strategy more accurately by analysing the valuable feedback from its customers. It should be perceived as a tool that improves traditional marketing rather than replacing them. According to the findings, extreme dependence on data without

thoughtful integration may poorly influence the public perception and yield diminishing returns. Business leaders and marketing executives can utilize these insights to effectively distribute resources. Furthermore, the examination shows big data does not moderate the impact of digital marketing on corporate image.

6. CONCLUSION

The extended theoretical of this research has proofed the crucial elements on how big data usage moderates the connection between marketing initiatives and corporate image in China's ICT sector. This study demonstrates the marketing initiatives remain fundamental to build a strong corporate image, and it also revealed that the use of big data analytics can be complex on these relationships. Theoretical contributions highlighted big data is not universally benefit to all marketing contexts. Marketing practitioners should take a balanced approach, by using big data wisely to enhance customer engagement, branding, innovation, and CSR efforts without reducing their impact. Policymakers and industry associations should consider the ethical use of big data, as these could create impact on privacy protection and

safety issues. In summary, this study offers a practical guidance for companies to align big data strategies with marketing goals, turning technology into a stronger branding and lasting competitive advantage.

7. LIMITATIONS AND FUTURE RESEARCH

This investigation has certain restrictions that open possibilities for future examination. First, data were collected through survey from employees in China ICT companies. Although it allowed effective model testing, but it may limit the generalizability of the discoveries. Potential research could consider stretch this study in other industries within or outside of China to see if the observed patterns are

hold or vary from different sectors. Comparative studies across industries or countries would uncover whether the negative moderation by big data is a general phenomenon or specific to a specific situation. Second introducing mixed-method approaches, where future researcher could include qualitative research method such as interviews or case studies. It could provide an opportunity for researcher to gather valuable insights from respondent. Third, future research may discover other moderating variables. For example, investigating the role of organizational factors such as leadership support, which might clarify how companies can utilize big data without adverse side effects.

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Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

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