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Contents

Editorial: The Thirtieth Anniversary of JBM	i-iv
<i>Eldon Y. Li, & She-I Chang</i>	
Examining the Impacts of ESG on Employee Retention: A Study of Generational Differences	1-22
<i>C. Christopher Lee, Joley L. Luppi, Tyler Simmons, BaoTram Tran, & Ruoqing Zhang</i>	
Search Data and Geodemographics Determinants of the Avocado Sales in the U.S. Markets	23-56
<i>Di Wu, Zhenning Xu, & Ji Li</i>	
Customer Satisfaction and Willingness to Pay More: Mediating Effects of Perceived Herbal Quality and Brand Trust in Ghana	57-79
<i>Peter Kwasi Oppong, Wilberforce Owusu-Ansah, & Joseph Owusu</i>	
Social Media Marketing – A Systematic Review of Quantitative Empirical Reserach	80-114
<i>Bernd W. Wirtz, & Isabell Balzer</i>	

Editorial: *The Thirtieth Anniversary of JBM*

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The Thirtieth Anniversary

The Journal of Business and Management is a double-blind refereed journal addressing extant or potential business management theories and practices and emergent issues of interest to academics and practitioners. The journal was inaugurated in 1993 by Prof. Franklin Strier and Prof. Burhan Yavas at California State University Dominguez Hills, USA. The publication of this issue marks the 30th Anniversary of the journal.

Editorial Objective

The primary editorial objective of the *JBM* is to provide a forum for disseminating theory and research in all areas of business, management, and organizational decisions. We invite research articles, comprehensive reviews, and case studies that provide insights into daily business phenomena. Authors of *JBM* are always encouraged to offer recommendations to readers exemplifying the applicability of their research findings.

Research Articles

In this issue of *JBM*, we have included four research articles. First, C. Christopher Lee, Joley L. Luppi, Tyler Simmons, BaoTram Tran, and Ruoqing Zhang co-author the article "Examining the impacts of ESG on employee retention: a study of generational differences." They examine whether employees' environment, society, and corporate governance (ESG) perceptions impact their intention to stay with the organization during the COVID-19 pandemic. The ESG is divided into environment-related ESG (E-ESG), society-related ESG (S-ESG), and corporate governance-related ESG (G-ESG). They analyze data collected online from 716 respondents and reveal that E-ESG and S-ESG positively and significantly impact employee retention, and the magnitudes vary across different generations. However, the impact of G-ESG on employee retention is not significant.

In the second article, "Search data and geodemographics determinants of the avocado sales in the US markets," Di Wu, Zhenning Xu, and Ji Li study the geodemographic data and search data across multiple metropolitan regions in the US collected by the Hass Avocado Board (HAB) and reveal that income, age, ethnicity, and education significantly correlate with avocado sales. Moreover, the analysis detects a strong growth of avocado consumption over the year and that regions with a younger population tend to have lower avocado sales per capita. They confirm that organic avocado sales are more volatile than conventional avocados due to price, supply and demand, and other relevant issues.

Next, Peter Kwasi Oppong, Wilberforce Owusu-Ansah, and Joseph Owusu present a study, "Customer satisfaction and willingness to pay more: mediating effects of perceived herbal quality and brand trust in Ghana." The study examines responses from 265 customers and confirms that perceived herbal quality partially mediates the link from customer satisfaction to brand trust and willingness to pay more. Likewise, brand trust partially mediates the impact of customer satisfaction and perceived herbal quality on willingness to pay more.

In the last and fourth study, Bernd W. Wirtz and Isabell Balzer present a study on "Social media marketing - a systematic review of quantitative empirical studies." The authors review 355 peer-reviewed quantitative empirical articles in social media marketing and identify gaps for potential research. They review the articles according to key themes, research objective, research perspective, statistical method, and data collection method. They identify four research periods within social media marketing research: (1) the origin of SMM research from 2004 to 2011; (2) the growing interest from 2011 to 2014 with the first developments regarding preferred theories; (3) the underpinning of theories with further research from 2014 to 2016; and (4) the paradigm shift in research from 2016 onward.

Acknowledgment

In this issue of Vol. 29, No. 1, we thank the authors for sharing their knowledge through the research projects and the reviewers for taking their precious time to review the articles and offer constructive suggestions to the authors. In addition, special thanks go to the College of Management at National Chung Cheng University (CCU) in Taiwan for the administrative support, to the Global Electronic Business Research Center for the editorial work, and to the International Consortium for Electronic Business (ICEB) for being a partner in accepting *JBM* as its official publication since the issue of Vol. 26, No. 2 in September 2020.

The publication of *JBM* cannot sustain without institutional partners and contributing scholars. Please note that the views expressed in these articles belong to the authors, not the editors, editorial board, *JBM*, ICEB, and CCU. We hope the articles are interesting and beneficial to your future research. On behalf of the Editorial Board, I sincerely thank you for your continuous support. Finally, we would like to take this opportunity to wish you all to be safe and healthy under the sustaining coronavirus epidemic. We hope the COVID-19 contagion ends soon, and we, the people, can get back to a healthy and normal life.

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She-I Chang is a Professor and Dean of the College of Management at National Chung Cheng University, Chiayi, Taiwan. He received his M.S. and Ph.D. in Computer Science and Information Systems Management from Bond University and Queensland University of Technology, Australia. He is currently the Dean of the College of Management and Professor at the Department of Accounting and Information Technology, National Chung Cheng University, Taiwan, and Visiting Professor at the International Graduate School of Accounting Policy (IGSAP), Tohoku University, Japan. He was involved in over 40 Ministry of Science and Technology (MOSTI) funded research projects or supported by other organizations, totaling over 3 million U.S. dollars. He has received over 30 awards, including research, teaching, and consulting services. His research interests focus on the business issues, challenges, and benefits realization associated with ERP life cycle-wide implementation, management, and support. He also has an interest in the application of qualitative research methodology. Currently, at CCU, Taiwan, his research has extended around IT/IS governance and enterprise-wide information systems performance management. He also serves as an editor-in-chief for the *Journal of Information Communication and Technology Auditing* and board members for many international professional organizations, including ISACA Taiwan Chapter, AIS Taiwan Chapter. Professor

Chang's research outcomes have contributed to both theory and practice. Based on the research areas, he authored/ co-authored over 80 refereed journal articles (e.g., *Information & Management*, *Decision Support Systems*, *Journal of Information Systems*, *Information Systems Management*, *Communication of AIS*, *Journal of Global Information Management*, *Information System Frontiers*) and published ten textbooks.

Examining the Impacts of ESG on Employee Retention: A Study of Generational Differences

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Abstract

Purposes – *This study examines the relative effects of employees' environment, society, and corporate governance (ESG) perceptions on their intention to stay with the organization during the COVID-19 pandemic. This study also explores whether generational differences moderate the relationships between the three ESG factors and employee retention.*

Methods – *This study uses an online survey to collect data via Amazon Mechanical Turk. Multiple regression analysis is used to analyze data collected from 716 respondents.*

Findings – *The results show that environment-related ESG (E-ESG) and society-related ESG (S-ESG) positively and significantly impact employee retention, and the magnitudes vary across different generations. However, the impact of corporate governance-related ESG (G-ESG) on employee retention is not significant.*

Limitations – *This study only compares two generational cohorts, namely Generation Y and Generation Z. Future research endeavors could expand the sample size, including Generation X, or consider other potential moderating factors such as job type, job location, or firm size.*

Contributions to literature – *This study makes a valuable contribution to the existing literature by empirically investigating the relationships between ESG dimensions and employee retention.*

Practical implications – *Businesses can effectively allocate corporate resources to important ESG factors uncovered by this study, thus, developing effective employee retention strategies.*

Originality – *This study examines the collective effects of three ESG factors on employee retention. Furthermore, it highlights generational differences in the relationships between ESG factors and employee retention.*

Keywords: employee retention, ESG, generations, regression analysis, COVID-19

Reference to this paper should be made as follows: Lee, C.C., Luppi, J.L., Simmons, T., Tran, B.T., & Zhang, R.Q. (2023). Examining the impacts of ESG on employee retention: a study of generational differences. *Journal of Business and Management*, 29(1), July, 1-22. DOI: 10.6347/JBM.202307_29(1).0001.

Introduction

Employee retention is a crucial factor for the long-term success of any organization (Basnyat & Lao, 2019; Das & Baruah, 2013). Retaining key employees ensures business stability, supports the ongoing development of business resources, and sustains profitability (Cloutier et al., 2015; Singh et al., 2022). However, the COVID-19 pandemic has led to “great resignation”, resulting in an unprecedented number of professionals quitting their jobs, making it challenging for companies to attract replacement staff. To address this issue, organizations need to understand the key success factors of talent retention (Harsch & Festing, 2020).

One approach many businesses have adopted to improve long-term employee retention is implementing ESG (environment, society, and corporate governance) principles. ESG principles focus on holistically favorable and socially conscious outcomes, promote appropriate business behavior, and address environmental, social, and governance issues. As discussed in the literature (e.g., Burke, 2022; Huang, 2021), environmental strategies focus on ensuring safe environmental practices, social strategies concentrate on relationships with stakeholders, and corporate governance strategies focus on the effectiveness and efficiency of leadership structures.

The global spread of COVID-19 has increased international concerns over ESG issues (Li et al., 2022). While prior research has shown that organizations implementing ESG practices can yield positive environmental impact results (Zumente & Bistрова, 2021), more favorable societal perceptions (Ikram et al., 2021), and higher overall expected returns for shareholders (Khan, 2019), it remains unclear how ESG factors collectively affect employee retention during the pandemic.

The perceptions of ESG initiatives are critical because they influence how employees interpret their organization’s culture, affecting their work attitudes and behaviors. Therefore, this study aims to empirically examine the effects of employees’ ESG perceptions on their retention intention during the COVID-19 pandemic. Specifically, this study compares the impact of ESG perceptions on retention intention between

Generation Y (Gen Y) and Generation Z (Gen Z) cohorts in the U.S. Our study proposes that differences in these two generation cohorts' perceptions of ESG initiatives may impact their retention intention differently. The findings from this study will assist companies in retaining employees by developing effective business strategies tailored to the specific needs of these two generation groups.

The remainder of this paper is structured as follows: the next section presents the research model, theoretical background, and hypothesis development. The research methodology is then discussed, followed by a description of the results. A discussion of findings and managerial implications is presented in the subsequent section. Finally, the last section concludes this research by highlighting propositions for future research.

Research Model, Theoretical Background, and Hypothesis Development

Research Model and Theoretical Background

The research model presented in Figure 1 explores the potential moderating effects of employee generations on the relationships between the three ESG dimensions and employee retention. The model hypothesizes that each of the three ESG dimensions would positively influence employee retention in the workplace.

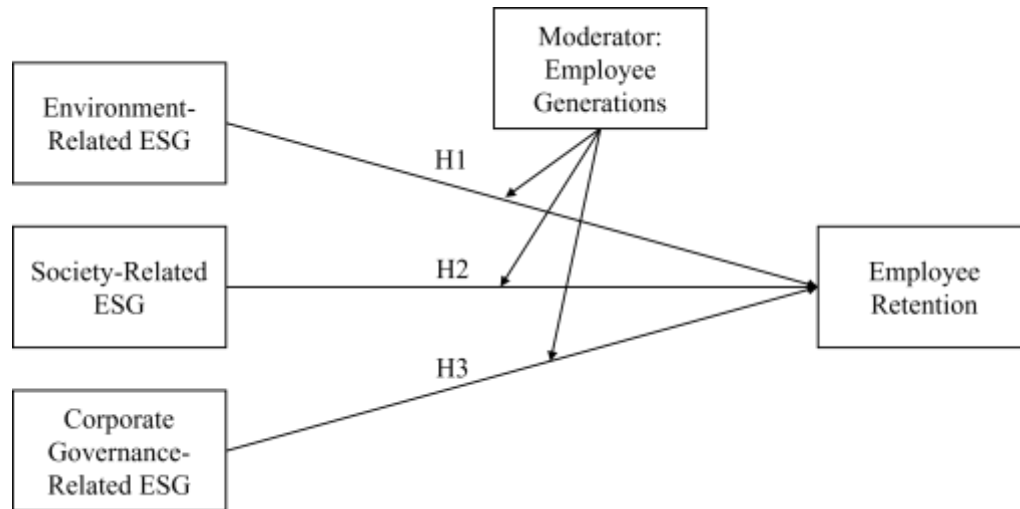


Figure 1: Research Model

The ESG principle has gained significant attention recently, particularly since its official proposal by the United Nations in 2004 (Annan, 2004). It has become integral to many organizations' competitive strategies (Escrig-Olmedo et al., 2019). One of the ESG dimensions is environment-related ESG (E-ESG), which focuses on a company's measures to protect the environment and promote sustainable practices that can preserve

the environment for future generations (Rahman & Alsayegh, 2021; Li et al., 2022). E-ESG initiatives include policies to address climate change, energy efficiency, waste and pollution, and natural resource preservation (Ruan & Liu, 2021; Ting et al., 2019). Businesses can demonstrate E-ESG by implementing policies that mitigate the environmental risks associated with their operations (Lisin et al., 2022). Stakeholders, including employees, are increasingly focused on the environmentally sustainable practices of businesses (Huang, 2021; Meng et al., 2023). Therefore, adopting such practices is crucial for companies to attract and retain talent.

Another dimension of ESG is society-related ESG (S-ESG), which assesses the relationships businesses have with their stakeholders, such as employees, supply chains, consumers, and the communities where their operations are located (Li et al., 2022; Sodhi & Tang, 2018). Encouraging social entrepreneurship, community donations, maintaining high supply chain standards for ethical operations, and sustaining ethical and safe workplace conditions are a few examples of S-ESG practices (Kennett-Hensel & Payne, 2018; Ruan & Liu, 2021; Ting et al., 2019). Like E-ESG initiatives, S-ESG practices and policies must be represented and implemented to gain long-term positive value, outcomes, and continued investor attraction.

Corporate governance-related ESG (G-ESG) examines the impact of management-level policies on business operations (Hsueh, 2019; Li et al., 2022). It encompasses the leadership structure, executive compensation plans, auditing, internal control procedures, and various rights of shareholders (Rahman & Alsayegh, 2021). Grove and Clouse (2018) suggest that favorable G-ESG policies demonstrate strong values related to diversity, integrity, transparency, and employee relations. Implementing such policies and values may decrease the likelihood of labor issues, discrimination, corruption, and deceptive practices.

The effects of ESG dimensions on employee retention are rooted in the social identity theory (Tajfel, 1979) and the job embeddedness theory (Holtom & O'neill, 2004). The social identity theory (Tajfel, 1979) proposes that individuals derive a sense of pride and self-esteem from their membership in various groups, such as social class and family. When applied to ESG practices in organizations, social identity theory suggests that employees who perceive ESG practices are more likely to identify strongly with their organizations. This identification, in turn, can increase employee job satisfaction and commitment. Similarly, the job embeddedness theory posits that employees would continue as valuable members of the organization when they feel embedded in their communities (Holtom & O'neill, 2004). This theory explains why many employees value working for companies that align with their values, with a commitment to ESG being a crucial aspect of that alignment.

Conversely, companies that lack a commitment to ESG may face difficulties retaining employees as employees may perceive their work as less meaningful or fulfilling. Thus, they may be more likely to leave for a company that aligns better with

their values. Several studies have demonstrated that companies with strong ESG programs tend to have positive organizational cultures, which can improve employee engagement, job satisfaction, and retention (e.g., Bernardino, 2021; Hsiao et al., 2020). Moreover, recent research has explored how the social identity theory and the job embeddedness theory can help explain the positive effects of ESG on employee attitudes or behaviors (e.g., Arici et al., 2023; Colvin, Witt, & Lacey, 2015; Paruzel, Danel, & Maier, 2020).

Hypothesis Development

Environment-Related ESG and Employee Retention

The literature on the relationship between E-ESG and employee retention has been explored in various settings. For instance, Shetty and Gujarathi (2013) investigate the effect of green practices on doctors' attitudes in hospitals in India and find that these initiatives increase facility attractiveness and work commitment among the respondents. In their study, green practices refer to initiatives integrating sustainability principles into business decisions, such as green buildings, green administration, waste management, and electricity conservation. Besides, Benn, Teo, and Martin (2015) surveyed and interviewed employees from a technical college and a consulting company in Australia and found a strong association between implementing environmental sustainability initiatives and employee engagement in the workplace. Similarly, Likhitkar and Verma (2017) examine the impact of green human resource management practices on organization sustainability and employee retention. Adopting environmentally friendly practices increases employee retention and positive outcomes such as improved morale, creativity, and team participation. Based on the findings from previous research and the above discussion, it can be inferred that businesses can retain talent by implementing E-ESG practices. Therefore, it is hypothesized that:

H1a: Environment-related ESG is positively related to employee retention in the workplace.

The impact of E-ESG on employee retention is likely moderated by generational differences, as evidenced by previous research. For example, Zaharee et al. (2018) find that young and early-career employees are more likely to seek job opportunities in environmentally sustainable companies. They discovered that candidates between the ages of 22 and 25 ranked organizational environmental responsibility as one of their top five requirements for potential employers. In contrast, this criterion is significantly lower in priority for candidates aged 30 or older. Similarly, Zainee and Puteh (2020) investigate the impact of corporate social responsibility on talent retention among millennials in the accounting field. They find that organizational involvement in environmental activities is crucial in determining millennials' loyalty to a company. Therefore, organizations' environmental protection efforts may positively affect the retention of millennials in the workplace. These findings suggest that the relationship between E-ESG and employee

retention is likely positively associated, particularly for younger generations more strongly impacted by E-ESG practices. Therefore, it is hypothesized that:

H1b: Generations moderate the relationship between environment-related ESG and employee retention in the workplace such that environment-related ESG has a stronger positive impact on talent retention among younger generations.

Society-Related ESG and Employee Retention

Numerous studies have consistently demonstrated a positive relationship between S-ESG and employee retention (Bode, Singh, & Rogan, 2015; Kuratko et al., 2017; Sanusi & Johl, 2022). For instance, Bode et al. (2015) use individual-level data of 9,821 employees in a global management consulting firm and find a positive retention effect associated with employee participation in a corporate initiative with explicit social impact goals. Similarly, Sanusi and Johl (2022) investigate the internal dynamics of S-ESG factors and reveal that positive S-ESG practices positively influence employee job continuity intention. These collective studies suggest that businesses can benefit from balancing the implementation of corporate social initiatives with financial profitability opportunities. Doing so may increase employee retention and reduce the direct and indirect costs associated with high employee turnover. Thus, it is hypothesized that:

H2a: Society-related ESG is positively related to employee retention in the workplace.

Research has also shown that younger generations place a greater emphasis on S-ESG in the workplace compared to older generations (e.g., Carnahan, Kryscynski, & Olson, 2017; McGlone, Spain, & McGlone, 2011; Zainee & Puteh, 2020). For instance, McGlone et al. (2011) surveyed college students to examine the relationship between their S-ESG attitudes and their willingness to work for companies that prioritize S-ESG through employee volunteerism. The authors find that younger generations rate S-ESG significantly higher than older generations, indicating that investment in S-ESG can lead to higher employee retention among younger generations. In examining the relationships between S-ESG factors, employee retention, and generations, Zainee and Puteh (2020) find a strong relationship between philanthropic responsibility and talent retention among Gen Y accountants in Malaysia. They suggest employers adopt S-ESG practices, such as volunteerism and other socially involved activities, to retain Gen Y accountants. Based on these findings, we posit that younger employees stay with companies longer than senior employees when companies participate in S-ESG activities. Therefore, it is hypothesized that:

H2b: Generations moderate the relationship between society-related ESG and employee retention in the workplace such that society-related ESG has a stronger positive impact on talent retention among younger generations.

Corporate Governance-Related ESG and Employee Retention

Corporate governance is a critical aspect of ESG factors as it directly impacts the daily work-life of employees. How a company governs itself affects employee satisfaction, engagement, and retention. Previous research has shown a significant association between G-ESG and employee attraction or retention (Hirota et al., 2010; Safieddine, Jamali, & Nouredine, 2009; Sumlin, Hough, & Green, 2021). Das and Baruah (2013) find that businesses prioritizing favorable G-ESG policies and practices are more likely to retain top talent. Thus, companies prioritizing sound governance practices may enjoy a competitive advantage in attracting and retaining high-performing employees. Therefore, we hypothesize that:

H3a: Corporate governance-related ESG is positively related to employee retention in the workplace.

Ikram et al. (2021) investigate how various internal governance practices influence faculty retention in higher education institutions in Pakistan. Among the factors analyzed, corporate governance and responsibility were ranked highly by Gen Y employees. However, the younger generation rated this factor less critical, consistent with the social responsibility literature. As newcomers to the workforce, younger employees may have less bargaining power to dictate their standards for suitable work environments than experienced professionals. Similarly, Pasko, Maellaro, and Stodnick (2021) examine the differences in work-related preferences across generational cohorts in a large U.S. firm. Their survey of 300 employees reveals that younger-generation workers place significantly greater importance on G-ESG practices such as job security, career advancement, work/life balance, and company leadership. Therefore, based on the findings from Ikram et al. (2021) and Pasko et al. (2021), we can expect G-ESG to have a stronger impact on the retention of younger generations. Therefore, it is hypothesized that:

H3b: Generations moderate the relationship between corporate governance-related ESG and employee retention in the workplace such that corporate governance-related ESG has a stronger positive impact on talent retention among younger generations.

Research Method

Sample and Data Collection

An online survey was conducted in April 2020 to collect data for this study. The survey link was posted on Amazon Mechanical Turk, and participants were required to be employed and over 18 years old. A total of 821 responses were collected, and measures

were implemented to ensure data quality. These measures involved screening out duplicate responses, those with multiple missing values, and insincere responses. As a result, the final sample consisted of 716 cases. Based on the age categorization criteria employed by Dhopade (2016) and Bateh (2019), respondents in this study were classified into different generational cohorts. Specifically, individuals between 18 and 24 years old were categorized as Gen Z, those between 25 and 39 years old were classified as Gen Y, individuals aged 40 to 55 years old were grouped as Gen X, and respondents over 55 years old were labeled as baby boomers, all as of April 2020. As shown in Table 1, the sample consisted of 263 Gen Z employees (36.7%), 344 Gen Y employees (48.0%), 93 Gen X employees (13.0%), and 16 baby boomers (2.2%).

Table 1: Respondents' Demographic Profile

Generations	Frequency	Percentage
Gen Z (18 to 24)	263	36.7
Gen Y (25 to 39)	344	48.0
Gen X (40 to 55)	93	13.0
Baby Boomers (> 55)	16	2.2
Total	716	100.0

Measures

The study utilized validated measures from previous research to assess four variables: E-ESG, S-ESG, G-ESG, and employee retention. A total of 14 scale items were included in the survey, with 11 items adopted from (Woo & Jin, 2015; 2016) to measure three ESG dimensions and three items from Armstrong-Stassen and Schlosser (2008) to measure employee retention. Respondents were asked to rate each item on a seven-point Likert-type scale, with "1 = strongly disagree", "7 = strongly agree", and "4 = neutral" as the midpoint. The scales were reviewed by three management experts, who provided feedback to improve the questionnaire's clarity. Table 2 details the variables, their indicators, and their respective sources.

Table 2: Variables, Measurement Items, and Sources

Variable	Indicator	Item	Source
Employee Retention (ER)	ER1	Barring unforeseen circumstances, I would remain in this organization indefinitely.	Armstrong-Stassen & Schlosser (2008)
	ER2	I would prefer to continue working in this organization if I were free to choose.	
	ER3	I expect to continue working as long as possible in this organization.	
Environment-related ESG (E-ESG)	E-ESG1	I think the company I work for tries to: Take care of water, energy, and material uses.	Woo & Jin (2015, 2016)
	E-ESG2	Minimize pollution when producing products/services.	
	E-ESG3	Invest in protecting the environment.	
Society-related ESG (S-ESG)	S-ESG1	I think the company I work for tries to: Protect human rights in workplaces.	Woo & Jin (2015, 2016)
	S-ESG2	Clarify health care benefits for employees.	
	S-ESG3	Clearly label/explain products/services for customers.	
	S-ESG4	Take care of customer complaints.	
	S-ESG5	Invest in developing local community welfare.	
Corporate Governance-related ESG (G-ESG)	G-ESG1	I think the company I work for tries to: Avoid corruption in business.	Woo & Jin (2015, 2016)
	G-ESG2	Provide the company's financial information to the public.	
	G-ESG3	Allow the freedom of labor unions and forbid discrimination.	

Regression Model

We formulated a regression model to test our hypotheses regarding generational differences in the relationships between the three independent and dependent variables. Our proposed model had employee retention (Y1) as the dependent variable and the three ESG factors, namely E-ESG (X1), S-ESG (X2), and G-ESG (X3), as independent variables.

$$Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

where Y_1 = Employee Retention (ER)

X_1 = Environment-Related ESG (E-ESG)

X_2 = Society-Related ESG (S-ESG)

X_3 = Corporate Governance-Related ESG (G-ESG)

Results

Descriptive Statistics and Correlations

Due to the limited number of responses collected from Gen X and Baby Boomer groups, this study primarily focuses on the full model (N = 716), Gen Y (N = 344), and Gen Z (N = 263). Descriptive analysis was conducted for the full model, Gen Y, and Gen Z groups. As presented in Table 3, the analysis for all employees (N = 716) reveals that S-ESG has the highest mean score (5.367 ± 1.132), followed by G-ESG (5.098 ± 1.280) and E-ESG (4.471 ± 1.550). The Pearson correlation analysis results demonstrate that employee retention is significantly correlated with the S-ESG (.437***), E-ESG (.421***), and G-ESG (.384***) variables.

Table 3: Means, standard deviations, and correlations of the variables for all data (N = 716)

	Mean	SD	(1)	(2)	(3)	(4)
(1) Y_1 _ER	4.456	1.906	1			
(2) X_1 _E-ESG	4.471	1.550	.421***	1		
(3) X_2 _S-ESG	5.367	1.132	.437***	.543***	1	
(4) X_3 _G-ESG	5.098	1.280	.384***	.541***	.743***	1

Note: SD = Standard deviation, *** $p < .001$ (2-tailed)

Table 4 displays the descriptive analysis results for Gen Y employees (N = 344). The mean pattern for the ESG factors is consistent with that shown in Table 3. Specifically, S-ESG has the highest mean score (5.405 ± 1.111), followed by G-ESG (5.169 ± 1.199) and E-ESG (4.625 ± 1.585). Furthermore, the Pearson correlation analysis shows significant positive correlations between employee retention and S-ESG (.466***), G-ESG (.401***), and E-ESG (.384***).

Table 4: Means, Standard Deviations, and Correlations of the Variables for Gen Y (N = 344)

	Mean	SD	(1)	(2)	(3)	(4)
(1) Y_1 _ER	4.714	1.753	1			
(2) X_1 _E-ESG	4.625	1.585	.384***	1		
(3) X_2 _S-ESG	5.405	1.111	.466***	.564***	1	
(4) X_3 _G-ESG	5.169	1.199	.401***	.539***	.733***	1

Note: SD = Standard deviation, *** $p < .001$ (2-tailed)

Table 5 provides the descriptive statistics for Gen Z employees (N = 263), consistent with the mean patterns in Tables 3 and 4. Specifically, S-ESG has the highest mean score of (5.242 ± 1.189), followed by G-ESG (4.989 ± 1.319) and E-ESG (4.252 ± 1.434). The Pearson correlation analysis results show that employee retention is significantly correlated with E-ESG (.457***), S-ESG (.387***), and G-ESG (.370***).

Table 5: Means, Standard Deviations, and Correlations of the Variables for Gen Z (N = 263)

	Mean	SD	(1)	(2)	(3)	(4)
(1) Y ₁ _ER	3.853	1.950	1			
(2) X ₁ _E-ESG	4.252	1.434	.457***	1		
(3) X ₂ _S-ESG	5.242	1.189	.387***	.492***	1	
(4) X ₃ _G-ESG	4.989	1.319	.370***	.522***	.754***	1

Note: SD = Standard deviation, ****p* < .001 (2-tailed)

Regression Results

To examine the generational differences in the relationships between ESG factors and employee retention, we performed regression analysis on three different groups: all data (N=716), Gen Y (N=344), and Gen Z (N=263). The first regression model was applied to all data, including three independent variables, E-ESG, S-ESG, and G-ESG, to estimate the dependent variable, employee retention. The results of the full regression model for all employees are presented in Table 6. The overall model is statistically significant [$R^2 = .240$, $R^2_{adj} = .237$, $F(3, 712) = 75.076$, $p < .001$], explaining 24.0% of the variance in the employee retention outcome ($R^2 = .240$).

The regression model has no evidence of serious multicollinearity because all VIFs are less than 10 (Myers, 1990), and the condition index is less than 30 (Kennedy, 2008). Based on the standardized regression coefficient (β), S-ESG has the highest impact on employee retention ($\beta = .261$), followed by E-ESG ($\beta = .249$). In summary, the results suggest that E-ESG ($\beta = .249$, $p < .001$) and S-ESG ($\beta = .261$, $p < .001$) have significant and positive effects on employee retention, supporting H1a and H2a, respectively. However, no significant relationship exists between G-ESG and employee retention ($\beta = .056$, $p = .266$), rejecting H3a and H3b.

Table 6: Regression Model Results for All Data (N = 716)

DV = Employee retention; $R^2 = .240$, $R^2_{adj} = .237$, $F(3, 712) = 75.076$, $p < .001$; CI = 17.893						
	B	SE	β	<i>t</i>	<i>p</i>	VIF
(Constant)	.307	.305		1.006	.315	
X ₁ _E-ESG	.306	.049	.249	6.201	<.001	1.510
X ₂ _S-ESG	.439	.085	.261	5.173	<.001	2.380
X ₃ _G-ESG	.083	.075	.056	1.114	.266	2.373

Note: DV = Dependent variable; CI = Condition index, B = Regression coefficient, SE = Standard error, β = Standardized regression coefficient, VIF = Variance inflation factor

The second and third regression models are tested separately for Gen Y (N = 344) and Gen Z respondents (N = 263). Table 7 displays the results for the Gen Y regression model, which is statistically significant [$R^2 = .242$, $R^2_{adj} = .235$, $F(3, 340) = 36.124$, $p < .001$] and accounts for 24.2% of the variance in employee retention ($R^2 = .242$). The findings reveal that S-ESG has a significant positive effect on employee retention ($p < .001$), while E-ESG has a moderately significant impact on employee retention ($p = .006$). However, there is no statistical significance found between G-ESG and employee retention. The β values indicate that S-ESG has the strongest impact on employee retention ($\beta = .312$), followed by E-ESG ($\beta = .163$). The Gen Y regression model does not exhibit serious multicollinearity since all VIFs are less than 10 (Myers, 1990), and the condition index is less than 30 (Kennedy, 2008).

Table 7: Regression Model Results for Gen Y (N = 344)

DV = Employee retention; $R^2 = .242$, $R^2_{adj} = .235$, $F(3, 340) = 36.124$, $p < .001$; CI = 18.304						
	B	SE	β	<i>t</i>	<i>p</i>	VIF
(Constant)	.582	.421		1.382	.168	
X ₁ _E-ESG	.180	.065	.163	2.778	.006	1.543
X ₂ _S-ESG	.493	.115	.312	4.302	<.001	2.364
X ₃ _G-ESG	.123	.104	.084	1.178	.239	2.274

Note: DV = Dependent variable; CI = Condition index, B = Regression coefficient, SE = Standard error, β = Standardized regression coefficient, VIF = Variance inflation factor

Table 8 presents the results of the regression model for Gen Z employees, which shows that the model is statistically significant [$R^2 = .245$, $R^2_{adj} = .236$, $F(3, 259) = 27.999$, $p < .001$]. The model explains 24.5% of the variance in employee retention ($R^2 = .245$). The results indicate that E-ESG is significantly related to employee retention ($p < .001$), while the relationship between S-ESG and employee retention is less significant ($p = .040$). However, no statistical significance exists between G-ESG and employee retention ($p = .470$). According to the β values, E-ESG has the strongest impact on employee retention ($\beta = .340$), followed by S-ESG ($\beta = .173$).

The results from Table 7 and Table 8 show that the relationship between E-ESG and employee retention is stronger among Gen Z employees ($\beta = .340, p < .001$) compared to the Gen Y group ($\beta = .163, p < .001$), supporting H1b. Contrary to H2b, the study finds that S-ESG has a weaker impact on employee retention among Gen Z employees ($\beta = .173, p < .001$) than in the Gen Y group ($\beta = .312, p < .001$). Finally, since no significant relationship is found between G-ESG and employee retention in the full model ($\beta = .056, p = .266$), H3b is rejected.

Moreover, no serious multicollinearity exists in the Gen Z regression model as all VIFs are less than 10 (Myers, 1990), and the condition index is less than 30 (Kennedy, 2008). Overall, these results provide further evidence that E-ESG and S-ESG can significantly positively affect employee retention, particularly among younger generations, and that G-ESG may not be as relevant.

Table 8: Regression Model Results for Gen Z (N = 263)

DV = Employee retention; $R^2 = .245, R^2_{adj} = .236, F(3, 259) = 27.999, p < .001; CI = 17.123$						
	B	SE	β	t	p	VIF
(Constant)	-.054	.488		-.110	.912	
X₁_E-ESG	.462	.088	.340	5.282	<.001	1.419
X₂_S-ESG	.284	.137	.173	2.068	.040	2.394
X₃_G-ESG	.091	.126	.062	.724	.470	2.495

Note: DV = Dependent variable; CI = Condition index, B = Regression coefficient, SE = Standard error, β = Standardized regression coefficient, VIF = Variance inflation factor

Discussion

This study seeks to understand the collective impacts of ESG factors (i.e., E-ESG, S-ESG, and G-ESG) on employee retention during the COVID-19 pandemic while examining the effect of generational differences between Gen Y and Gen Z. The study surveyed a total of 716 respondents. The evidence indicates that E-ESG ($\beta = .249, p < .001$) and S-ESG ($\beta = .261, p < .001$) have significant and positive impacts on employee retention, supporting H1a and H2a, respectively. These findings are consistent with prior empirical studies (e.g., Shetty & Gujarathi, 2013; Likhitkar & Verma, 2017), which suggest that employers who exhibit environmentally responsible behavior and demonstrate a commitment to social issues have a higher chance of retaining their employees. However, no significant relationship was found between G-ESG and employee retention ($\beta = .056, p = .266$), rejecting H3a and H3b. This result contrasts with previous research by Safieddine et al. (2009), and Hirota et al. (2010), but the differences may be attributed to the varying contexts of the samples used in these studies, such as industry, country, or culture.

This study also explores the moderating role of generational differences on the relationships between ESG factors and employee retention. The findings indicate that Gen Z has a stronger connection between E-ESG and employee retention ($\beta = .340, p < .001$) than Gen Y ($\beta = .163, p < .05$), supporting H1b. This finding aligns with previous studies (e.g., Zaharee et al., 2018; Zainee & Puteh, 2020) that suggest younger generations are more willing to stay with environmentally responsible organizations. The study also finds that S-ESG has a stronger impact on employee retention among Gen Y ($\beta = .312, p < .001$) compared to Gen Z ($\beta = .173, p < .001$), partially supporting H2b. However, this finding contradicts previous research (e.g., Goessling, 2017; Zainee & Puteh, 2020), which suggests that S-ESG has a stronger impact on employee retention for younger generations. This discrepancy may be attributed to differences in the work experiences of Gen Z respondents, which may be limited compared to those of Gen Y respondents. The results are summarized in Table 9.

Table 9: Summary of Research Findings

Hypothesis	Relationship	Moderator	Conclusion
H1a	E-ESG → Employee Retention	/	Supported
H1b	E-ESG → Employee Retention	Generations	Supported
H2a	S-ESG → Employee Retention	/	Supported
H2b	S-ESG → Employee Retention	Generations	Partially Supported
H3a	G-ESG → Employee Retention	/	Rejected
H3b	G-ESG → Employee Retention	Generations	Rejected

The results of this study also provide important managerial implications for businesses that aim to retain employees. First and foremost, it is important to stress that the results of this study should not be construed as implying that organizations make any work-related decisions based on an individual’s demographic characteristics unless those traits such as generation and age have been unequivocally shown to meet the strict legal standards of a bona fide occupational qualification. Except in rare cases where an employee’s demographic traits are critical to their performance, using characteristics such as age or generation to influence personnel decisions is not only illegal but also morally wrong. There should be no doubt about the researchers’ position on this matter.

The findings suggest that G-ESG is not a significant factor in employee retention; thus, it is not recommended to prioritize it in businesses. Instead, companies should prioritize S-ESG and E-ESG, with S-ESG taking precedence over E-ESG based on the full data model analysis results. For Gen Y and Gen Z groups, the study suggests different priority levels for E-ESG and S-ESG. The analysis results for the Gen Y group indicate that businesses should prioritize S-ESG first, followed by E-ESG. On the other hand, based on the analysis results for the Gen Z group, companies should prioritize E-ESG

first, followed by S-ESG. The findings suggest that businesses should emphasize S-ESG initiatives to improve overall employee retention, particularly among Gen Y employees. For Gen Z employees, prioritizing E-ESG initiatives is recommended to improve retention rates.

Conclusion

This study examines the impact of environment-related ESG, society-related ESG, and corporate governance-related ESG on employee retention. Multiple regression analysis is employed to analyze the influence of these ESG factors on employee retention. The results indicate that S-ESG has the highest impact on employee retention, followed by E-ESG. In contrast, the relationship between G-ESG and employee retention is found to be insignificant. These findings are consistent with the results observed in the Gen Y group (aged 25-39). In contrast, for the Gen Z group (aged 18-24), E-ESG exerts a greater impact on employee retention, followed by S-ESG. Across all models, no significant relationship was found between G-ESG and employee retention.

While the findings provide meaningful implications for employee retention research, there are several limitations to consider in this research study. Firstly, establishing strong causal relationships is challenging due to the utilization of cross-sectional survey data. Thus, it is advisable to interpret the analysis results cautiously. Secondly, the sample was collected in the U.S. during the COVID-19 pandemic, so caution should be exercised when generalizing the findings to other countries or cultures. Researchers are encouraged to conduct longitudinal studies to investigate the evolving perceptions of ESG among employees. Thirdly, although multiple regression analysis is appropriate for examining the effects of three ESG dimensions on a single dependent variable (employee retention), more robust statistical techniques such as structural equation modeling can be considered when research models incorporate multiple endogenous/dependent variables (e.g., job satisfaction, firm performance). Finally, due to time and funding constraints, this study only explores the implications of employee retention for two generations, Gen Y and Gen Z, as moderators. Exploring other potential moderating variables such as job type, job location, and firm size is recommended. We hope that this study will stimulate researchers' interest in pursuing these issues in their future endeavors.

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Search Data and Geodemographics Determinants of the Avocado Sales in the US Markets

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Abstract

Purpose – This work aims at providing insights into avocado sales and markets in the US by leveraging advanced data analytics and data visualization methods to model the industry data combined with geodemographics and search data.

Method – The dataset from the Hass Avocado Board (HAB), collected geodemographic data and search data across multiple metropolitan regions in the US are studied by employing quantitative methods and tools, such as principal component analysis (PCA), cluster analysis, data visualization, and regression models.

Findings – The results show that avocado sales and markets are highly affected by geodemographic factors and strongly correlated with the search data in the internet community. Income, Age, Ethnicity, and Education significantly correlate with avocado sales. Not only are Google Trends data correlated with avocado sales, but they also can further improve the explanatory power of regression models. Data analytics and visualization tools can be particularly useful for exploring market data in various areas, such as market segmentation, consumer preferences for different avocados (organic vs. conventional), seasonality, and market patterns. Geographically distant cities may have similar consumer markets for avocado sales.

Limitations – The study focuses on the limited panel data from 2015 to 2019 due to the COVID-19 disruption in the 2020 US Census data publication and hence the lack of the geodemographics data in and after 2020, which may not be used to study post-COVID markets. Other limitations include that the study may have possible contemporaneous correlations between conventional and organic avocado sales and only focus on the avocado markets with specific conditions. Therefore, the models developed in this research may need further expanded and studied for different food markets and retailing industries for future improvement and applicability.

Implications – *The study offers insights into the regional trends and search trends of consumers for potentially better sales and market opportunities. The paper has the potential to advance the understanding of the role of geodemographics and public interest in commercial products. From descriptive and diagnostic perspectives, our work harnesses k-means clustering and hierarchical clustering methods as well as exploratory mapping methods to offer data-driven visualizations, which is one of few studies focusing on food markets. Specifically, the results provide useful information and knowledge of the avocado markets to policymakers, producers, distributors, retailers, and consumers as the trend for health-conscious consumption keeps growing in different regions. Furthermore, the study may have implications for practitioners and scholars interested in other agricultural products.*

Originality – *This paper is among the first to underscore heterogeneous characteristics of consumer appetite for avocados across different regions in the US and to provide evidence and examples on how search data and demographic information can be beneficial to further understanding the sales data, exploring markets in various aspects, and potentially developing effective and efficient sales and marketing strategies by region.*

Keywords: clustering and segmentation, data visualization, geodemographics, search data

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Introduction

From sales and marketing perspectives, data analytics and visualization tools can help businesses gain additional information and insights into building brands, making optimal pricing decisions, increasing market shares, and improving customer loyalty. This process focuses on defining metrics, collecting data, employing analytics tools, developing business strategies and executable plans, making decisions, and finally auditing and verifying the results (Wedel & Kannan, 2016), which refers to data-driven decision-making.

Traditional economic research assumes that industry-level analysis is important for making good decisions. However, an increasing number of marketing and information system scholars suggest that adding geodemographic data and non-traditional data like Google Trends (gtrends) search data may help managers make better decisions (Iacobucci et al., 2019; Wedel & Kannan, 2016). Specifically, demographic data is vital to understanding customer behavior and consumption patterns in a specific market. Additionally, geodemographic analysis and time series analysis may help businesses take advantage of the power of data for predictive analysis or prescriptive

analysis, which are often more complex by nature (Wedel & Kannan, 2016). Recent studies suggest that combining industrial-level data with search data and time series data may provide insights into the longitudinal data available for marketers, uncovering subtle nuanced patterns that augment traditionally adopted marketing analytics in the industry (Liu et al., 2021; Skenderi et al., 2021).

A common approach in mainstream time series analysis studies is to estimate how an endogenous variable responds to a change in exogenous variables or predictors using industrial-level data (Zu, Wang, & Cui, 2022). Such studies often underperform since selecting the best predictors is often challenging (Rodriguez, Ozkul, & Marks, 2018). The use of new explanatory variables like Google Trends related to forecasting and prediction activities has gained prominence in the literature. Google Trends is considered a gold mine for business research and is becoming increasingly heavily used (Dos Santos, 2018; Einav & Levin, 2014; Silva et al., 2019). Google Trends data that tracks people's search interests over time can be used to identify consumer demands and preferences, market threats from business competitors, seasonal patterns, business opportunities, and market risks. Previous studies have used Google Trends data to forecast influenzas, fashion trends, and oil consumption (Dos Santos, 2018; Einav & Levin, 2014; Silva et al., 2019; Yu et al., 2019). However, using data analytics and visualizations to model the sales of agriculture markets effectively remains challenging and difficult (Yoo & Oh, 2020). For instance, the techniques as mentioned above may often become inaccessible to practitioners due to various challenges, such as collecting relevant and reliable data and handling advanced analytic methods. As a result, businesses may make suboptimal decisions if they are unable to address these technical challenges, and industrial applications of these methods may not have reached their full potential. There is still in need for more studies, methods, and insights to give practitioners and academics guidance on how to gain business insights via data analytics that goes beyond traditional industrial-level or firm-level variables (Ravenscraft, 1983). Furthermore, finding meaningful data sets for practitioners and academics to conduct comprehensive studies is always challenging.

As such, much less is known regarding the impact of search trends and other industrial-level or category-level factors (pricing, product attributes, etc.) on agriculture product sales. The availability of avocado sales and pricing data in the form of time series and the increasing popularity of avocados in different geographic regions of the US will likely make avocados a good fit for this empirical study. This research selects the avocado market for the planned study to close the gaps between marketing practices and theories. For instance, avocados are popular fruits due to their taste and nutritional value. Avocado consumption is critical in food coupling and cooking, especially among millennials (HAB, 2019). Avocados sold in the US Market are primarily the Hass type (Ambrozek, Saitone, & Sexton, 2018). Hass avocados imported from Mexico account for over 90% of avocados sold in the US (Ambrozek, Saitone, & Sexton, 2018). Hass avocados

are branded as a type of "superfood" that have significant health and nutritional benefits (Ambrozek, Saitone, & Sexton, 2018).

In particular, the Hass Avocado Board (HAB) is an industry association responsible for promoting, researching, and managing Hass avocados. HAB has released weekly Hass avocado sales data across different regions in the US since 2014. The importance of Hass avocados is growing in the US due to the impacts of globalization and marketing efforts (Kourgialas & Dokou, 2021). Another reason this study chooses Hass avocado markets is that there is scant research on comprehensive marketing analytics for the avocado industry. This study can potentially help different market participants (importers, retailers, etc.) develop a data-driven marketing analytics roadmap to understand Hass avocado sales and provide insights into allocating marketing resources and making customer-related decisions. Although some research studies are looking at avocado sales in the selected regional markets, very few studies have examined avocado sales using geodemographics and Google Trends search data. Additionally, there is an urgent need to understand what factors affect avocado sales as well as what market patterns can be useful in making important decisions in avocado businesses, such as branding and pricing (Migliore et al., 2017; Ambrozek, Saitone, & Sexton, 2018; Ambrozek, Saitone, & Sexton, 2019).

Specifically, this study focuses on integrating Google Trends search data into analysis for examining pricing, sales, and revenue forecasting. Understanding regional and global markets and building reliable forecasting solutions are often challenging, preventing businesses from developing effective pricing and marketing strategies and making meaningful budgets and plans for future business successes. On the one hand, unsuccessful forecasting and marketing analysis often lacks sufficient and critical factors in the constructed models. On the other hand, models with too much complexity and redundant factors may limit their applications and even mislead users in understanding relationships between factors and results. At a high level, the progress of technology, the continuous generation of data flows through a fast-growing online community (such as Google Trends), and advancements in data analytics and algorithms have enabled us to construct more robust models with more rigor. Encouraged by recent development in data analytics and recognizing the challenges and opportunities at hand, we have developed several research questions. By addressing these questions, we demonstrate the criticality of incorporating Google Trends search data into principal component analysis (PCA) and time series analysis and offer the possibility of helping businesses explore more resilient methods of decision-making related to pricing, marketing, budgeting, and planning endeavors.

The research inquiries include but are not limited to, 1) explain potential correlations between geodemographic factors, such as education, age, ethnicity, income, and avocado sales. Geodemographic factors have proven helpful in understanding markets, which motivates us to explore how these factors can contribute to the

explanation of constructed regression models in avocado markets. The research inquiry aims to investigate the potential inter-correlations among geodemographic factors, identify any redundant factors, and assess the impact of these factors on regional markets; and 2) examine how Google Trends can further strengthen the explanatory power of regression models. In addition to geodemographic factors, internet search data is believed to play an important role in understanding regional markets. In general, internet search data has demonstrated success in providing real-time insight into consumer interests and purchasing intentions. A few recent studies have inspired us to explore how Google Trends data can improve the potential applications of our constructed models in this study. By incorporating geodemographic factors and internet search data into this study, we can better understand how to cluster regional markets, including geographically distant regions with potentially highly similar markets, and vice versa. To address these research inquiries, we employ a combination of k-means clustering, hierarchical clustering, regression analysis, and exploratory mapping to study a comprehensive dataset that includes industrial-level variables, census data, and search data.

This study contributes to three areas of research. First, data analytics and visualization tools were used to analyze avocado pricing and sales based on industrial-level, geodemographic, and Google Trends data, offering insights beyond traditional longitudinal analysis. Second, the study shows combining Google Trends search data with industrial-level data in a time series analysis can improve model performance. Third, this study may assist decision-makers in the avocado industry in making general demand and supply assumptions about the avocado market and in positioning avocados based on market-driven factors like Google Trends search data. Although this study is done in the US as well as the data is for the US markets, the research tools, models, conclusions, and insights in this study can be particularly useful to business researchers, professionals, and regulatory bodies all over the world as this study provides a comprehensive analysis and a typical example. Hence, similar applications can be undertaken for products in other industries and regions.

On the other hand, understanding local, regional, and national sales opportunities for foods and fruits in the US presents a significant challenge. When it comes to making critical decisions like warehousing, managing cross-border trading activities, and projecting demand and supply, international fruit or food importers and exporters may find it beneficial to integrate geodemographic data and search data into industrial-level data like prices and sales as this study advocates for.

Literature Review

As a starting point, we selected thirteen seminal articles to clarify the theoretical context and the subject area of avocado sales. We used geodemographic information and

Google Trends for forecasting. These articles were summarized in Table 1, and the results were used to help us identify the research gap in this study. Please understand the weaknesses column may not give a complete overview of the scenarios due to space limitations. A detailed discussion of these articles is available in this literature review section.

Geodemographics refers to using both demographic and geographic information of consumers and target markets. Using geodemographic information in marketing has shown great potential for making complex decisions. For instance, geodemographic information can be used to help marketers monitor trade areas and open new locations (Baviera-Puig, Buitrago-Vera, & Escriba-Perez, 2016; Formánek & Sokol, 2022; Rains & Longley, 2021). Geodemographic variables, such as location, age, education, gender, income, and ethnicity, have been used to understand status consumption (Eastman & Liu, 2012), grocery retailing (Prasad & Aryasri, 2011), cigarette brand loyalty and purchase patterns (Dawes, 2014), and customer loyalty in retail banking (Kamath, Pai, & Prabhu, 2019). Notably, a distinction is observable between previous periods (pre-2021), when Google Search data was not included, and recent periods (post-2021), when almost all studies incorporated this data type in their analyses. However, the more recent studies have not fully considered geodemographic and other relevant factors, highlighting a gap. Our study may potentially help fill this gap.

Table 1. Overview of the reviewed sources

Author/year	Sample/design	Data/tools	Results	Weakness
Studies that did not use Google Trends search data				
Palmon & Sopranzetti (2004)	6385 observations of real estate transactions of properties	Transaction data/cluster analysis	Using cluster analysis can help marketers dive deeper into the transaction price and the turnover of houses.	Some potential to use Google Trends data
Calantone & Di, Benedetto (2007)	215 recent new product launches	New product data/cluster analysis	Cluster analysis is performed to help pinpoint possible reasons that lead to successful launches of new products.	Some potential to use geodemographic data and Google search data
Bezawada & Pauwels (2013)	75 stores that span 355 weeks across 56 categories	Persistence modeling	Marketing organic foods and products can be special and different.	Some potential to use Google search data
Nghiem et al. (2016)	Google search data from 2004 to 2013	Google Search data/regression analysis	The quantity of news articles is related to patterns in Google search volume.	Some potential to use geodemographic data
Ambrozek, Saitone, & Sexton (2018)	Hass Avocado sales data from 2013 to 2017	Regression analysis and trend analysis	The activities of the Hass Avocado Board and its member associations have played a fundamental role in this success.	Some potential to use Google search data
Ambrozek, Saitone, & Sexton (2019)	Hass Avocado sales data from 2013 to 2018	Elasticity analysis and regression analysis	Demand for fresh Hass avocados is highly inelastic at the shipper and retail levels.	Some potential to use Google search data
Kirby-Hawkins, Birkin, and Clarke (2019)	814000 unique customer data	E-commerce sales/quadrant analysis	Geodemographic information shows spatial patterns in online grocery sales	Some potential to use Google search data

Chou et al. (2020)	977 consumers	Survey data/CFA	Green consumption intention was significantly and indirectly driven by attitude to green products.	Some potential to use geodemographic variables and Google search data
Studies that used Google Trends search data				
France, Shi, & Kazandjian (2021)	Search data for 100 brands over ten years	Google Search data/regression analysis	Google Trends creates several brand equity series for 100 top-ranked brands.	Some potential to use geodemographic data
Glass & Jarett (2021)	25 search terms	Google Search data/text analysis	Google Trends data offers zero moments of truth about online digital records or search queries over time.	Ignores the use of industrial-level data
Higuchi & Maehara (2021)	381 respondents' quinoa consumption data	Survey data/factor-cluster analysis	A factor-cluster analysis is performed to identify reasons for consuming quinoa.	Some potential to use geodemographic data and Google search data
James et al. (2021)	250,000 expenditure and attitudinal data	Expenditure data and Survey data/Segmentation analysis	Geodemographic information may help meat processors understand temporal and spatial patterns of meat consumption and sales.	Some potential to use demographic data

In the food and grocery industry, geodemographic information is particularly useful for distributors and retailers to develop effective marketing plans and strategies. Geodemographic information may provide insights into the expansion opportunities of retail companies (Thompson et al., 2012). Geodemographic information shows spatial patterns in online grocery sales (Kirby-Hawkins, Birkin, and Clarke, 2019). A recent study shows that applying geodemographic information may help meat processors understand temporal and spatial patterns of meat consumption and sales (James et al., 2021). Furthermore, combining supermarket sales data and geodemographic data can help marketers gain new insights into dietary purchase patterns, not only from marketing and sales perspectives but also from public health perspectives (Clark et al, 2021).

As people become more concerned with food allergies, pesticides, preservatives, or other health issues, organic foods and products have gained more popularity over the years (Vukasovič, 2016). Literature shows organic foods and products have different characteristics from their conventional counterparts (Rana & Paul, 2017). Therefore, marketing organic foods and products can be special and different. For instance, organic products may have higher demand elasticities (Bezawada & Pauwels, 2013), which implies that different promotion strategies may be required. Factors like geodemographic information may have a nuanced relationship with product categories. For instance, age, education level, and income affect people's preference for organic products in both developed and emerging economies (Chou et al., 2020; Vukasovič, 2016).

On the other hand, the consumption of avocados is considered very healthy and may reduce the risk of heart disease (Dreher & Davenport, 2013). Among all types of avocados, Hass avocados rank highly in quality, nutritional value, and taste. Hass avocados can only grow in certain regions and soils and are harvested less frequently than other avocados and fruits (Kourgialas & Dokou, 2021). Due to weather changes

(such as drought), trade barriers, and natural disasters, the supply of Hass avocados is highly volatile. As a result, all these reasons make Hass avocados very expensive fruits.

As the internet evolves from Web 1.0 to 3.0, businesses with the tools necessary to navigate the complexity of consumer trends and geodemographic information obtain a competitive advantage that may lead to better sales (Wedel & Kannan, 2016). Using mobile devices or information technology, consumers nowadays can access product and sales information through tools or platforms as either users or reviewers. As a result, digital records that may be relevant to business operations have grown exponentially. Specifically, Google Trends data offers zero moments of truth about online digital records or search queries over time for different regions that may be due to various marketing efforts (campaign effectiveness, promotional events, etc.) (Glass & Jarett, 2021). Zero moments of truth are a term coined by Google, which means the moment that occurs after the consumers perform online searches but before they make a real-world purchase behavior. As such, Google Trends resembles Zero moments of truth and is an aggregated index based on online search volume data in different regions over time. Google Trends data have been applied to analyze different phenomena for now casting and forecasting purposes (Dos Santos, 2018; France, Shi, & Kazandjian, 2021). In a recent write-up, Glass and Jarett (2021) show that Google Trends allows marketers to investigate the choice of region, time, and geolocation. Glass and Jarett (2021) also recommend that combining Google Trends with other actionable data may be a solution for unlocking new marketing opportunities.

Moreover, Nghiem et al. (2016) suggest that Google Trends may provide useful time-series information on public interest changes and shifts and is particularly useful for topics that span weekly or spatially. This paper is among the first to underscore heterogenous characteristics of consumer appetite for avocados across different regions in the US. The study may have implications for practitioners and scholars interested in other agricultural products.

Clustering and segmentation of markets and customers have been proven to be useful tools for detecting patterns and identify similarities by considering different types of information. Cluster analysis has successfully revealed hidden traits of marketing data for both descriptive and diagnostic purposes. For instance, cluster analysis can help marketers dive deeper into the transaction price and the turnover of houses on the market associated with list price and agency characteristics (Palmon & Sopranzetti, 2004). Cluster analysis can also help pinpoint possible reasons that lead to successful launches of new products (Calantone & Di Benedetto, 2007). A recent study found that factor-cluster analysis proves useful in identifying reasons for consuming quinoa (Higuchi & Maehara, 2021). Although more than 100 clustering algorithms are available, several major methods are popular and widely used. Hierarchical clustering can be used to identify dissimilarities or distances among observations and construct trees of clusters (Scitovski et al, 2021). The algorithm starts at a single cluster and split/join the cluster(s) iteratively

until certain conditions are met. Another popular approach is k-means clustering which was first used in the 1960s (Scitovski et al, 2021). Given a predefined k number of clusters, the initial assignments of items to these clusters will start, and then centroids will be calculated. The algorithm runs iteratively until the summed distances between clusters are minimized.

This paper represents one of the first to study the U.S. Hass avocado market with industrial-level data, census data, and Google Trends search data. As a native fruit in the Americas, avocados became very popular in the US According to the USDA 2018 report, per capita consumption of avocados in the US has tripled since 2001 to 8 pounds per person in 2018 (USDA, 2022). Most imported avocados are the Hass type. Previous research studies on Hass avocados in the metropolitan and regional markets found that not all of the markets are elastic and, over the years, the promotion programs funded by the Hass Avocado Board (HAB) have affected the consumption and demand of fresh Hass avocados in the US positively (Ambrozek, Saitone, & Sexton, 2018; Ambrozek, Saitone, & Sexton, 2019). However, no research has been conducted to understand 1) how different these main regional markets are, 2) what main factors may lead to these regional differences, and 3) the similarities and differences between these primary target markets. The study collects data from various sources, including Hass avocado sales data across different regions from 2015 to 2019, geodemographic data, and Google Trends search data on "avocado" from 2015 to 2019.

The purpose of this study is three-fold. Firstly, the study adopts cluster analysis and visualizations to uncover the differences and similarities between different regional markets. Secondly, a robust regression analysis is performed to understand different factors that may contribute to these regional differences in avocado consumption. Thirdly, the study aims to help different market participants (marketers, wholesalers, distributors, retailers, etc.) develop a data-driven marketing analytics roadmap to understand Hass avocado sales. This paper will contribute not only to the literature on marketing research in avocado or agriculture products, but also to the literature on marketing analytics.

Research Methodology and Data

In this research study, avocado markets are of primary concern. Avocados have become increasingly popular over the years due to their taste and nutritional value. Most avocados sold in the US market are primarily the Hass type (Ambrozek, Saitone, & Sexton, 2018). According to Hass Avocado Board reports (HAB, 2019), the annual consumption of Hass avocados per capita has increased steadily. HAB has released weekly Hass avocado sales data across different regions in the US since 2014. The importance of Hass avocados is growing in the US due to the impacts of globalization and marketing efforts (Kourgialas & Dokou, 2021).

There are a few demographic factors that may affect the consumption of avocados. First, a high level of education may affect people's consumption of healthy food, such as avocados (Li & Powdthavee, 2015). Second, market reports also show that avocados are highly popular among young people (Lufkin, 2019). Third, as avocados originated in Latin America, it is not surprising that many studies support that Hispanic populations outpace other ethnic groups in consuming avocados. Fourth, the consumption of Hass avocados may be affected by income level as Hass avocados are relatively expensive fruits. Fifth, people have become highly aware of and concerned with antibiotics, pesticides, and preservatives, and organic Hass avocados have gained great popularity in the market (Chou et al., 2020). However, organic Hass avocados are usually more expensive than conventional ones. Finally, seasonality plays an important role in agricultural products; avocado is not an exception. Agriculture reports recommend that the avocado season usually starts from April to September, causing prices of avocados to be relatively lower in summer (The Produce News, 2021). Compared to the previous search studies (Ambrozek, Saitone, & Sexton, 2018, 2019), this study considers a broader set of geodemographic factors except population and focuses on more exploratory analysis, one of which studied how promotions affected avocado consumptions and sales. Therefore, the application of these studies may be limited, and the study may have limited practical applications and benefits for practitioners. Therefore, this research study is among the first to consider a broad set of geodemographic factors in the developed models.

As the internet community continues to grow, Google search, as one of the effective tools for revealing the zero moments of truth, shows a good track record in adding more predictive power to existing regression models (France, Shi, & Kazandjian, 2021). As a result of Google searches performed by millions of consumers across different regions, it makes sense to extract aggregated search insights from different regions on any topic, such as marketing, sales, health issues, and technology (France, Shi, & Kazandjian, 2021). A Google Trends dataset collected using certain search queries may indicate the popularity of these topics in the internet community. From sales and marketing perspectives, highly frequent searches may be correlated with more product sales. Following previous studies (France, Shi, & Kazandjian, 2021, Nghiem et al., 2016), Google Trends search interest data is included in the time series model as it may be a good indicator for the consumption of avocados across different regions. To the best of our knowledge, in studying possible factors affecting consumers' interests in avocado consumption, no paper has combined industry-level factors (organic, seasonal issues, etc.), geodemographic factors (education, income, ethnicity, age, etc.), and Google Trends search data that serve as a proxy of public interest in avocados in different regions (France, Shi, & Kazandjian, 2021).

To help readers better understand our methods and procedures, a process that describes our research in these details is offered in Figure 1. The data used in this research are collected from several different sources. Weekly organic and conventional Hass avocados sales data from January 2015 to December 2019 for 27 major metropolitan regions are collected from the Hass Avocado Board. Please note that this dataset is from

2015 to 2019 due to the COVID-19 disruption in the 2020 US Census data publication and hence the lack of geodemographic data in and after 2020. The sales data and geodemographic data after 2020, when available, may provide additional insight into the avocado markets during COVID-19, which will be studied in the future. The geodemographic variables, including annual income, median age, population, education, and ethnicity, are collected from the US Census Bureau and the US Bureau of Labor Statistics. Weekly Google Trends data for these metropolitan markets are extracted from the Google Trends website by using the gtrends R package available in R. Since most people would use "avocado" instead of "Hass avocado" for Google search, it makes sense to use "avocado" as a generic search term to capture the popularity of "Hass avocado" searches. It is possible to include other languages in the search term. However, since Google Trends is a relative index, the popularity of avocados in a different language may not be directly comparable to that of avocados in English. A future study may be developed to offer insights into this issue. Data visualization and exploratory analysis are conducted using PCA, clustering, and several graphics algorithms available in several R packages. The detailed research process and proposed concept are summarized in Figure 1.

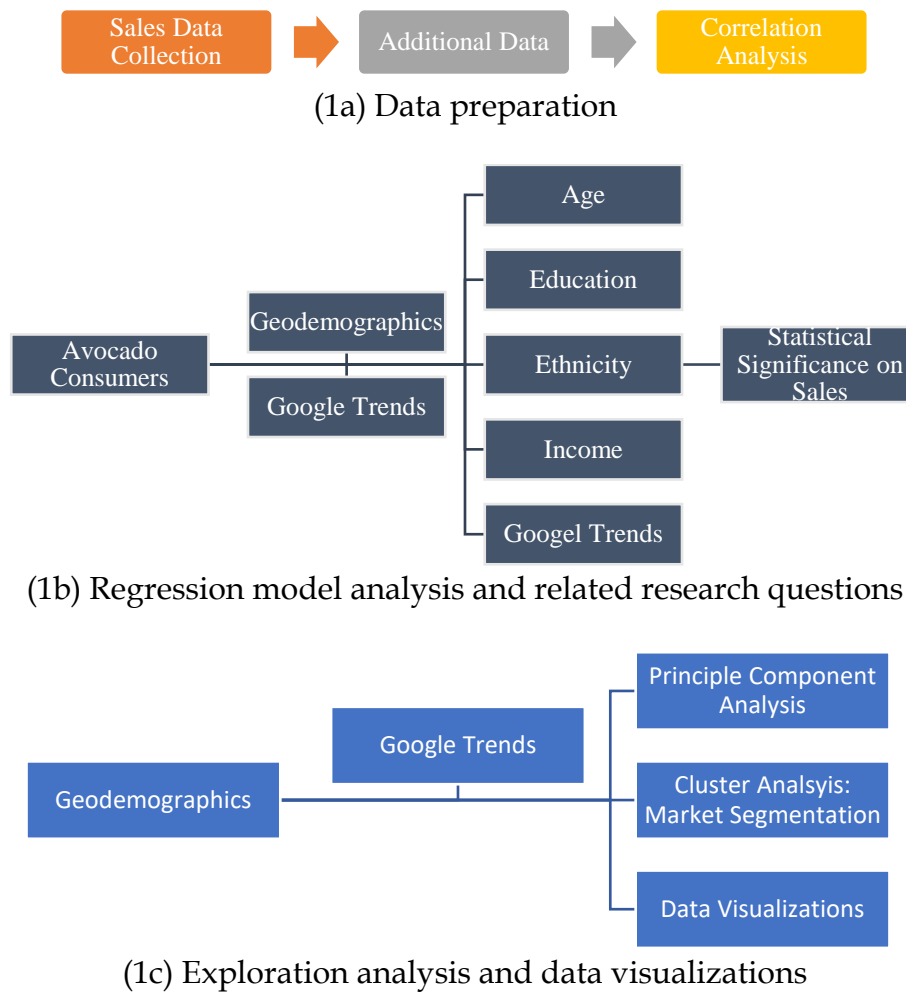


Figure 1. Research process

This research study features panel data from the different metropolitan markets and weekly sales information from January 2015 to December 2019. The regression model is hypothesized and constructed below:

$$\begin{aligned} \text{WeeklySalesPerCapita} = & \beta_1 \text{Education} + \beta_2 \text{Ethnicity} + \beta_3 \text{Income} + \beta_4 \text{MedianAge} \\ & + \beta_5 \text{GoogleTrends} + \alpha_{\text{Type}} \text{Type} + \alpha_{\text{Month}} \text{Month} + \alpha_{\text{Year}} \text{Year} + \varepsilon \end{aligned}$$

The model description is as follows:

WeeklySalesPerCapita is calculated by multiplying weekly average sales price by total sales volume of Hass avocados and then converted to sales per capita. It is the dependent variable;

Education is the percentage of the population with a college degree or higher;

Ethnicity gives the percentage of the Hispanic heritage population in each market;

Income shows the average annual income in the region;

MedianAge provides the median age in the region;

GoogleTrends offers the weekly search popularity for the query "avocados" in the Google search engine for each region. Nghiem et al. (2016) suggest that Google Trends may contain time-series information on public interest shifts and is particularly useful for topics that span weekly or spatially;

Type is a fixed effect variable for the type (organic or conventional) of Hass avocados sold on the market. This fixed effect variable distinguishes between these two types of avocados;

Month is a fixed effect variable that handles seasonal variations that takes the values from January to December of each year. As such, the model takes one if the observation is drawn from that month and 0 otherwise;

Year is a fixed effect variable that explains year-over-year variations that take the values from 2015 to 2019;

ε is the error term that assumes to follow the normal distribution.

A Hausman test (Dougherty, 2011) is applied to determine if fixed-effects or random-effects methods should be used (Dougherty, 2011; Hausman 1978) to model the panel data in the study. The Hausman test was performed using the PLM package available in

the R environment. In the Hausman test, the null hypothesis is developed as no systematic difference in fixed-effects coefficients and random-effects coefficients. The results of the Hausman test for both models show that the p-value is less than $<.001$ and is significant, suggesting that the fixed-effects model is preferred over the random-effects model (Hausman 1978). Therefore, this study will use the fixed-effects panel regression model as it controls for the time-invariant variables. The fixed-effects model is also essential to adjust the errors for potential heteroscedasticity. Table 2 summarizes the Hausman test, supporting fixed effects model.

Table 2. Hausman test for fixed effects, random effects, and pooled ordinary least squares (OLS) models

Step	Fixed Effects Output in R package	Random Effects Output in R Package
Step 1. Regression	Total Sum of Squares: 1039500 Residual Sum of Squares: 230560 R-Squared: 0.77821 Adj. R-Squared: 0.77717 F-statistic: 8045.8 on 6 and 13758 DF, p-value: $< 2.22e-16$	Total Sum of Squares: 1041800 Residual Sum of Squares: 231720 R-Squared: 0.77757 Adj. R-Squared: 0.77748 Chisq: 48287.5 on 6 DF, p-value: $< 2.22e-16$
Step 2. Hausman test	H ₀ : the preferred model is random effects H ₁ : the preferred model is fixed effects Conclusion: the result is significant to reject H ₀ , so the preferred model is fixed effects	Output data: psales1 ~ ethnicity + education + income1 + medianage + gtrends + ... chisq = 42.721, df = 6, p-value = 1.325e-07 alternative hypothesis: one model is inconsistent
Step 3. Random Effects VS Pooled OLS	This step is only conducted when a fixed effect model is not chosen. Since the results support the fixed effects model, this step is not necessary.	

Results and Discussions

The data analysis is carried out in the R environment except for mapping avocado sales per capita. The research process outlined in the previous section will start with a regression analysis of research questions and hypotheses, followed by exploratory analysis and data visualization.

Regression Analysis

A subsequent regression analysis is performed to analyze the impact of these factors on avocado sales per capita. Regression analysis shown in Table 3 indicates that multiple factors influence per capita sales of Hass avocados, as previously proposed and hypothesized. For instance, education level is statistically significant and is positively associated with per capita sales of Hass avocados. This suggests that other things being equal, regions with higher education levels tend to have better sales of avocados.

Moreover, the results show that the coefficients for ethnicity, income, and Google Trends search interest all appear positive and significant, while the coefficient for median age is negative and significant. Consumers with Hispanic ethnicity are inclined to consume more Hass avocados, which is consistent with the fact that, historically, avocado is part of their traditional foods. Income also plays an important role in predicting per capita sales of Hass avocados. Consumers with higher income would tend to purchase more avocados. Median age is an important proxy for future growth opportunities. In a recent study by HAB (2019), avocados are more popular among younger generations (Gen Z and millennials).

Google Trends search interest is a proxy or indicator for changes in public interest in different topics (France, Shi, & Kazandjian, 2021). In recent years, due to different promotions and marketing campaigns launched by health professionals on the rich nutrition of avocados, it has become trendy to eat avocados (Kerr, 2018). As such, Google Trends search interest is proven to be a statistically significant and positive predictor (i.e., coefficient value is .07) for per capita sales of Hass avocados. Table 3 also shows that adding Google Trends as a predictor improves the model's predictability (i.e., adjusted R squared value) from 0.775 to 0.782.

Table 3. Regression analysis of avocado sales per capita

Variables	Panel A: Without Google Trends				Panel B: With Google Trends			
	Coefficients	t value	P value		Coefficients	t value	P value	
(Intercept)	14.897	19.014	< 2e-16	***	10.339	12.947	< 2e-16	***
education	19.838	20.060	< 2e-16	***	21.387	21.931	< 2e-16	***
ethnicity	9.171	29.788	< 2e-16	***	10.517	34.030	< 2e-16	***
income	0.004	0.963	0.335	NS	0.022	4.793	0.000	***
median age	-0.246	-12.485	< 2e-16	***	-0.188	-9.607	< 2e-16	***
gtrends	NA	NA	NA	NA	0.074	21.731	< 2e-16	***
factor(organic)	-14.933	-	< 2e-16	***	-14.933	-215.139	< 2e-16	***
factor (month) 2	0.238	1.374	0.169	NS	0.294	1.724	0.085	#
factor (month) 3	0.234	1.383	0.167	NS	0.268	1.612	0.107	NS
factor (month) 4	0.734	4.342	0.000	***	0.744	4.477	0.000	***
factor (month) 5	1.375	8.130	0.000	***	1.330	7.995	0.000	***
factor (month) 6	1.292	7.545	0.000	***	1.314	7.803	0.000	***
factor (month) 7	1.203	7.195	0.000	***	1.242	7.552	0.000	***
factor (month) 8	0.860	5.025	0.000	***	0.969	5.755	0.000	***
factor (month) 9	0.564	3.335	0.001	***	0.798	4.787	0.000	***
factor (month) 10	0.025	0.147	0.883	NS	0.303	1.818	0.069	#
factor (month) 11	-0.788	-4.600	0.000	***	-0.491	-2.908	0.004	**
factor (month) 12	-0.938	-5.319	0.000	***	-0.700	-4.025	0.000	***
factor (year) 2016	0.509	4.569	0.000	***	0.401	3.656	0.000	***

factor (year) 2017	1.590	14.235	< 2e-16	***	1.397	12.676	< 2e-16	***
factor (year) 2018	2.112	18.272	< 2e-16	***	1.712	14.866	< 2e-16	***
factor (year) 2019	2.501	21.657	< 2e-16	***	2.052	17.779	< 2e-16	***

Notes: Adjusted R-squared: 0.775 for Panel A - Without Google Trends, and 0.782 for Panel B -With Google Trends. Significance levels: ***p<0.001; **p<0.01; *p<0.05; #p<0.10; NS=Not significant.

Li and Powdthavee (2015) found that more education is associated with health behaviors in Australia. In general, most previous studies focus on analyzing the causal relationship of education on risky behaviors like smoking, alcohol consumption, overeating, and drug abuse (Cutler & Lleras-Muney, 2010). Analyzing the causal relationship of education on the consumption of super-healthy fruits like avocados may provide ideas to address these risky behaviors. A coefficient of 2.14E-01 (or .214 in real number) means that an increase of one percent in the population with at least a college degree will lead to a surge of .214 dollars in avocado sales per capita. Interestingly, the positive effect of ethnicity on avocado sales is only 1.05E-01 (or 0.105 in real number) and is relatively smaller. In general, an increase of one percent in the Hispanic population tends to lead to a modest gain in avocado sales per capita at \$.105.

Several fixed effect factors like types of avocados, year, and month are controlled in the regression model. The coefficient for type is negative and significant, which suggests that, compared to conventional Hass avocados, organic Hass avocados are less popular due to their high price. The results show the existing and significant seasonal effects. In particular, consumption of Hass avocados per capita starts to pick up from February, reaches its peak in summer, and slows down in winter, which coincides with the months when avocados are in season.

Principle component analysis (PCA) and data visualization

The model has five independent variables, including education level, ethnicity, income level, the median age of the population, and the Google Trends search interest for each region. PCA is critical when determining the importance of predictors before pursuing a standard regression analysis (Rodriguez, Ozkul, & Marks, 2018). Using PCA to study the variations of these five factors can reduce the complexity of the large dataset while summarizing the information efficiently in reduced dimensions (Rodriguez, Ozkul, & Marks, 2018). Table 4 summarizes the eigenvalues and cumulative variance percent of PCA analysis for these five factors. Table 4 and Figure 2a shows that the first four dimensions can explain about 94.35% of data variation. The results suggest that each one of these factors is critical, and they all have the potential to make better predictions. Please note that subspace dimensions calculated in PCA analysis generally do not have a specific meaning but provide insights into studying inter-relationships between model variables and reducing complex models to effective and simplified ones. Researchers can benefit from PCA analysis and gain more insights into the developed models.

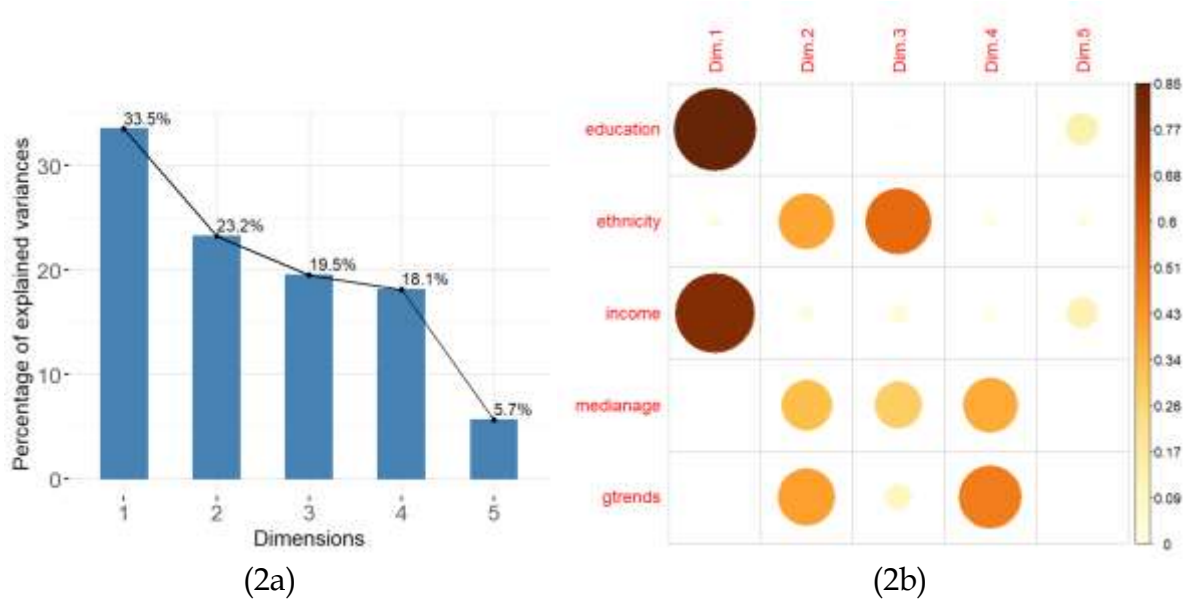


Figure 2. Histogram of cumulative variance percent (2a) and projection map (2b) of each factor

Figure 2b shows how variation changes of these factors are related, as well as the scale or magnitude of the projection of each factor on each PCA dimension. In the projection map of Figure 2b, education and income seem to be highly similar in the projections on PCA dimensions 1 and 5. According to social economics research, education and income are highly correlated. For instance, according to a recent article (Dickler, 2021), a person with at least a bachelor's degree may earn a median of \$2.8 million in their lifetime, about 75% more than their counterparts with only high school diplomas. The PCA results suggest that these two factors may have similar effects on the consumption of Hass avocados in a regression analysis.

Moreover, median age (median age) and Google Trends (gtrends) may correlate as they are primarily expressed in the PCA dimensions 2, 3, and 4. However, Google Trends search data may be more related to young consumers and hence may be heading in the opposite direction of what the median age factor does. In a recent HAB (2019) study, avocados seem to be more popular among younger generations (e.g., Gen Z and Millennials). Interestingly, ethnicity and median age (median age) are correlated as they are represented in the PCA dimensions 2 and 3. However, they may affect Hass avocado consumption in the opposite direction as it is plausible that the high percentage of the Hispanic population, the greater the consumption of Hass avocados per capita in the region. According to the US Census Bureau (2021), the Hispanic ethnic group is the youngest in the US. Therefore, the higher the percentage of the Hispanic population in the region, the lower the median age. Lastly, education and income seem linearly independent from ethnicity, income, and median age (see Figure 2b and Figure 3).

Table 4. Principal component analysis

Dimension	Eigenvalue	Variance Percent	Cumulative Variance Percent
Dim.1	1.674909	33.49817	33.49817
Dim.2	1.162082	23.24165	56.73982
Dim.3	0.974451	19.48902	76.22884
Dim.4	0.906021	18.12042	94.34926
Dim.5	0.282537	5.650743	100

Furthermore, Figure 3 shows that when these five factors are projected on two dimensions, income and education move along the horizontal axis in the right or positive direction. Moreover, ethnicity and Google Trends search interest move along the vertical axis in the up or positive direction, with the median age being placed in the opposite direction of the vertical axis.

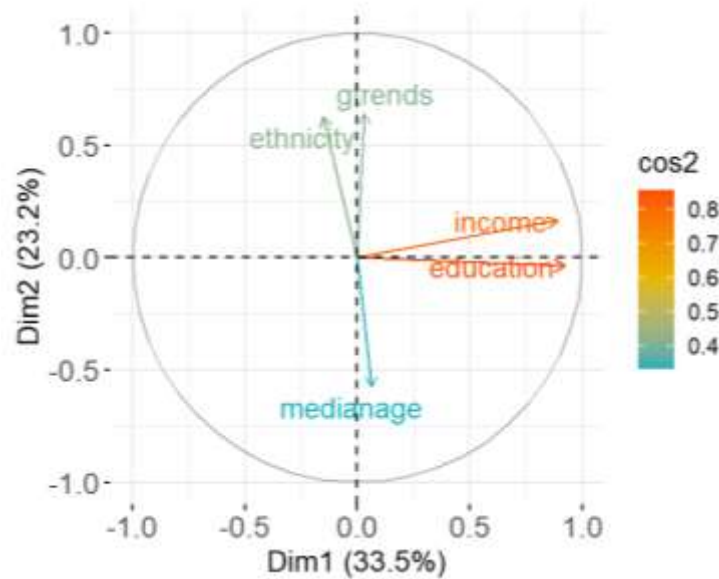


Figure 3. A 2D projection of factors on PCA dimensions

Clustering and exploratory analysis using maps

Cluster analysis is performed to find patterns and commonalities between the 27 regional markets used in this study. This analysis uses all the market information, such as geodemographics and Google Trends search data. The results may suggest that these regional markets can be aggregated into a few groups. In each group, these regions are generally similar in many ways but not necessarily geographically close.

The first analysis presents the distance matrix between regions. In this analysis, the regional multi-dimension data, including geodemographics and Google Trends data,

are normalized, and then the Euclidean distance is calculated between pairwise markets. As shown in Figure 4a, similar markets have a short physical distance for the conventional Hass avocado markets, for example, Charlotte and Atlanta; for the organic Hass avocado markets in Figure 4b, New York and Chicago have similar markets. However, markets that are not geographically close may belong to the same cluster, such as Boston and Seattle in the distance map, as shown in Figure 4a, and Los Angeles and Dallas in the distance map, as shown in Figure 4b.

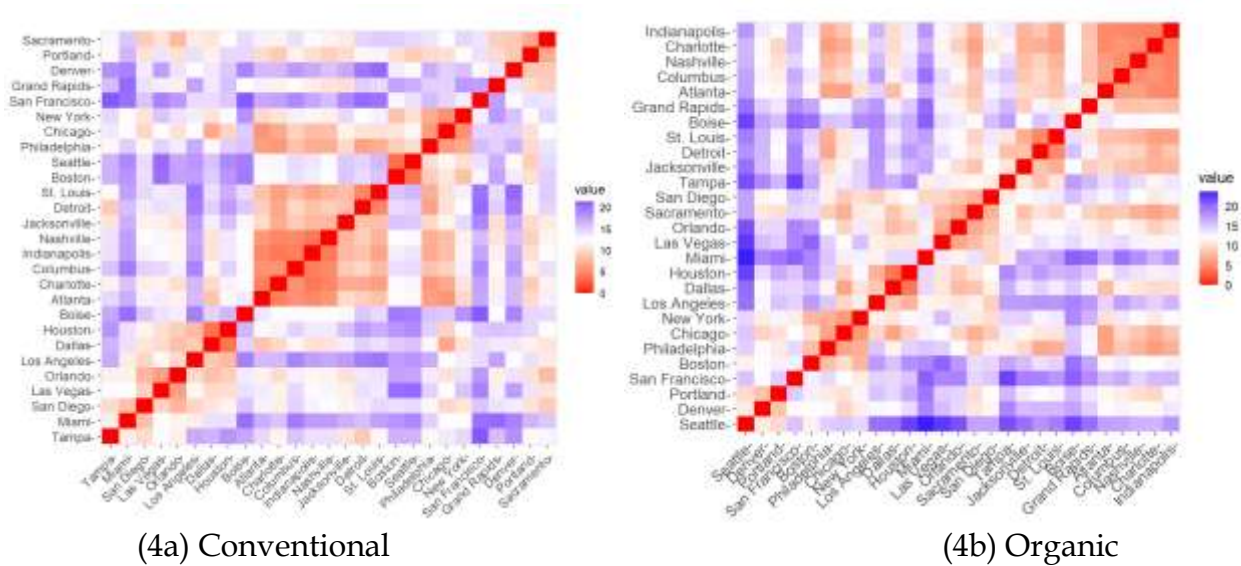


Figure 4. Distance matrix of regional markets

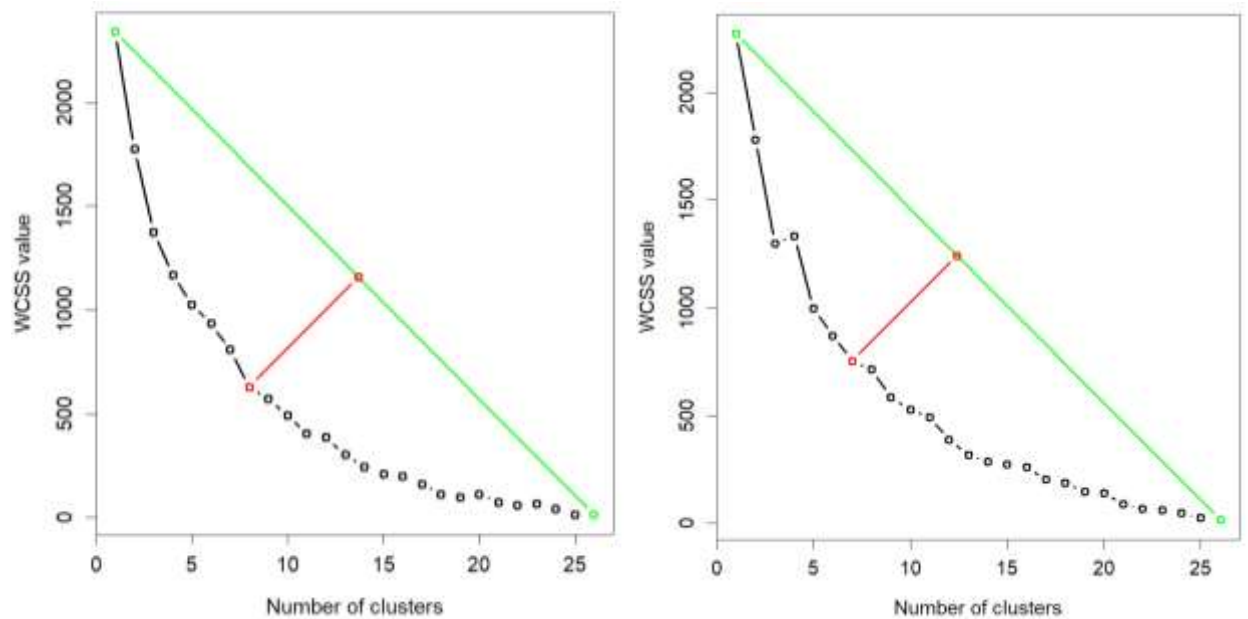
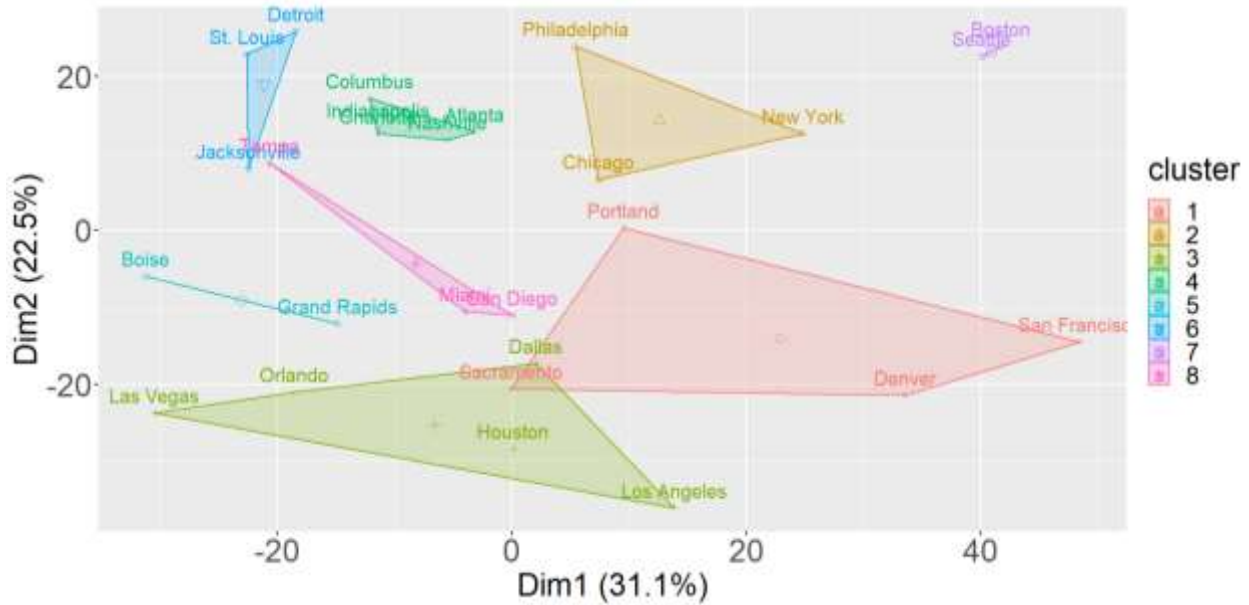


Figure 5. Elbow method for determining an optimal number of clusters

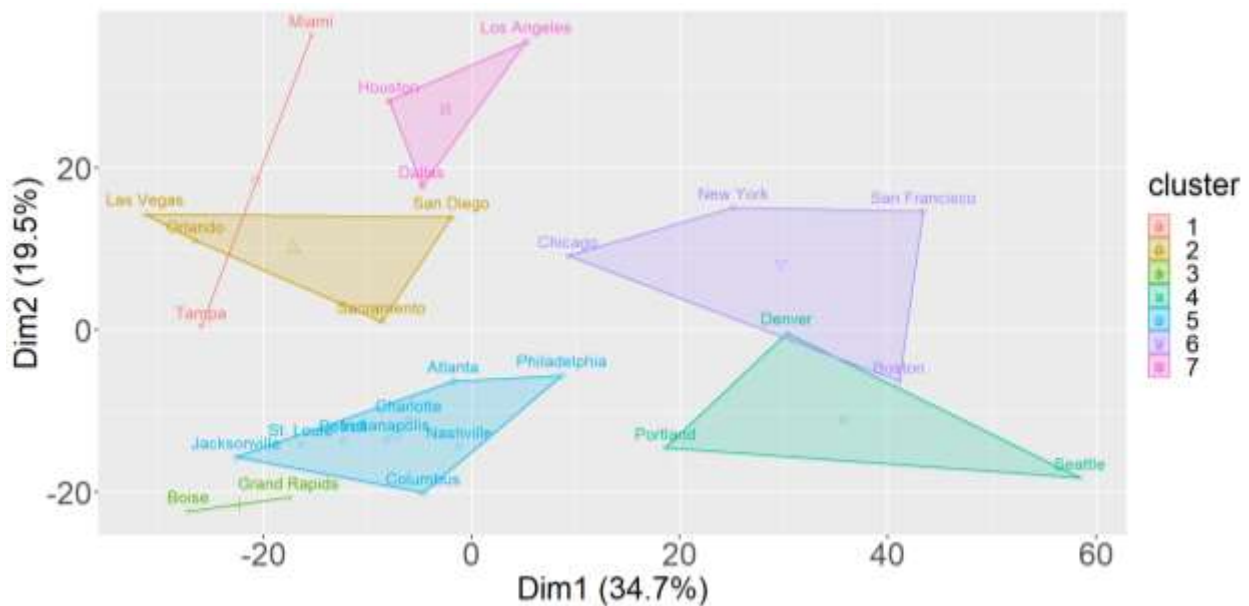
Two popular cluster analysis approaches, k-means clustering and hierarchical clustering methods, are adopted as they are widely used in data analytics and represent two major families of clustering methods (James et al, 2013). K-means clustering is centroid-based, in which the number of clusters is k , and each cluster is represented by a central vector (may not be an observation). K-means clustering minimizes the total squared distances from objects to the assigned cluster centers by finding the optimal centers and grouping the objects to the closest center (Hartigan & Wong, 1979; James et al., 2013). On the other hand, the hierarchical clustering method is connectivity-based, in which the objects are connected to form clusters based on distances. Hierarchical clustering does not partition the data set as k-means clustering does, instead using a dendrogram to represent merged clusters within certain distances (see Figure 7) (James et al., 2013). Considering the difference between organic and conventional Hass avocado markets, the analysis of each type of Hass avocado is studied separately. In the cluster analysis, selecting appropriate numbers of clusters these regions may be grouped into is important. The Elbow method efficiently and effectively determines the number of clusters in the analysis (Hardy, 1994). The idea behind this method is modeling and graphing the total within-cluster sum-of-squares (WCSS) based on the number of clusters. The optimal number of clusters is selected when the slope of the WCSS is flatter, which indicates adding more clusters will not add much to the variance, and the variance is then optimized (Hardy, 1994). In this study, employing the Elbow method suggests that for the conventional Hass avocado markets, an 8-cluster solution is optimal (see Figure 5a). In contrast, for the organic Hass avocado markets, a 7-cluster solution works better (see Figure 5b).

Applying k-means clustering to the conventional and organic Hass avocado markets allows us to see how these regional markets are grouped into different market segments. As summarized in Table 5 and Figure 6, regional markets that are geographically close are not necessarily in the same clusters and vice versa; clustering results are quite different between conventional and organic Hass avocado markets. For example, the San Diego market may be similar to the Tampa and Miami markets for conventional avocados; however, San Diego is not in the same cluster as Tampa and Miami for organic avocado markets. As a result, this indicates that when developing marketing and sales plans for conventional avocados, whatever plans or forecasting work for the San Diego market might also work for the Tampa and Miami markets, but it may not be the case for organic Hass avocados. One could argue that it is unsurprising to cluster the San Diego, Tampa, and Miami markets in one group as they all have high living expenses and are located in the south with large Hispanic populations. Another interesting observation is that for the conventional Hass avocado consumption, San Francisco, Denver, Portland, and Sacramento are in the same group, located in the west region. Still, the San Francisco market is grouped into the same cluster as the Boston, Chicago, and New York markets for organic Hass avocado consumption. This may indicate that as Hass organic avocados are more expensive and income may influence

more organic Hass avocados markets like Boston, Chicago, New York, and San Francisco, which are well known for their higher than usual living expenses and income level; for the conventional Hass avocado consumption, demographics may play a role as Denver, Portland, Sacramento, and San Francisco have similar levels of demographics and are all located in the west.

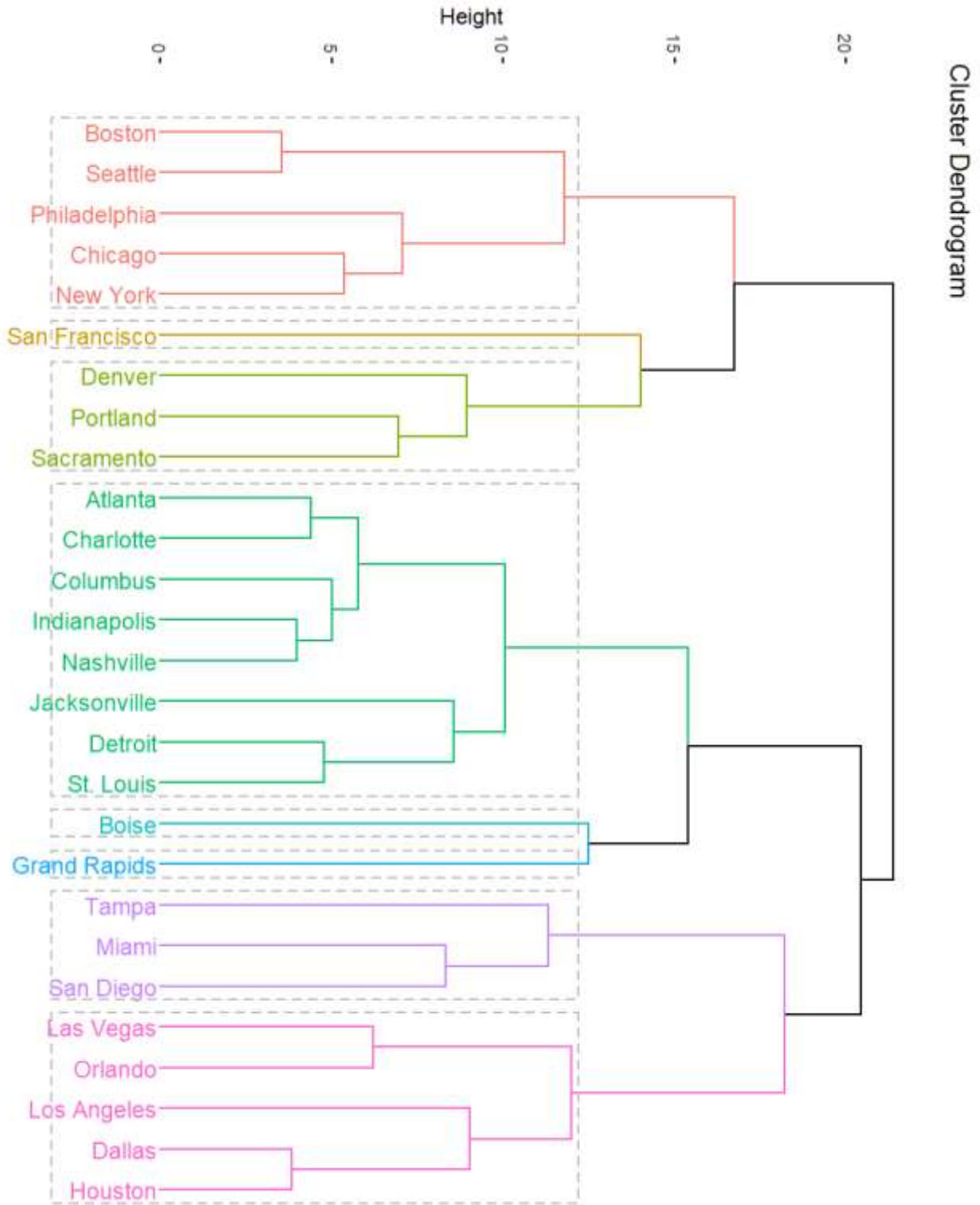


(6a) Conventional

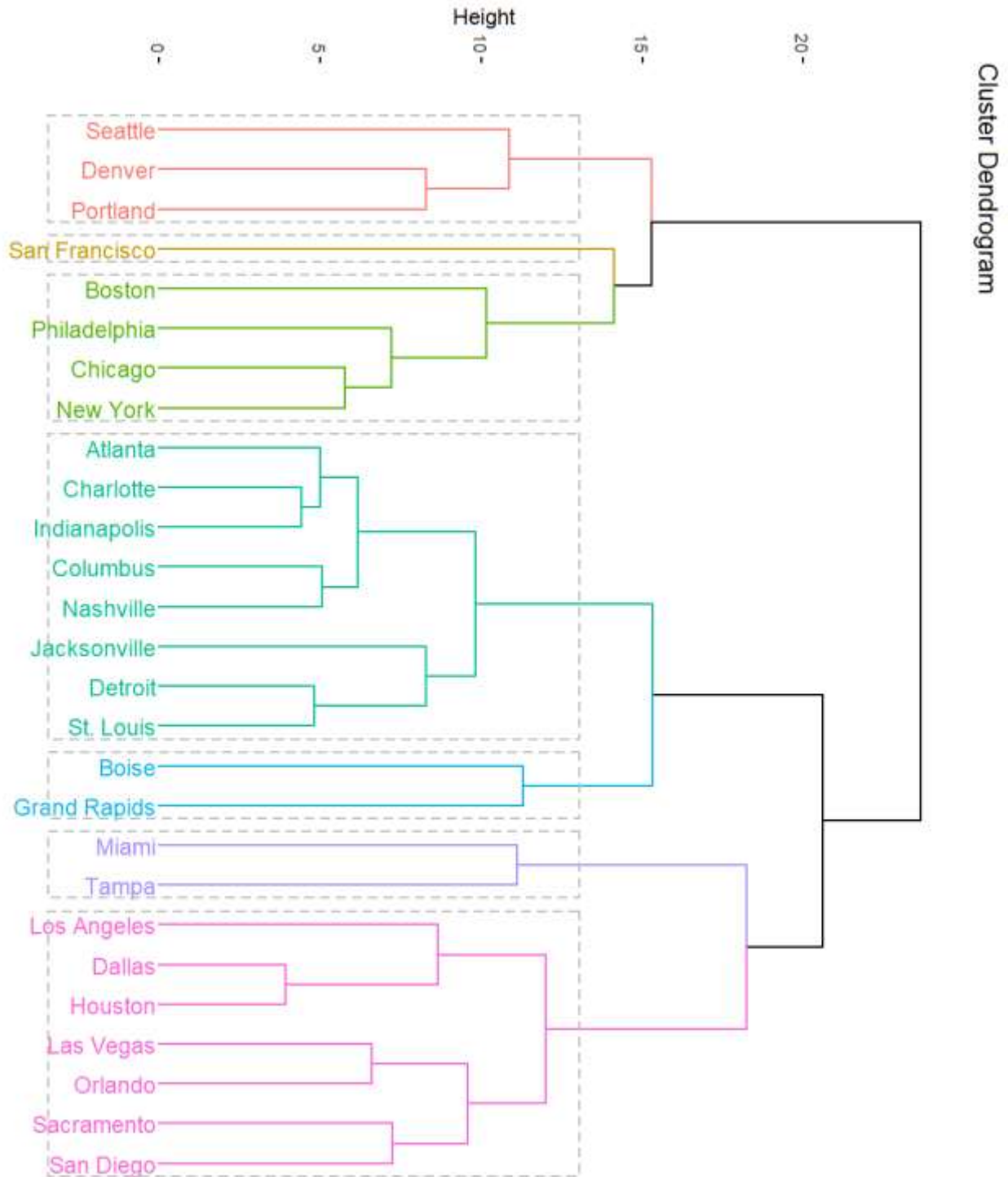


(6b) Organic

Figure 6. K-means clustering results projected on primary two dimensions



(7a) Conventional



(7b) Organic

Figure 7. Visualization of hierarchical clustering results

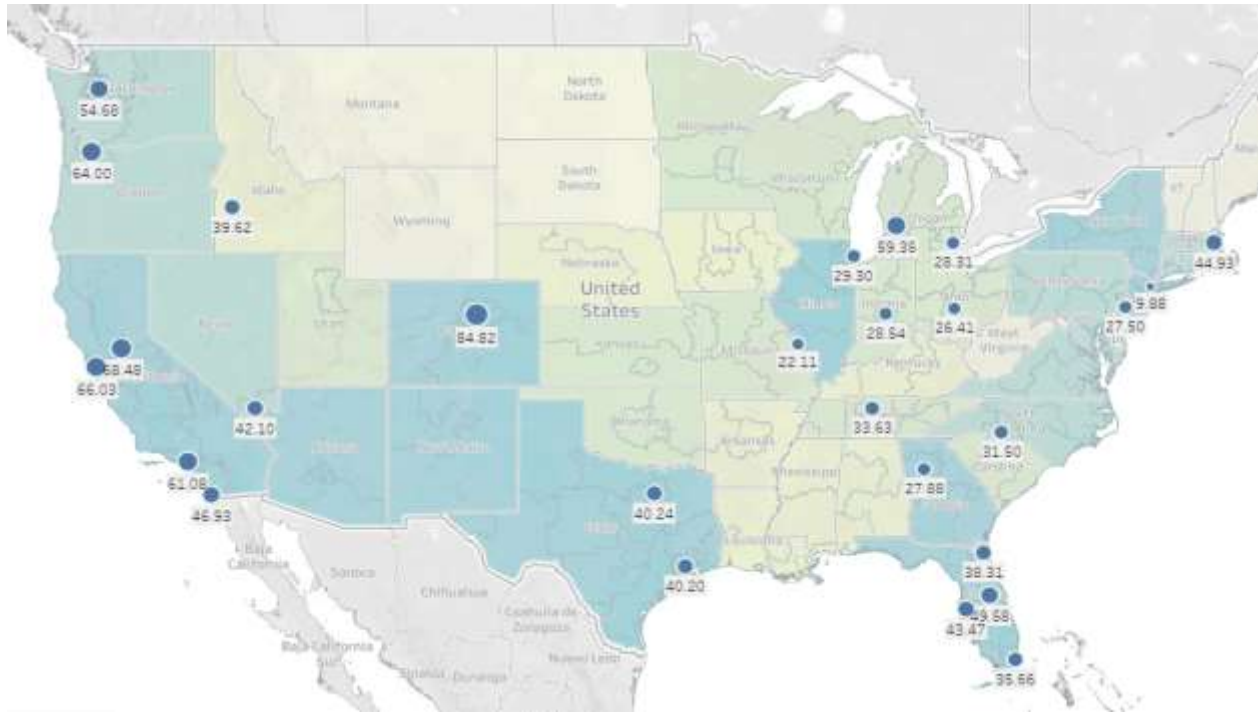
Hierarchical cluster analysis is also applied to analyze these regional markets from a different perspective. Compared with the k-means method, the results are similar, as

shown in Figures 7a-7b. The results indicate that although these two approaches use different algorithms and focus on different objectives, both methods give similar results in classifying these regional markets. Cluster analysis can help marketers discover critical geodemographic patterns between different regional markets. The results can help businesses develop effective and efficient plans to gain additional market share, be more strategic, cost-efficient, and agile, and become risk intelligent.

Table 5. K-means cluster analysis

Clusters	Conventional	Organic
1	Denver, Portland, Sacramento, San Francisco	Miami, Tampa
2	Chicago, New York, Philadelphia	Las Vegas, Orlando, Sacramento, San Diego
3	Dallas, Houston, Las Vegas, Los Angeles, Orlando	Boise, Grand Rapids
4	Atlanta, Charlotte, Columbus, Indianapolis, Nashville	Denver, Portland, Seattle
5	Boise, Grand Rapids	Atlanta, Charlotte, Columbus, Detroit, Indianapolis, Jacksonville, Nashville, Philadelphia, St. Louis
6	Detroit, Jacksonville, St. Louis	Boston, Chicago, New York, San Francisco
7	Boston, Seattle	Dallas, Houston, Los Angeles
8	Miami, San Diego, Tampa	

Mapping visualization is a good way to demonstrate how different regions behave regarding avocado sales per capita. Figure 8 shows sales per capita in each selected region. This visualization shows that Denver, Colorado, has the highest Hass avocado sales per capita, followed by Sacramento, California. In addition, cities in the western region have a higher range of sales per capita. For conventional Hass avocados, the same pattern can be observed. However, for organic Hass avocados, Seattle, Washington, has the highest per capita sale of 5.9, followed by Portland, Oregon, with per capita sales 4.57. The cluster analysis and the sales map suggest that businesses can gain insights into the similarities and differences of regional markets using exploratory analysis.

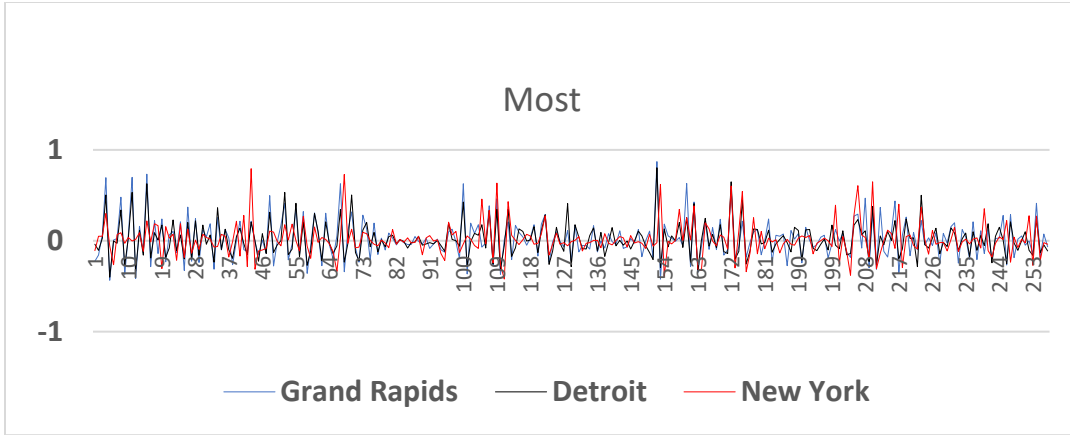


Legend: Blue regions indicate areas where Hispanics and Latino communities are highly concentrated.

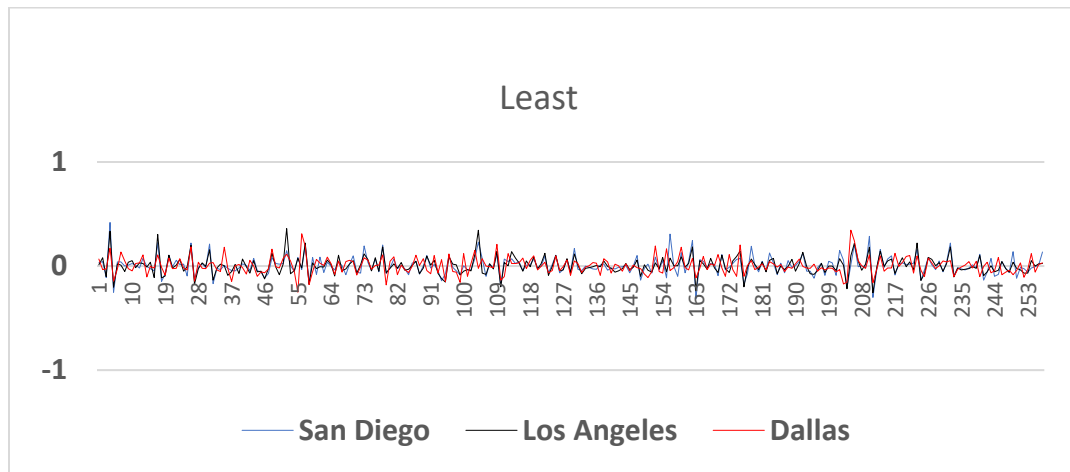
Figure 8. Avocado sales per capita across different regions

Sales Per Capita Change Volatility and Data Visualization

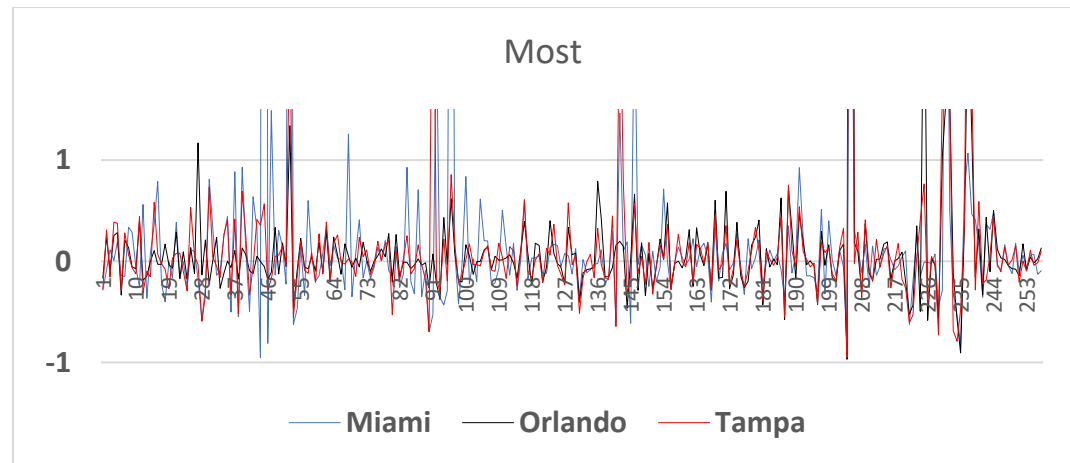
A series of figures are further explored to reveal the volatilities of avocado sales per capita (Figures 9a-9d). In general, there is some level of volatility in avocado sales per capita. For conventional Hass avocados, the following three cities, Grand Rapids, Detroit, and New York, experience the largest yearly volatility, as shown in Figure 9. These cities are in the northern area of the US, and they experience temperature and weather changes; thus Hass avocado supply is impacted accordingly. As such, avocado prices may also be affected and may experience the sales volatility per capita. Interestingly, cities that experience the least volatility change of sales per capita are all located in temperate climates of the US, like San Diego, Los Angeles, and Dallas (Figure 9b). These cities are also relatively closer to the places of product origin.



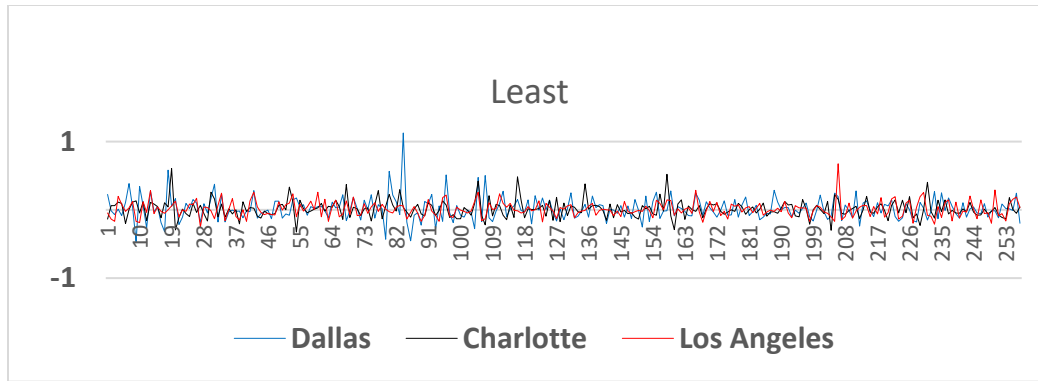
(9a) Most volatile markets of conventional avocados



(9b) Least volatile markets of conventional avocados



(9c) Most volatile markets of organic avocados



(9d) Least volatile markets of organic avocados
Figure 9. Volatility analysis

In terms of organic Hass avocados, Miami, Orlando, and Tampa experience the largest volatility in per capita sales, and we also find that these volatilities coincidentally occurred at almost the same time, as shown in Figure 9c. These three cities are all located in Florida and are relatively closer to the places of product origin. The abundant supply of Hass avocados and seasonal changes in Hass avocado supply throughout the year contribute to the lower prices of organic Hass avocados, thus stimulating the consumption in these regions. A stable trend of organic Hass, avocado sales per capita, is observed in the following cities: Dallas, Charlotte, and Los Angeles, as shown in Figure 9d. The variations in sales per capita among these cities are the lowest throughout the year. The results indicate that demographic factors, like race, eating habits, supply and demand, and the prices of organic Hass avocados in those cities, might be more similar over time.

In comparison, organic Hass avocado markets seem more volatile than conventional Hass avocado markets in general. Volatility analysis of these markets of different types of Hass avocado can help businesses develop more complex strategies in risk management, inventory, warehousing, and promotion activities.

Implications and Limitations

This study concludes with interesting findings that can be useful for importers and retailers. According to the results, the income level and the percentage of the Hispanic population, although significantly correlated, are not dominant factors for the growth of consumption of healthy fruits like avocados. In sum, well-educated consumers seem to be a more important category of customer segment that needs immediate attention from retailers. Based on our regression analysis, the study offers insights into the regional trends and search trends of consumers for potentially better sales and market opportunities. For instance, according to our volatility analysis, importers and retailers may further allocate resources in different regions to reduce volatility in certain regions. Furthermore, based on our classification of different cities and different types of factors,

importers and retailers may consider designing customized dashboards to integrate different types of demographic trends and search behaviors into their conventional managerial operations.

This work contributes to several critical aspects of data analytics and visualization development in the sales and market literature. By combining industry-level data with geodemographic data and Google Trends search data, the paper can advance our understanding of the role of geodemographics and public interest in commercial products. Using geodemographic and Google Trends search data to analyze product sales is an important endeavor that has not been systematically undertaken in business research. Through programmatic empirical studies, this paper applies marketing analytics to a practical business scenario (Iacobucci et al., 2019; Wedel & Kannan, 2016).

This study offers significant contributions to academia. From descriptive and diagnostic perspectives, our work harnesses k-means clustering and hierarchical clustering methods and exploratory mapping methods to offer data-driven visualizations. The cluster analysis and the mapping approach offer different types of information while complementing each other in the use of design patterns, trends, and algorithms. From predictive and prescriptive perspectives, this study shows how Google Trends search interest could complement traditional industry-level and geodemographic variables in marketing research. Furthermore, our predictive and prescriptive analyses shed light on the sales and market of other agriculture products.

Google Trends search data, a proxy of public interest in topics, offers a valuable tool through which suppliers, retailers, and wholesalers can now cast or even forecast consumers' purchasing patterns and preferences (organic vs. conventional avocados in our context) in different regions. In light of the post-COVID-19 era, such well-suited knowledge of consumers is particularly important as consumers would spend more time on the internet, and the influence of trendy topics would greatly impact consumers' decision-making. Furthermore, this analysis integrates descriptive, diagnostic, predictive, and prescriptive analyses into an easy-to-follow, practical approach that might inform future decision-making practices with data-driven marketing analytics.

Although the results are promising, this study does have a few limitations. First, the study performs empirical analyses using a panel data set describing avocado sales and pricing in multiple metropolitan regions from 2015 to 2019, the Google search index for "avocado", and the geodemographic data from the US Census Bureau. Due to the COVID-19 disruption in 2020, the geodemographic data in and after 2020 was unavailable when the study was performed. It may be interesting to study the post-COVID datasets to further explore the applicability of developed models in this study. Therefore, practitioners may use models and results from this study with caution. Secondly, the study may have possible contemporaneous correlations between conventional and organic avocado sales, which may have misleading results. For instance,

people who purchase conventional avocados may give up on organic avocados, and vice versa. This limitation can be further explored in the future. Third, this study only focuses on the avocado markets with specific conditions in the US regions. Similar results or conclusions may not be obtained when studying other markets or regions. This research may need to be further expanded and studied for different food markets and retailing industries for future improvement, the process's applicability, and insights. Fourth, the Google Trends index is consolidated and aggregated, which does not provide any information on consumers' preferences, likes or dislikes, and search purposes. For instance, we would not know if a search is performed to take a biology exam or look for avocado recipes. Therefore, these limitations may limit the applications of this study.

Conclusion

This paper is among the first to systematically study Hass avocado sales in the regional markets of the US with industry-level data, geodemographic data, and Google Trends data. Our empirical results potentially provide mechanisms for understanding and explaining causalities between industry-level variables, different geodemographic factors, public interest in avocados as measured by Google Trends, and avocado sales.

Specifically, major findings in this study include: 1) the regression analysis suggests that demographic factors, including education level (i.e., a bachelor' degree or higher) and ethnicity (percentage of Hispanic population in a region), have positive impacts on avocado sales per capita. Without Google Trends data, income is not significantly correlated with sales per capita in the model but significantly and positively correlated with sales per capita after adding Google Trends data. The results also imply that regions with a younger population tend to have lower avocado sales per capita; 2) most importantly, the impact of Google Trends search interest on avocados shows that the higher the active search of avocado as a keyword via the Google search engine in the region, the more avocado sales per capita; 3) through fixed effect factors, the models captures the seasonal patterns as Hass avocado sales normally pick up in spring, reach its peak season during summer and slows down through the rest of year, which is highly consistent with the seasons of growing and harvesting avocados. The models detect a strong growth of avocado consumption over the years; 4) furthermore, they also show that although organic avocados are healthier, their high prices may discourage sales significantly. Our additional volatility analysis shows that organic avocado sales are more volatile than conventional ones due to price, supply and demand, and other relevant issues; 5) the study employs clustering techniques and data visualization tools to explore regional markets further. The 27 regional markets in the study are grouped into a few clusters based on their market characteristics, such as geodemographic and Google Trends data. The clustering results show that geographically close markets are not always in the same market cluster, and markets that are distant geographically may be grouped into the same cluster. The cluster analysis is vital to gaining insights into market segmentation and developing marketing strategies and sales plans. With these

descriptive and diagnostic solutions, businesses can explore further the details and become risk intelligent.

Major findings 1) and 2) are critical for constructing reliable models for future applications. It is worth highlighting that geodemographic factors and Google Trends data are very helpful in understanding regional markets. These factors can be considered when businesses explore opportunities and develop mitigation plans for risks. Some factors show inter-correlation, such as education and income, while ethnicity, median age, and Google Trends provide different perspectives in marketing analysis. These two major findings address the research questions in this study and provide foundational knowledge in developing regression models for studying avocado sales and regional markets. Major findings 3) and 4) provide important information for businesses to address seasonal effects and elasticity issues of organic products. Seasonal effects can be addressed by leveraging inventory management, high and low season planning, cash flow, new vendor sources, and cold chain warehouses, which may be further addressed in future research. Additionally, organic avocados have a price premium, and therefore, our study reveals that customers tend to be sensitive to price changes in organic avocado sales. Major finding 5) showcases how clustering tools can use these factors in the models to segment regional markets.

In summary, geodemographics and Google Trends data can be used to model avocado sales. Data analytics and data visualization tools used in this study are very effective and efficient in understanding the Hass avocado markets. Data-driven decision-making in marketing has been a hot topic in recent years. However, it is not easy to identify a practical approach. Although Wedel & Kannan (2016) proposed their data-driven decision-making model, there is scant research about this model, and we recommend that marketers and practitioners further test the data-driven decision-making model proposed by Wedel & Kannan (2016), namely how to support data-driven decision-making with descriptive, diagnostic, predictive and prescriptive analyses. The data-driven decision-making model and the research approach can also be extended to other fields, such as new product development, innovation, and sustainability.

As understanding consumer trends becomes more and more challenging year over year, importers and retailers may benefit from this study. In particular, the study offers a great example of how consumer trends in the food industry are affected by prices, geodemographic factors, and Google Trends. Specifically, the results indicate that importers may focus on regional differences to optimize sales and promotion efforts in different regions. In addition, since education and the percentage of Hispanic consumers emerge as significant predictors for per capita avocado sales, retailers may launch more targeted marketing efforts to reach out to Hispanic consumers and communities with better education levels.

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Customer Satisfaction and Willingness to Pay More: Mediating Effects of Perceived Herbal Quality and Brand Trust in Ghana

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Abstract

Purpose – This research investigated the mediation influence of perceived herbal quality and brand trust in customer satisfaction and willingness to pay (WTP) more nexus.

Methods – Survey questionnaires were systematically utilized to gather data from a sample of 265 customers in the herbal market in Cape Coast, Ghana. The hypotheses formulated were statistically examined through structural equation modeling using Smart PLS 3.3.3.

Findings – Findings from the research indicate that perceived herbal quality partially mediates the nexus between customer satisfaction, WTP at a high-price, and brand trust. Again, the research found that the impact of customer satisfaction and perceived herbal quality on WTP is partially mediated by brand trust.

Implications – The research findings are relevant to the academicians and strategic initiatives of the herbal companies in the industry, especially as traditional medicine is fast becoming a viable option in the health and welfare of Ghanaians following decades of substantial growth. The study established that brand trust and perceived quality partly contribute to the causal relationship between customer satisfaction and customers' willingness to pay more. This also provides strong evidence for herbal companies to consider brand trust and perceived quality as critical factors for developing a satisfaction strategy to strengthen customers' WTP at a high price.

Originality – The current research unearths a new model that suggests that customer satisfaction predicts perceived quality, which strengthens willingness to pay a high price. Again, the study adds to the body of knowledge by confirming that perceived quality and brand trust partially mediates the relationship between satisfaction and WTP at a high price, which has not been explored in the brand equity literature.

Keywords: *herbal industry, satisfaction, trust, quality, willingness to pay more*

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Introduction

The use of herbal medicines to treat minor diseases dates back to when conventional drugs were not in existence. However, there has been a growing demand for herbal treatment in the past few decades, regardless of the increasing popularity of orthodox medicines worldwide. It is reported that approximately one-third of the population in high-income countries have used complementary/alternative medicines (CAM) to treat their ailments at least once in their lifetime (WHO, 2008). In Ghana, roughly 80 to 90 % of the population depends on herbal treatment, especially those living in distant parts of the country where it is the only available health care (UNDP, 2007; WHO, 2019). Traditional medicine practice is now considered an integral part of the country's healthcare delivery system following an integration policy incorporating herbal medicine services into orthodox healthcare in 2011 (Okertchiri, 2022). Herbal medicine relates to "plant-derived materials or products with therapeutic or other human health benefits which contain either raw or processed ingredients from one or plants" (WHO, 1998, p. 6). Several companies have been established in response to the increasing demand for herbal medicines, culminating in intense industry rivalry (UNDP, 2007; Essegbey *et al.*, 2014; WHO, 2019). This might have engendered low prices and margins in the industry. It has been noted that providing superior customer satisfaction, perceived quality, and brand trust can create a platform for a firm to gain a competitive distinctiveness in the market. Enhanced customer satisfaction, brand trust, and quality can also increase the value of a brand (Aaker, 1991; Lassar *et al.*, 1995), which may generate incremental revenue. Besides, it has been emphasized that quality and trust are key determinants of customer purchase intentions of herbal products (Mubarak & Mufeeth, 2020). Empirical studies have reported that a high level of satisfaction, perceived quality, and brand trust support customers' willingness to pay a price premium (Chaudhuri & Ligas, 2016; Khan & Siddiqui, 2020; Aksoy & Özsönmez, 2019), which can create an avenue for a firm to gain larger margins to grow in a keenly competitive business environment.

Extant literature reveals that the significance of customer satisfaction to perceived quality (e.g., Pappu & Quester, 2006), brand trust (e.g., Cuong, 2020; Delgado-Ballester &

Munuera-Alemán, 2001), and willingness to pay more (e.g., Chaudhuri & Ligas, 2016; Rambocas *et al.*, 2018) and in turn, the role of perceived quality (e.g., Khan & Siddiqui, 2020; Munir *et al.*, 2017) and brand trust (e.g., Aksoy & Özsönmez, 2019; Tamara *et al.*, 2020) in strengthening willingness to pay a price premium has been documented. Likewise, the impact of perceived quality on brand trust has also been studied (e.g., Ericş, Ünal, Candan, & Yildirim, 2012; Alan & Kabadayi, 2014; Ahmed *et al.*, 2014). This implies that perceived quality and brand trust can mediate the relationship between satisfaction and WTP, a price premium. Prior research investigated the intermediary role of perceived quality in the effect of brand experience on customers` WTP price premiums (Khan & Siddiqui, 2020). Besides, the mediating effect of store trust in the relationship between perceived merchandise value and WTP has also been studied (Chaudhuri & Ligas, 2016). However, empirical investigations on the impact of customer satisfaction on WTP at a high price mediated by the perceived quality and brand trust in the herbal industry remain unexplored.

This paper examines the influence of customer satisfaction and willingness to pay a price premium through the intermediary role of perceptions of quality and brand trust in the herbal industry. In this regard, the objectives are to evaluate; (1) the impact of customer satisfaction on brand trust, perceived quality, and willingness to pay more, (2) the influence of perceived quality on brand trust, (3) the mediating role of brand trust and perceived quality in the impact of satisfaction on WTP a high price, and (4) the mediating role of trust in the influence of satisfaction and perceptions of quality on willingness to pay more.

The next section of the paper covers the theoretical review, research hypotheses, conceptual model, methodology, data analysis, and findings. The last section presents the discussion, theoretical and managerial implications, conclusion, limitations, and direction of future research.

Literature Review

Brand Equity Theory

A brand with strong value is regarded as a critical asset of a firm because it provides predicted sales and a stream of revenue. Brand equity is the added value branding offers to a product (Farquhar, 1989). Brand equity has been studied from market perceptions and financial perspectives (Lassar *et al.*, 1995; Keller *et al.*, 2015). Market perception of brand equity is usually known as customer-based brand equity (CBBE). It refers to how brand knowledge affects consumer responses resulting from the marketing campaigns and actions of the brand (Keller *et al.*, 2015). The conceptualization of CBBE emerged from cognitive psychology, depicted in the associative network memory model

(Aaker, 1991; Keller, 1993; Lassar *et al.*, 1995). The associative network memory model recognizes memory as a network of nodes and links.

Nodes are stored information connected by links that differ in strength (Mitchel, 1982; Keller, 1993). According to the model, information is stored in the mind as nodes that are connected to other nodes. The recall of information from memory involves an activation process. As particular nodes are activated in the network, the activation spreads to other linked nodes in the memory. When the amount of activation that spreads to a specific node is greater than some threshold level, the information in that node is recalled. Based on the associative network memory model, consumers' knowledge of a brand is developed, which underlies the concept of CBBE. Brand knowledge relates to the brand information registered in the consumers' memory from which various associations are connected (Keller, 1993). Thus, the foundation of the concept of CBBE is that the strength of a brand is dependent on what customers have learned, felt, seen, and heard about the brand resulting from their exposure to the brand over time. Brand knowledge is subdivided into brand awareness and association.

Lassar *et al.* (1995, p. 12) also explained CBBE as "the enhancement in the perceived utility and desirability in a brand name confers on a product". In their view, perceived performance, social image, commitment, brand trust, perceived value, and attachment/identification are the main determinants of CBBE. The perceived performance dimension was used synonymously with perceived quality in their study. Accordingly, the present study is guided by the associative network memory theory, focusing on the dimensionality of Lassar *et al.*'s (1995) CBBE model to investigate the influence of customer satisfaction on WTP more through the mediating roles of brand trust and quality in the herbal industry.

Willingness to Pay More

Willingness to pay more measures the additional money a customer will pay for a preferred brand over similar or less expensive ones of comparable size (Netemeyer *et al.*, 2004). Rambocas *et al.* (2018) also described willingness to pay more as a customer's voluntary decision to pay additional money for an offering due to branding. According to Rambocas *et al.*, customers are willing to pay more when they expect equivalent or better benefits in return, and the more benefits they receive from using up the product, the more inclined they are to pay an extra price. Extant literature revealed that WTP at a high price is one of the positive behavioral aspects of loyalty (Cronin, Brady, & Hult, 2000) and measures how powerful brands are (Aaker, 1996; Netemeyer *et al.*, 2004). A strong brand helps to make consumer purchasing decisions much easier since it minimizes perceived risks by instilling emotional and cognitive confidence in customers. Prior research also reported that customers who are delighted with a brand are willing to pay a high price over its competing brands (Rambocas *et al.*, 2018).

Research Hypotheses

The hypotheses formulated in this research are explained below:

Customer Satisfaction

Developing superior customer satisfaction creates a platform for a company to generate an edge over the competition, forming the basis of successful customer retention. Customer satisfaction shows the extent to which a customer is happy or unhappy with a product by assessing his perceived product experience to expectations (Kotler, Armstrong, & Opresnik, 2021). It has been stressed that most customer satisfaction studies are rooted in the expectancy-disconfirmation model (Buttle & Maklan, 2015; Lovelock & Wirtz, 2016; Kotler *et al.*, 2021). The expectancy-disconfirmation model suggests that satisfaction is based on comparing a product's perceived performance to expectations (Oliver, 2010; Lovelock & Wirtz, 2016). Thus, disconfirmation occurs when there is a discrepancy, positive or negative, between prior expectations and perceived outcomes (Hoyer & MacInnis, 2010).

Consequently, if the perceived product outcome is as expected, the expectation is confirmed, and the customer is satisfied. Besides, if the perceived performance is below the expectation, the expectation is negatively disconfirmed, and the customer is dissatisfied. Finally, if the perceived outcome exceeds the expectations, the expectation is positively disconfirmed, making the customer delighted. Customers' expectations stem from prior purchase experiences, word-of-mouth referrals, and a company and its rivals' activities (Kotler & Keller, 2016).

Superior customer satisfaction forms the basis of increased loyalty, re-purchase behavior, word-of-mouth referrals, paying a premium price, and decreased customer switching behavior (Ferrell & Hartline, 2011; Kotler & Keller, 2016). It has been highlighted that perceived quality is an antecedent of satisfaction (Zeithaml, Bitner, & Gremler, 2018). However, Bitner (1990) contended that satisfaction could enhance perceived quality, which in turn, reinforces customers' behavioral responses. Lovelock and Wirtz (2016) also emphasized that overall satisfaction significantly contributes to the total quality perceptions of a firm. Prior research also reported that customer satisfaction has a positive impact on perceived quality (Pappu & Quester, 2006), brand trust (Delgado-Ballester & Munuera-Alemán, 2001; Cuong, 2020), and willingness to pay more (Chaudhuri & Ligas, 2016; Rambocas *et al.*, 2018). It was also found that customers' satisfaction with herbal medicinal products increased trust (Oppong *et al.*, 2021) and the behavioral intention to pay a high price, provide word-of-mouth, and repurchase (Oppong, 2020).

Based on the above discussion, the proposed hypotheses are:

H1: Customer satisfaction will have a significant and positive relationship with brand trust.

H2: Customer satisfaction will have a significant and positive relationship with willingness to pay more.

H3: Customer satisfaction will have a significant and positive relationship with perceived quality.

Perceived Quality

Perceived quality is one of the strategic objectives of most companies because of its direct contribution to profitability. Keller *et al.* (2015) defined perceived quality as a customer's perception of a product's superiority over its rivals and intended uses. Perceived quality also measures the judgment of a product's overall excellence (Zeithaml, 1988). Customers' subjective assessment of the quality of a product depends on its performance, reliability, durability, serviceability, fit and finish, features, and conformance to the specification (Aaker, 1991).

Aaker further emphasized that increased perceived quality creates a platform for brand differentiation, charging high prices and line extensions, directly impacting the company's market share and overall profitability. The author believes good perceived quality supports customers' satisfaction and repeated patronage behavior. Empirical evidence suggests that high perceived quality has a positive influence on customers' WTP a high price (Munir *et al.*, 2017; Khan & Siddiqui, 2020) and brand trust (Erçis *et al.*, 2012; Alan & Kabadayi, 2014; Ahmed *et al.*, 2014) and is positively affected by customer satisfaction (Pappu & Quester, 2006).

Based on the above discussion, the proposed hypotheses are:

H4: Perceived quality will have a significant and positive relationship with willingness to pay more.

H5: Perceived quality will have a significant and positive relationship with brand trust.

H6: Perceived quality will significantly and positively mediate the relationship between customer satisfaction and willingness to pay more.

H7: Perceived quality will have a significant and positive mediation effect on the relationship between customer satisfaction and brand trust

Brand Trust

Securing customers' trust is one of the strategic goals of a company's efforts to create a long-term relationship to gain an advantage over the competition. According to Moorman, Zaltman, and Deshpande (1992), trust concerns one party's willingness to depend on a business associate with whom he has confidence. The scholars view trust as expectations about a business associate's trustworthiness arising from his expertise, reliability, and intentions. Morgan and Hunt (1994) explained trust as confidence in a business associate's reliability and integrity. The essence of trust is that an exchange partner in whom one party has confidence would not exploit one's vulnerability.

Therefore, the trusted business partner is expected to exhibit high benevolence, competence, and honesty (Buttle & Maklan, 2015).

Brand trust also relates to customers' readiness to depend on a brand's capability to fulfill its stated purpose (Chaudhuri & Holbrook, 2001). The scholars emphasized that trust is crucial in risk-prone business settings where customers are more vulnerable. As a result, customers repeatedly patronize trusted brands because they are recognized as safe, reliable, and authentic. Similarly, Yague-Guillen, Munuera-Aleman, and Delgado-Ballester (2003) defined brand trust as confident anticipation of a brand's reliability and intentions in uncertain settings (Yague-Guillen *et al.*, 2003). The scholars proposed that reliability and intentions are the key elements of brand trust. The brand's reliability measures the belief that it can meet its intended promise. Conversely, intentions relate to the belief that the brand would seek the customers' interest when an unanticipated problem arises with its consumption.

Empirical studies show that brand trust has a positive and significant effect on WTP price premium (Chaudhuri & Ligas, 2016; Aksoy & Özsönmez, 2019; Tamara *et al.*, 2020) and is directly influenced by customer satisfaction (Pappu & Quester, 2006) and perceived quality (Ericş *et al.*, 2012; Alan & Kabadayi, 2014). It was also revealed that customers' trust in plant-based medicines enhanced their intention to pay a premium price (Oppong *et al.*, 2022).

Based on the above discussion, the hypotheses posited are:

H8: Brand trust will have a significant and positive relationship with willingness to pay more.

H9: Brand trust will significantly and positively mediate the relationship between customer satisfaction and willingness to pay more.

H10: Brand trust will significantly and positively mediate the relationship between perceived quality and willingness to pay more.

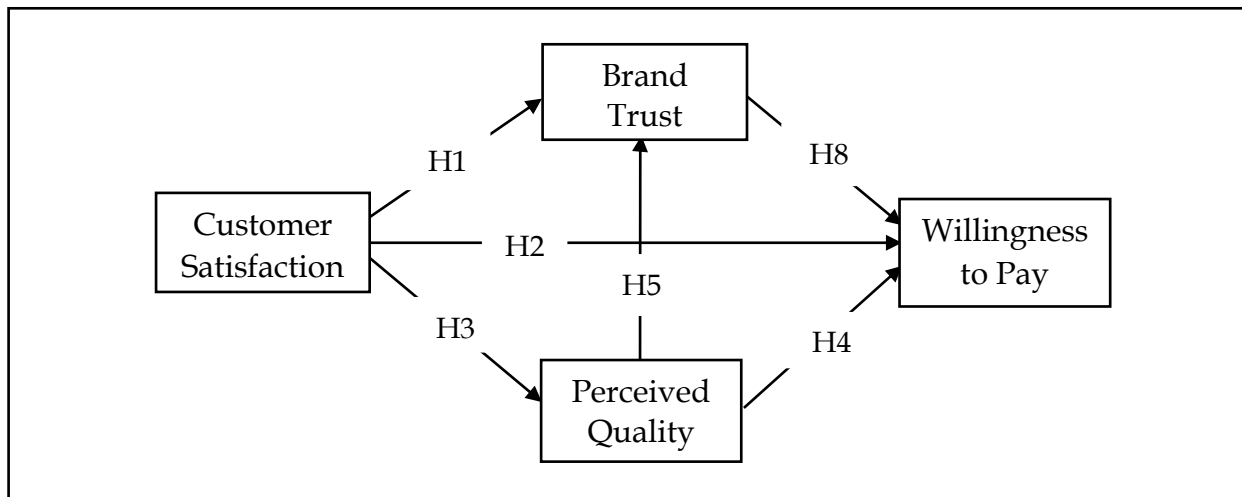
Research Model

The research model highlights the main constructs and their relationships in a narrative or graphical form (Sekaran & Bougie, 2016). In the current paper, satisfaction is an exogenous variable; brand trust and perceived quality mediate, while a customer WTP is a dependent variable. The research model in Figure 1 shows that customer satisfaction is directly related to perceived quality, brand trust, and WTP, while perceived quality positively affects brand trust. In addition, perceived quality and brand trust mediates the path between customer satisfaction and WTP more, while brand trust mediates the relationship between perceived quality and WTP more.

In this paper, perceived quality is measured as the judgment of a product's overall excellence (Zeithaml, 1988), and satisfaction relates to the customers' feelings of pleasure

or displeasure arising from evaluating a product's perceived performance with expectations (Kotler & Keller, 2016). Again, brand trust is operationalized as confident anticipation of a brand's reliability and intentions in uncertain settings (Yague-Guillen *et al.*, 2003), while willingness to pay more is measured as the customer's voluntary decision to pay an additional amount for a product due to its branding (Rambocas *et al.*, 2018).

Figure 1: Research Model



Source: Designed by the Researchers

Research Methodology

The method adopted to examine the research hypotheses is explained below.

Participants and Sampling

The research population includes 26 retail stores selling herbal products and 854 customers in Ghana's Cape Coast central business district. The data about the herbal retail outlets were obtained from the Cape Coast Traditional Medicine Practice Council, an institution tasked to regulate the sale of medicinal herbal products. In contrast, that of 854 customers was obtained from the 26 herbal retail outlets' sales ledger. Two hundred sixty-five (265) customers were selected based on Krejcie and Morgan's (1970) sample size table.

The characteristics of the respondents show that the majority were males, and they happened to be youth who had graduated from senior high school. Thus, the males who

constituted the majority were (115) 51.6 percent, the youth (26-35 years) were (89) 39.7 percent, and those who graduated from senior high school were (78) 35.5 percent.

Scale Design and Data Collection Method

The variables were measured by multiple indicators adapted from previous studies using a five-point Likert scale anchored on 1 = strongly disagree to 5 = strongly agree. The scale items of brand trust were selected from Chaudhuri and Holdbrook (2001); He, Li, and Harris (2012) and Delgado-Ballester and Munuera-Alemán (2005) provided those of satisfaction; WTP more from Zeithaml, Berry, and Parasuraman (1996); Chaudhuri and Holdbrook (2001) and Netemeyer *et al.* (2004); while Yoo, Donthu, and Lee (2000) and Gil, Andres, and Martinez (2007) supplied those of perceived quality. The closed-ended questions allowed the researcher to obtain quantitative data for statistical analysis (Creswell, 2014).

The questionnaires were distributed to the respondents after they had finished shopping at the entrance of the herbal retail outlets, using a systematic sampling method. The first respondent was selected randomly; subsequently, a third of every respondent was asked to respond to the survey questionnaires. The researchers adopted this sampling procedure because it allowed the respondents to be selected from the sampling frame without forehand knowledge of them (Malhotra *et al.*, 2017). A total of 265 copies of the questionnaires were sent out, but 226 were usable, resulting from poor responses.

Data Analysis and Results

Structural Equation Modelling

Structural equation modeling (SEM) was utilized to analyze the hypotheses using Smart PLS version 3.3.3. The PLS-SEM provided an efficient and better method for handling individual multiple regression concurrently, small sample size (226) and data that are not normally distributed (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). A two-stage procedure was used to conduct the SEM, as Byrne (2016) suggested.

Measurement Model

The measurement model consists of reflective measures, and hence, a reflective model was analyzed in this study. According to Hair, Hult, Ringle, and Sarstedt (2017), the essence of conducting the measurement model was to check the individual construct's reliability, composite reliability, convergent validity, and discriminant validity.

The measurement model results support the internal consistency reliability and construct validity. First, all the indicator loadings are statistically significant at a probability level of .001 and above .05, as shown in Table 1 (Hair, Black, Babin, & Anderson, 2014). Table 2 provides the results of the psychometric measures, including individual construct’s reliability, composite reliability, average variance extracted (AVE), the Fornell-Lacker criterion, and the heterotrait-monotriat ratio for determining discriminant validity. Again, all the individual construct’s reliability is satisfactory because the coefficient alpha values are above .70 (Tavakol & Dennick, 2011). Not only this but also, the composite reliability is acceptable because their coefficients exceeded .70 (Hair *et al.*, 2017). Moreover, the values of AVE are above 0.50, suggesting satisfactory convergent validity (Bagozzi & Yi, 1988). Likewise, the square AVEs are greater than the correlations among the constructs, confirming discriminant validity (Fornell & Lacker, 1981). Furthermore, the HTMT ratio of correlation was examined. Again, all the constructs have values less than 0.85, which suggests good discriminant validity, as seen in Table 2 (Henseler *et al.*, 2015).

Table 1: Results of the Measurement Model

Construct and Scale Items		M	SD	Standardized loadings	t-value
Brand Trust					
BT1	I trust X	4.119	.864	.849	31.958
BT2	I rely on X to solve my problems	4.093	.902	.878	37.385
BT4	X is an honest brand	4.133	.783	.849	33.702
Customer Satisfaction					
CS1	I am completely satisfied with X	4.159	.910	.863	35.047
CS2	I am very pleased with X	4.022	.935	.863	26.333
CS3	I am delighted with X	4.027	.864	.827	24.258
Perceived Quality					
PQ1	I can always trust X if I want a product of high quality	4.204	.855	.911	57.948
PQ2	X is of high quality	4.265	.772	.860	27.675
PQ4	The likelihood that X would be functional is very high	3.863	.916	.605	6.300
WTP More					
WTPP2	I would be willing to pay a higher price for X than the other brands	3.827	.948	0.776	15.104
WTPP3	The price of X would have to go up quite high before I would switch to another brand	3.938	.941	0.841	20.491
WTPP4	I am committed to X	3.991	.879	0.866	44.771

Notes: X = Focal brand; M = Mean; SD = Standard Deviation; All the standardised estimates are significant at the p = 0.05 two-tailed level

Table 2: Results of Psychometric Measures

Variable	α	CR	AVE	WTPM	PQ	CS	BT
Willingness to Pay More (WTPM)	.779	.868	.686	.828**			
Perceived Quality (PQ)	.710	.841	.645	.467	.803**		
Customer Satisfaction (CS)	.811	.887	.724	.345	.233	.851**	
Brand Trust (BT)	.822	.894	.737	.512	.432	.418	.859**
Results of Heterotrait-Monotriat Ratio				WTPM	PQ	CS	BT
Willingness to Pay More (WTPM)				1			
Perceived Quality (PQ)				.593	1		
Customer Satisfaction (CS)				.417	.320	1	
Brand Trust (BT)				.614	.552	.504	1

Notes: α = Cronbach alpha; CR = Composite Reliability; AVE = Average Variance Extracted; ** = Square root of AVE; Off-diagonal estimates measure the squared inter-construct correlations

Path Model

The path model was used to evaluate the proposed hypotheses in the study. The path model was conducted by using a bootstrap re-sampling procedure. To assess the path estimates` quality, the R² of WTP more, trust, and quality are 0.352, 0.293, and 0.054, respectively. These results show that WTP, trust, and quality have weak predictive power (Hair *et al.*, 2017). Furthermore, the cross-validated redundancy measure (Q²) of WTP price premium, trust, and quality is .215, .207, and .029, respectively. These values are above zero (0), and consequently, all the variables command satisfactory predictive importance. Besides, these outcomes suggest that WTP and trust have a medium, whereas quality has a small predictive relevance in the model (*ibid*).

Moreover, the collinearity levels of the exogenous variables were examined via the path model's variance inflation factor (VIF). The results in Table 4 reveal that all the exogenous variables have VIF below 5, confirming no collinearity in the model (Hair *et al.*, 2017). The effect size of the exogenous variables was also analyzed to ascertain how much they impacted the endogenous variables. Cohen (1988) and Hair *et al.* (2017) reported that f² values of 0.02, 0.15, and 0.35 suggest the predictor variables' small, medium and large effects on the outcome variable. While the f² value below 0.02 suggests that there is no effect. The results in Table 5 show that customer satisfaction has a medium effect on brand trust (f² = .150) but a small effect on willingness to pay more (f² = .025) and perceived herbal quality (f² = .058). Moreover, the findings indicate that perception of

herbal quality has a medium effect on brand trust ($f^2 = .167$) and a small effect on willingness to pay more ($f^2 = .108$), and in turn, brand trust has a medium effect on willingness to pay more ($f^2 = .166$).

The results in Table 5 and Figure 2 demonstrate that customer satisfaction significantly positively affects brand trust and perceived quality at a significance level of .05 and WTP less than 0.05; hence, *H1*, *H2*, and *H3* are supported, respectively. Moreover, the path analysis results indicate that perceived quality directly impacts WTP more and brand trust at a $p < .05$; consequently, *H4* and *H5* are supported. Lastly, the path analysis reveals that brand trust positively influences willingness to pay more at a significance level of less than 0.05, supporting *H8*.

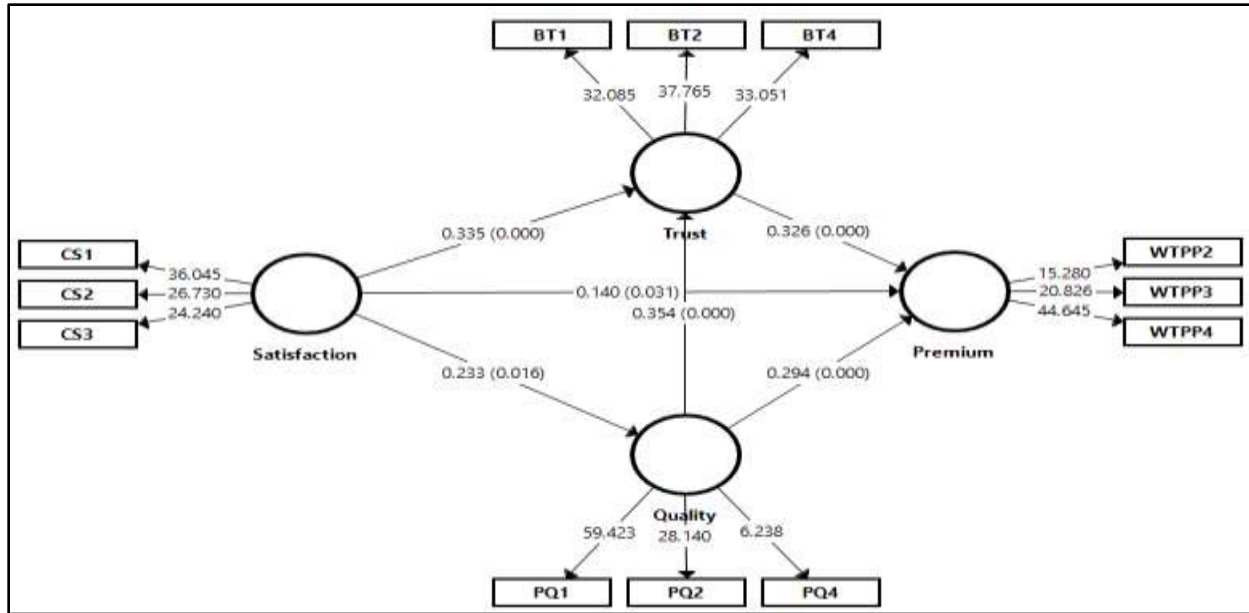
Table 4: Results of Collinearity Analysis

Constructs	Willingness to Pay More	Perceived Quality	Satisfaction	Brand Trust
Willingness to Pay More				
Perceived Quality	1.234			1.058
Satisfaction	1.217	1.000		1.058
Brand Trust	1.414			

Table 5: Results of Path Analysis

Hypotheses	Structural Relations	f^2	Beta Estimate	t-value	p-value	Supported
H1	Satisfaction ----> Brand Trust	.150	.335	4.578	.000	Yes
H2	Satisfaction -----> WTP More	.025	.140	2.151	.031	Yes
H3	Satisfaction ----> Quality	.058	.233	2.418	.016	Yes
H4	Quality -----> WTP More	.108	.294	4.556	.000	Yes
H5	Quality ----> Brand Trust	.167	.354	5.828	.000	Yes
H8	Trust ----> WTP More	.166	.326	4.400	.000	Yes

Figure 2: Path Diagram of Structural Model



Mediation Model

The study also aimed to assess the mediation influence of brand trust and perceived herbal quality on the relationship between satisfaction and willingness to pay more. The mediation effects were analyzed using Baron and Kenny’s (1986) mediational model, which suggests that (1) the mediators should be regressed on the predictor, (2) the dependent variable on the predictor, and (3) the independent variable on both the predictor and the mediator. This analysis was also done through a bootstrap re-sampling procedure using Smart PLS 3.3.3.

First, the direct effects without the mediator variables (brand trust and perceived quality) were evaluated in the path model. Table 5 indicates that all the direct effects are significant at a probability level of .05. Secondly, the mediation model was evaluated by including the mediators in the research model. The results in Table 5 show that the indirect relationship between satisfaction, brand trust, and WTP is significant at $p < .05$. This result indicates the effect of satisfaction on brand trust and willingness to pay more is partially mediated by perceived quality. Furthermore, the results show that the indirect influence of satisfaction and perceived quality on WTP is significant at $p < .05$. This outcome also shows that the influence of satisfaction and perceived quality on WTP at a high price is partially mediated by brand trust.

Table 5: Summary of Mediation Results

Hypotheses	Structural Relations	Direct without Mediators	Direct with Mediators	Indirect Effect	Results
H6	Satisfaction -> Quality -> WTP More	.140 (.031)*	.294(.000)*	.068 (.049)*	Partial mediation
H7	Satisfaction --> Quality --> Trust	.335 (.000)*	.354(.000)*	.082 (.032)*	Partial mediation
H9	Satisfaction --> Trust -> WTP More	.140 (.031)*	.326(.000)*	.109(.004)*	Partial mediation
H10	Quality ---> Trust --> WTP More	.294(.000)*	.140 (.031)*	.115(.000)*	Partial mediation

Notes: * Statistically significant @ p < .05

Discussions

The main objective of this paper is to explore the mediating impact of perceived herbal quality and trust on the relationship between customer satisfaction and willingness to pay more. The results indicate that customer satisfaction positively influences brand trust in the herbal industry. This finding agrees with earlier studies (Cuong, 2020; Delgado-Ballester & Munuera-Alemán, 2001) which suggested that satisfaction directly influences trust. Moreover, this outcome corroborates past research conducted by Oppong *et al.* (2021), which confirmed that customers` satisfaction with herbal medicinal products increased their trust in them in Ghana. This implies that high customer brand satisfaction evokes confidence in a brand.

Moreover, similar to the outcomes of past investigations (Chaudhuri & Ligas, 2016; Rambocas *et al.*, 2018), the data analysis results show that satisfaction directly impacts WTP more. Besides, this result is consistent with prior research by Oppong (2020), which established that customer satisfaction predicts WTP at a high price, word-of-mouth referrals, and repeat purchases of herbal medicine in the industry. This suggests that the customers are ready to pay a higher price for a brand that gives them more satisfaction. The results of the data analysis further revealed that customer satisfaction has a significant positive effect on perceived herbal medicinal product quality. This result is in line with prior research (Pappu & Quester, 2006), which pointed out that customer satisfaction directly impacts perceived quality. This outcome contradicts the previous studies (Putri *et al.*, 2018; Karim & Chowdhury, 2014; Srivastava & Sharma, 2013), demonstrating that perceived quality positively affects customer satisfaction. The study`s result implies that customers are satisfied with brands that are of high quality. In other words, customers` brand satisfaction increases the perceived quality of a brand in the market. In agreement with past investigations (Khan & Siddiqui, 2020; Munir *et al.*, 2017), the study`s findings indicate that perceived herbal medicinal product quality positively influences customers` WTP at a high price. This result indicates that customers are willing to pay more for a product or brand perceived to be dependable and perform better.

Besides, the study found that perceived herbal medicinal product quality positively affects the customers' brand trust. This outcome is similar to previous studies (Ericş *et al.*, 2012; Alan & Kabadayi, 2014), which reported that perceived quality strongly influences customers' brand trust. This result implies that customers have greater confidence in reliable brands that perform better than their counterparts in the market. Building trust in the perceived herbal quality is also crucial to the business's success due to the customers' greater anxiety about their side effects of late. The results further point out that customer brand trust directly supports the formation and strength of willingness to pay a price premium. This result concurs with earlier studies (Chaudhuri & Ligas, 2016; Aksoy & Özsönmez, 2019), which pointed out that willingness to pay more is directly influenced by customer brand trust. Furthermore, this outcome agrees with past research conducted by Oppong *et al.* (2022), which established that customers' brand trust enhances their intentions to pay a premium price for herbal products in Ghana. This outcome suggests that the customers' intentions to pay a high price are induced by their confidence in herbal products.

The findings also show that perceived quality partially mediates the impact of customer satisfaction on willingness to pay more and brand trust in the herbal industry. This result indicates that perceived herbal medicinal product quality partly contributes to strengthening the relationship between customers' satisfaction with their willingness to pay a price premium and brand trust. Lastly, it was revealed that brand trust partially mediates the impact of customer satisfaction and brand quality on WTP in the herbal industry. This result demonstrates that brand trust partially contributes to building a relationship between customer satisfaction and perceived quality with the customers' willingness to pay a high price in the herbal industry.

Managerial Implications

The study's main objective was to explore the mediating effects of perceived herbal quality and trust on the relationship between customer satisfaction and willingness to pay more. The results show that customer satisfaction enhances brand trust, perceived herbal quality, and willingness to pay more. In turn, brand trust and perceived herbal quality positively influence willingness to pay more. Thus, customers who are satisfied with a brand are willing to pay more. Furthermore, satisfied customers perceive the brand as high quality, develop confidence, and are willing to pay a high price. This implies that brand managers of herbal companies can enhance the customers' perceived quality and trust and, ultimately, their willingness to pay a price premium by developing products that excite them. Again, the satisfied customers will be ready to pay more for the products.

Moreover, the study establishes that perceived herbal quality partially mediates the impact of satisfaction on brand trust and customers' behavioral intention to pay a high price. This suggests the impact of satisfaction on customers' trust and willingness to

pay more is partly supported by perceived herbal quality. Recognizing the important role of perceived herbal quality in the impact of satisfaction on customer trust and their willingness to pay a high price, the brand managers of herbal companies should consider perceived herbal quality in creating satisfaction to strengthen the customers' brand trust and their willingness to pay more in the industry. Also, the research confirms that brand trust partially mediates the effect of satisfaction and quality on WTP more. This means that the impact of customer satisfaction and perceived herbal quality on willingness to pay more is partly due to the influence of brand trust. Therefore, brand managers of herbal companies should consider brand trust in building satisfaction and perceived herbal quality to enrich the customers' willingness to more in the industry.

Theoretical Implications

The significance of satisfaction, brand trust, and perceived quality to customers' willingness to pay more have been investigated by several authors (e.g., Chaudhuri & Ligas, 2016; Khan & Siddiqui, 2020; Aksoy & Özsönmez, 2019) in the brand management literature. However, investigations on the mediating effects of brand trust and perceived quality in the nexus between satisfaction and willingness to pay more are relatively scarce. Hence, this study contributes to increasing the brand management theory.

Again, a review of the literature indicates that perceived quality leads to satisfaction which, in turn, enhances customer behavioral responses, such as switching behavior, repurchase intention, willingness to pay a high price, etc. (e.g., Izzudin & Novandarii, 2018; Srivastava & Sharma, 2013; Saha & Theingi, 2009). However, this study is one of the few that have empirically established that customer satisfaction strengthens perceived quality which, in turn, supports willingness to pay more. Therefore, this paper contributes to the ongoing debate on the satisfaction-quality relationship and its effect on customers' behavioral responses in the brand management literature. Besides, a new research framework was developed to offer insights into the relationships between brand trust, perceived quality, satisfaction, and WTP at a high price for herbal products. The framework could be applied in future brand management research because its validity and reliability have been rigorously tested.

Finally, although the significance of satisfaction, brand trust, and perceived quality in building customers' willingness to pay a high price has been documented in the literature, the current research further expands the earlier studies and contributes to the brand management literature.

Conclusion

The main objective of this research was to investigate the impact of customer satisfaction on willingness to pay more via the intermediary role of brand trust and perceived herbal quality. The study found that perceived quality partially enhances the impact of satisfaction on WTP at a price premium and brand trust. Hence, perceived quality is critical in the herbal industry when developing a customer satisfaction strategy to improve brand trust and customers' willingness to pay more for herbal medicinal products. The research further points out that brand trust partially mediates the effect of satisfaction and quality on WTP. In this regard, brand trust is also critical and invaluable when building and harnessing satisfaction and perceived herbal quality to support the customers' willingness to pay more in the industry.

This paper concludes that brand trust and perceived quality are pre-requisite for building customer satisfaction to enrich the customers' willingness to pay more for herbal medicinal products in the industry.

Limitations and Suggestions for Future Research

Although this paper is underlain with sound literature and methodology, it has some limitations that must be resolved to improve similar future research. Data were gathered from the respondents in a store-based retail environment. It is suggested that similar research conducted in the future should include both store-based and online retail settings to gain a holistic picture of customers' satisfaction, perceptions of herbal quality, brand trust, and their WTP for herbal products. Furthermore, the research was confined to the herbal industry in Ghana. It is recommended that similar research should widen the geographic setting to include other countries to enrich its generalization. Finally, the paper relied on quantitative methodology to ascertain the causal relationship between satisfaction, quality, trust, and WTP at a high price. It is suggested that future research should consider mixed methodologies to enrich its generalization.

Besides, herbal medicines encompass herbs, materials, preparations, and finished packaged herbal products. The current paper, however, considered only the finished packaged herbal products in the herbal industry. Future studies should investigate all aspects of herbal medicines in the herbal industry. Furthermore, the current research examined customer satisfaction, brand trust, perceived quality, and willingness to pay a high price in Ghana. Future research should consider collecting data from other countries to enhance the generalization of this study.

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Social Media Marketing – A Systematic Review of Quantitative Empirical Studies

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Abstract

Purpose – *The main purpose of this paper is to review the available research in the area of social media marketing and provide an overview of the research potential to identify research gaps and define specific areas for further research.*

Method – *Through various reading and structuring loops, we examined 355 peer-reviewed quantitative empirical articles according to key themes, research objectives, research perspective, statistical method, and data collection method. Descriptive statistics were used to analyze research foci and identify research gaps.*

Findings – *We were able to identify four research periods within social media marketing research: (1) emergence of SMM research, (2) growing interest, (3) underpinning of the theories, and (4) paradigm shift in research. We also identified the most interesting (e.g., 'success with SMM') and underrepresented social media marketing research topics (e.g., 'B2B influence factors'). In addition, the lack of a two-way research orientation (customer and provider) is evident and should be addressed in the future. Finally, we uncovered the need for further exploratory research in SMM.*

Limitations – *Because we focused on quantitative empirical research, we cannot provide insights into the entire SMM research body. In addition, we cannot guarantee the completeness of the data because relevant publications may not have been retrieved due to the limitation of the search terms. Moreover, there is a potential loss of information, as we have summarized information to present it better.*

Implications – *Future research should focus on two-sided research dealing with manager responses in SNS and customer loyalty and comparing manager responses and consumer reviews on social media performance. In addition, future research could include exploratory research questions. Research on the effects of social media marketing in a business-to-business context is also of great importance in the future.*

Originality – *There has been no systematic review of the quantitative literature on social media marketing. Therefore, we attribute originality to our approach and results.*

Keywords: social media marketing; literature review; empirical research; quantitative research

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Introduction

Social media marketing (SMM) still represents a young but valuable field of marketing (Ahmed *et al.*, 2019), having emerged in the last decades along with information and communication technologies (ICTs) (Wan *et al.*, 2020). Due to its ability to reach a large number of people in a short period, social media marketing can be a powerful tool for announcing product innovations, presenting product variations (Wang *et al.*, 2016; Wu, 2020), connecting and maintaining contact with customers and users (Cho & Sutton, 2021; Wu *et al.*, 2020). Moreover, with social media marketing, companies can increase brand awareness, existing brand acceptance, and the related attitude toward the brand (Wu, 2020; Yee *et al.*, 2021; Zahoor & Qureshi, 2017). According to Huh (2018) and Thao and van Anh (2020), social media is one of the most important tools to increase knowledge. It implies a shift to a digital world where social media communication is indispensable. In this context, social media marketing is gaining importance for companies and becoming an important research topic for academics and scientists (Felix *et al.*, 2016; Koszembar-Wiklik, 2016; Thao & van Anh, 2020). Therefore, much research has already been conducted in social media and SMM. Nevertheless, several researchers postulate the need for further (empirical) research (Felix *et al.*, 2016; Keegan & Rowley, 2017; Wu *et al.*, 2020).

To fill the research gaps, the relevant literature must be reviewed to establish a solid foundation, uncover topics and areas needing further investigation, and define promising research directions (Webster & Watson, 2002). In this article, we gain insight into the current state of social media marketing to facilitate the search for appropriate and relevant research opportunities. As the digital world is subject to volatile dynamics in technology and usage, continuously updating research needs is crucial for marketing science to stay in touch with the field's current state. Despite its scientific importance, social media marketing practitioners rely on the latest insights into its dynamics and state of the art to quickly adapt their company's strategies and gain a competitive advantage. Aware of the scientific and practical importance of updating the knowledge about the current state of social media marketing, we attempt to answer the following research questions with this literature review:

- What are the main topics of social media marketing research?

- What research opportunities and challenges emerge from the state of the art?

According to these questions, the analysis of the latest insights from the relevant literature reviews dealing with social media marketing (e.g., Arrigo, 2018; Buratti *et al.*, 2018; Alves *et al.*, 2016; Hester & Vargo, 2013) already reveals the need for further literature reviews. For example, Alves *et al.* (2016) proclaim the need for a complementary analysis to confirm their findings.

Overall, the literature reviews examined use the full range of empirical and conceptual articles, and in some cases focusing on specific topics such as brand equity (e.g., Zahoor & Qureshi, 2017) or luxury brands (e.g., Arrigo, 2018). In terms of content and subject of study, we have grouped these literature reviews into six thematic areas: (1) luxury brands; (2) B2B services; (3) brand equity; (4) digital, social media, and mobile marketing; (5) attitude-behavior theories; and (6) general overview. The literature reviews also differ in terms of data source and methodology.¹

In the most limited review in our sample, Arora and Sanni (2019) limit their data source to only one specific journal, the *Journal of Promotion Management*. This approach is insufficient to provide a comprehensive overview of social media research. Lamberton and Stephen (2016) also limit their literature review to specific journals. However, unlike the aforementioned authors, Lamberton and Stephen (2016) use five marketing-related journals for their meta-analysis. In addition, the authors focus on three main topics: digital, social media, and mobile marketing. In contrast, Hester and Vargo (2013), Dwivedi *et al.* (2015), and Alves *et al.* (2016) use large databases such as EBSCO (in the case of Hester and Vargo), Scopus (in the case of Dwivedi *et al.*) and Web of Science (in the case of Alves *et al.*) for their literature reviews.

From a methodological point of view, the literature reviews show a great variety in terms of literature analysis and content. Although some literature reviews use interesting and comparatively rare methods, they have limitations regarding data sources, and none addresses the quantitative empirical perspective.

In summary, the literature reviews relevant to social media marketing provide scholarly contributions by providing detailed information on specific topics or analyzing the link between conceptual research and empirical observation. However, they do not adequately address quantitative empirical research to uncover possible further research questions (Alves *et al.*, 2016). This study addresses this shortcoming and aims to advance knowledge on the current state and development of quantitative empirical research to identify potential research gaps and derive implications for future research. To achieve this, we examine different thematic clusters, statistical methods, and research trends based on the existing scope of scientific quantitative empirical social media marketing

¹ For details, see Appendix A, which provides an overview of the literature reviews we scrutinized.

literature (publications from 2004 to 2021), thus complementing the scope of recent social media marketing literature reviews.

We examined 355 peer-reviewed quantitative empirical articles on SMM to achieve this goal. This database, combined with the subsequent quantitative research review, provides a solid foundation for identifying research gaps and implications for future research (Webster & Watson, 2002). Consequently, this article is organized as follows: The second section outlines the methodology we used to prepare this literature review. Next, the third section summarizes the findings of the previous analysis and discusses its potential limitations. Finally, the study concludes with implications for future research in social media marketing.

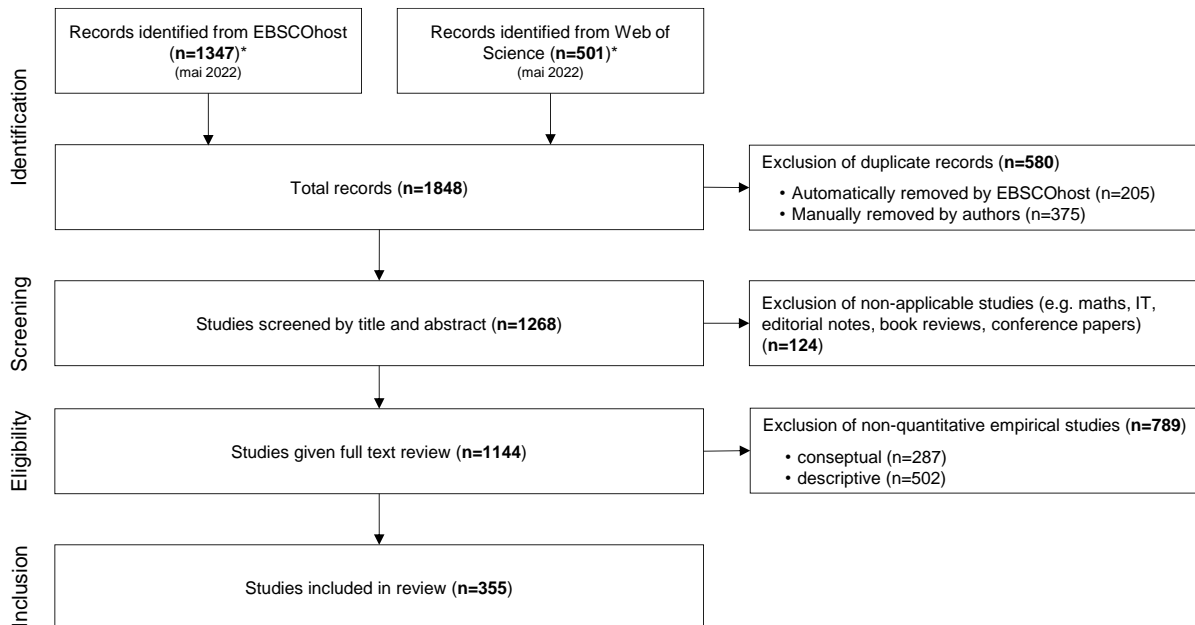
Methodology

In line with Hester and Vargo (2013) and Alves *et al.* (2016), this literature review focuses on peer-reviewed articles published in scientific, academic journals in order to consider high-quality and recent research (Webster & Watson, 2002). Therefore, our analysis is based on the EBSCOhost Academic Search Complete, Business Source Complete, and EconLit databases, using a systematic four-step approach proposed by Webster and Watson (2002) for literature search and selection. First, we searched the databases for the terms 'social media marketing' or 'social network marketing' in either the title, abstract, or subtitle, limiting the literature selection to peer-reviewed academic journals written in English. The same approach was applied to the Web of Science database. We excluded editorial notes or author comments and duplicates in the second step. The third step was to obtain full-text access to the articles through the library system. Finally, in the fourth step, we clustered the articles according to the methodology used, using three categories: (a) conceptual studies that provide frameworks or only describe the current state of the art; (b) descriptive empirical studies that use case studies, basic empirical methods, qualitative interviews, content analysis or descriptive statistics; and (c) multivariate empirical studies that use quantitative empirical methods such as structural equation modeling, simple and multiple regression, causal analysis and factor analysis.

Because previous meta-analyses and literature reviews have comprehensively covered both qualitative and quantitative research, we excluded conceptual and descriptive studies from further consideration to focus on quantitative research. With 445 research publications identified in the literature review, descriptive SMM research appears well-researched (see Figure 1). Furthermore, as SMM is a highly application-oriented and rapidly changing topic, application- and practice-oriented research is crucial for further empirical development. Quantitative research provides more applicable insights from practitioners than conceptual or theoretical studies by providing empirical facts and observed data. In addition, focusing on the body of quantitative research in SMM helps to classify different research topics according to their state of development in

basic research. Since quantitative confirmatory research always requires basic theories and qualitative preliminary studies, a large body of quantitative research is based on a deep theoretical foundation. In contrast, a thin body of quantitative research implies a lack of a basic understanding of causality, effects, and properties. Therefore, this article's limitation to quantitative research allows for identifying gaps in qualitative and quantitative research.

As a result of the above four-step approach, our literature base includes 355 relevant peer-reviewed quantitative empirical articles. To illustrate our approach, we have created a flowchart of the review phases (see Figure 1), which shows the individual steps of the literature search. A flowchart is an important research protocol that helps to ensure the traceability and transparency of the process undertaken by researchers (Liberati *et al.*, 2009).



*Limitation to articles in English language in peer-reviewed academic journals

Figure 1: Flow Diagram of the Review Phases

Regarding the search term and the different steps of the identification process, there is no guarantee that all relevant publications dealing with social media marketing quantitatively have been identified. Other articles dealing with social media marketing may not use the above search terms in their title, subtitle, or abstract and, therefore, may have escaped our scrutiny. However, we are confident that our database provides a sound basis for our research and identifies research gaps. We followed a structured and systematic approach and used two reliable online databases with high-quality standards, as explained and suggested in the scientific literature (Webster & Watson, 2002). We also used several independent rounds of reading, clustering, summarizing, and comparing. In detail, this means that both authors independently analyzed the literature, compared

their results, and, in case of disagreement, reviewed the publications again. In doing so, we followed the approach of several other authors and considered the resulting body of literature to be a robust and valid representation of SMM research.

Figure 2 illustrates the evolution of peer-reviewed empirical publications in social media marketing. Because of the gap between the first publications (2004 and 2009) and to illustrate the expansion of the research field, we do not show the appearance of the first publications and focus on the field's evolution from 2010 to 2021. Considering this evolution of research, social media marketing still appears as a young branch of marketing research gaining momentum in 2011. Most empirical research (40%) has been published in the last three years and more than 70% of the total body of research dates from 2016 to 2021. Thus, the evolution of SMM research indicates that the empirical study of social media marketing is a new research activity still gaining scientific interest.

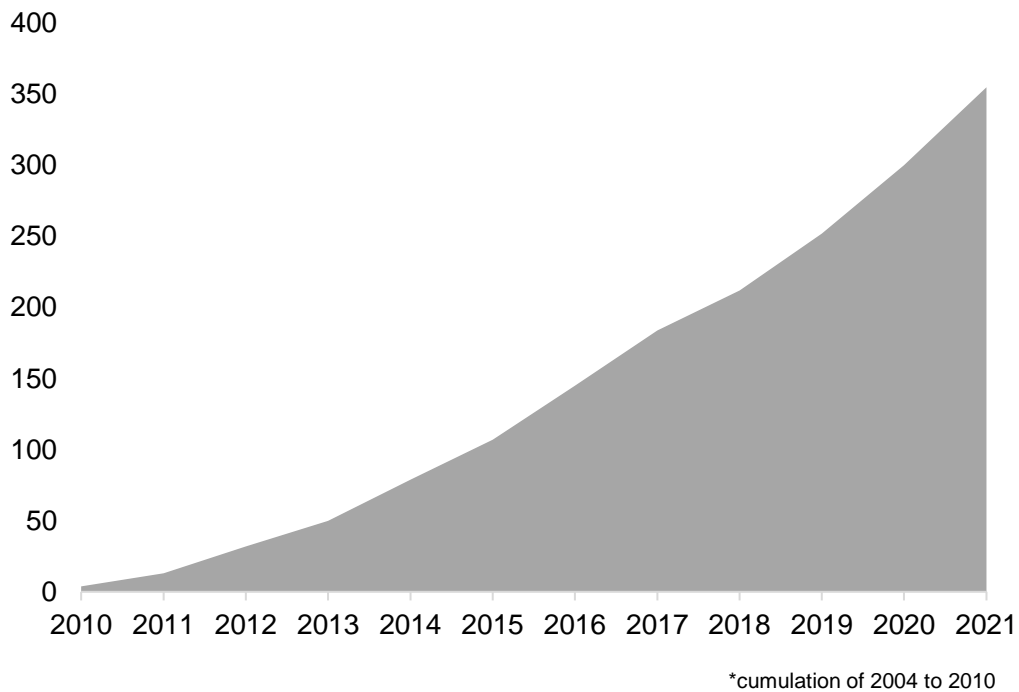


Figure 2: Number of Quantitative Empirical Research Studies

To identify the key topics or specific research areas, the reviewed studies were read several times to create useful and clear clusters of key topics for this literature review. On this occasion, each article was analyzed and added to a thematic cluster according to the study's research question. We reviewed the articles again to consolidate the thematic clusters and looked for similarities. We repeated this process several times until further summarization no longer produced meaningful clustering. However, because a few studies addressed multiple topics, assigning these articles to one of these clusters posed a significant challenge to the process. We carefully read the studies for these special cases

to determine their categorization by identifying the article's focus. As a result, we could classify the entire set of 355 articles according to their identified key themes, research objective, perspective, statistical method used, and data collection. Table 1 provides an overview of the final classification criteria.

Table 1: Final Classification Criteria

Category	Components
Key Topic	<ul style="list-style-type: none"> • B2B Influence Factors • Brand Attitude • Customer Relationship Management • Customer Loyalty • Diffusion Process • Effects on Consumer Review • Manager Responses in SNS • Motivation/ Attitude/ Acceptance/ Sharing • Relevance for Firms • Success with SMM
Research goal	<ul style="list-style-type: none"> • Confirmatory • Exploratory
Research perspective	<ul style="list-style-type: none"> • Both • Consumer • provider
Statistical method	<ul style="list-style-type: none"> • ANOVA & MANOVA • Cluster/ Conjoint Analysis • Factor analysis • Simple & multiple Regression • CB SEM • PLS SEM
Data collection	<ul style="list-style-type: none"> • Field study • Interview • Questionnaire • Secondary Data • Combination of data collection methods

ANOVA= Analysis of Variance; MANOVA = Multivariate Analysis of Variance; CB SEM = Covariance Bases; Structural Equation Modeling; PLS SEM = Partial Least Squared Structural Equation Modeling

In total, the procedure resulted in ten key topics by describing the main content and main objectives of the relevant literature. Consequently, articles dealing with social media in business-to-business (B2B) marketing and its influencing factors are classified into the 'B2B influence factors' group. 'Brand attitude' includes all articles discussing aspects of SNS communication related to brand awareness, brand loyalty, and influence factors of SMM on brand attitude. 'Customer-relationship management (CRM)' includes published papers that examine how social media marketing influences customer relationship management. Publications dealing with the effects on customer loyalty and the results of customer loyalty are summarized in 'customer loyalty'. 'Diffusion process' as a key topic mostly represents articles using network analysis as an empirical method, while publications dealing with the effects of consumer reviews, e.g., the influence on the intention to buy a product, are summarized in the corresponding topic. In contrast, the

'manager responses in SNS' topic includes research evaluating manager messages' effects. 'Motivation/Attitude/Acceptance/Sharing' includes published papers that explore motivation to use, the attitude toward social network sites, acceptance of social media marketing by different companies, and motivation to share information on SNS. Articles discovering the relevance of SMM for companies are presented in 'relevance for firms'. Tips on implementing SMM and the results of social media marketing campaigns are presented in 'Success with SMM'.

'Research goal' as a criterion is divided into two clusters: (1) confirmatory, for articles that follow a hypothesis-testing approach; (2) exploratory studies, where the goal is to uncover structures in the database. 'Research perspective' classifies the object of study, i.e., whether the study is provider- or consumer-oriented or pays heed to both sides. The quantitative method used to achieve the research goal is classified under the 'statistical method'. Since some articles use multiple statistical methods, we have chosen the most relevant to the study's intended research objectives. Finally, 'data collection' refers to the process by which studies collect data for research.

An Overview of Research on Social Media Marketing

Evolution of SMM and Its Definitions

Before we start with the research review, we briefly describe the development of SMMs and their definitions. The development of social media and social networks is inextricably linked to changes in the Internet and, thus, to changes in information and communication technology (ICT). With the increasing availability of the Internet, web surfing has become increasingly popular among the general public. This, in turn, led to the introduction of social media and social media networks in 2003 (MySpace) and 2004 (Facebook) (Kaplan & Haenlein, 2010). The number of available Web 2.0 applications is still increasing (Arora & Sanni, 2019; Popesku, 2014), and the available social network sites are growing in diversity and scope (Ahlquist, 2014; Yadav & Rahman, 2018).

Since representation on social networks is not limited to private use, brands, public administrations, universities, and businesses are free to use social media as a promotional platform. In this context, marketing through social networks is becoming increasingly important (Brocato *et al.*, 2015; Crittenden & Crittenden, 2015; Yang *et al.*, 2019). Furthermore, this trend attracts the academic community's interest and poses new challenges for practitioners (Yang *et al.*, 2019; Yang *et al.*, 2016).

Due to the growing importance of social media as a marketing tool for various companies, there is an acute need to provide a detailed definition of social media marketing. Therefore, Table 2 provides an overview of definitions that explain social media marketing and the opportunities that arise from using social communities as a marketing tool.

Table 2: Definitions and Characteristics of Social Media Marketing

Author(s)	Definition
Ang (2011)	"[...] social media strategy, at a basic level, means companies adopting a configuration of activities using SM to create value and set themselves apart from their competitors."
Petrescu and Korgaonkar (2011)	" Social-media advertising uses social communities , such as social networks and virtual worlds as an advertising medium, just as traditional advertising focuses on the television platform. Social media have become the new advertising channels."
Järvinen <i>et al.</i> (2012)	"[...] we regard social media as integrated elements, platforms, and tools of digital marketing that facilitate social interaction between business and customer networks. Accordingly, digital marketing refers to the use of all kinds of digital and social media tools that allow companies to foster interactions with customers."
Mahesh and Amulya (2013)	"[...] it is the methodical use of marketing with other technological concepts and techniques to achieve specific goals for a company. [...] social marketing, means building a business through many different media, like viral videos, ad films, ad copies, and blogs."
Abbott (2014)	"Social media marketing involves the use of Web 2.0 tools , including social networking sites, to increase the awareness of an enterprise's brand, products, and services. For example, [...] share tips on Twitter, announce special promotions on Facebook, and post pictures of new products on Instagram."
Dwivedi <i>et al.</i> (2015)	"[...] Social Media Marketing (SMM) can rather be defined as a dialogue often triggered by consumers/audiences , or a business/product/service that travels in a circle amongst the stated parties to set in motion revealing communications on some promotional information, or to learn from one another's use experiences, eventually benefitting either or all of the involved parties."
Keinänen and Kuivalainen (2015)	"Social media marketing is a term which describes the actual acts of using social networks for marketing purposes. "
Valos <i>et al.</i> (2015)	" Social Media (SM) [...] have the ability to integrate promotion and sales in a way that previous physical promotion and sales channels could not. [...] SM allow organizations to combine sales, selling and promotion in new ways . SM also connect organizational departments in ways that were previously impossible, thus creating unique benefits as well as unanticipated challenges. "
Felix <i>et al.</i> (2016)	"Social Media Marketing is an interdisciplinary and cross-functional concept that uses social media (often in combination with other communication channels) to achieve organizational goals by creating value for stakeholders. "

In 2011, Ang (2011) and Petrescu and Korgaonkar (2011) presented the first definitions of SMM. Ang (2011) aimed to identify a good social media strategy, which is why he first needs to create a notion of social media strategy. In contrast, Petrescu and Korgaonkar (2011) attempt “to clarify and analyze the concept of viral advertising in social media [...] [and] to provide a definition to reduce the prevailing ambiguities” (p.210). Therefore, they analyze previous definitions of social media activities according to purpose, platform, object, and direction. In conclusion, they present a comprehensive definition that summarizes existing viral concepts.

Järvinen *et al.* (2012) have a similar goal. Their intention behind formulating a definition of SMM is to distinguish digital, Internet, and online marketing, which provides a good foundation for comparing B2B marketing activities. In order to incorporate the new field of social media marketing into business language studies, Abbott (2014) identifies the importance of defining social media marketing.

Mahesh and Amulya (2013) take a different approach. They look at social media and social media marketing and its benefits in the regionally limited context of India. For this purpose, they also need to define SMM. The same applies to Keinänen and Kuivalainen (2015), who define social media marketing in order to “put the projected contribution of [their] study into context” (p.712).

The definition presented by Valos *et al.* (2015) is based on an extensive literature review and serves as a basis for further scientific research. In contrast, Felix *et al.* (2016) defined SMM at the end of their research article after providing a holistic and strategic framework for SMM.

In compiling an overview of existing social media marketing studies, Dwivedi *et al.* (2015) also compare different SMM definitions and summarize them into a detailed definition that includes the important aspects. To the extent that this approach is very purposeful and popular, this detailed definition is one of the well-known definitions.

As shown in Table 1, most definitions refer to social media marketing using social media applications or social network sites for advertising and marketing campaigns. Social media marketing extends existing advertising strategies, including television (Petrescu & Korgaonkar, 2011) or other physical advertising and sales channels (Valos *et al.*, 2015). Following this conclusion, Petrescu and Korgaonkar (2011) define social media advertising instead of social media marketing, referring to social networks as new and important advertising channels but not as an innovative form of marketing per se. This designation is in line with Kaplan and Haenlein (2010), who state that virtual social worlds offer “a multitude of opportunities for companies in marketing (advertising/communication, virtual product sales/v-commerce, marketing research) and human resource and internal process management” (p. 64).

To better understand the issue, the following brief examples of SMM provide further insights: In their study, Trihas *et al.* (2013) analyze the impact of SMM via Facebook on tourism in Greek municipalities. Several authors dealt with the effectiveness of SMM on specific brands or market areas, e.g., Üçok Hughes *et al.* (2016) analyzing the effects of a story-giving tool on Tiffany, Santomier *et al.* (2016) placing their research in the area of sports brands, or Keat (2012) focusing on the use of Facebook for elections.

These definitions and examples of social media use illustrate the relevance of SMM as an important marketing tool. In this context, companies and users present their products, services, or themselves on social network sites (SNS) and benefit from community members sharing, liking, or retweeting by community members within the provider's network presence. In addition, the community can comment on the offers and present their individual experiences with the products. These facts open up new research possibilities, such as trust in consumer responses to SNS (Hahn *et al.*, 2016), the effects of electronic word of mouth in SMM (Goel, 2013) or customer loyalty through SNS (Gamboa & Gonçalves, 2014). In summary, there is already an extensive body of research on social media marketing. The following section provides a brief overview of the main developments in research published in peer-reviewed journals.

The first publication dealing with SMM appeared in 2004 (LaRose & Eastin, 2004), followed by another publication in 2009 (Trusov *et al.*, 2009). LaRose and Eastin (2004) mainly focus their research on media attendance with an emphasis on the medium of the Internet and its regular use for a wide range of activities, such as online shopping. In contrast, Trusov *et al.* (2009) investigate word-of-mouth in social networking sites as a major influence on online shopping. The authors compare word-of-mouth on social networking sites with traditional marketing in this context. However, academic interest in social media marketing remained low until 2011, when a linear increase in the number of publications was observed. While there was only one publication on SMM in 2010, there were already nine publications in 2011. These include a publication analyzing the response to different forms of marketing on Facebook (Lee *et al.*, 2011) and the first research on the differential impact of advertising in brand communities and other social media advertising (Chi, 2011).

Main Research Topics and Research Perspectives in the SMM Literature

After this brief description, we now begin with the results of our literature review of 355 SMM publications. First, we overview the most common key topics and their research perspectives. 74 out of the 355 relevant publications deal with the motivation and acceptance of using social media, the intention to share something on SNS, and attitudes towards social media in general (see Table 3). Nearly two-thirds of the studies are consumer-oriented, indicating a need for more provider-oriented research. However, if we look at the total share of each orientation (consumer and provider), we see that the

ratio is almost completely balanced. Although this reveals a lack of comparative studies using both perspectives, only 8% of the studies address this issue.

Table 3: Key Topics According to Research Perspective

Key topic	Provider-oriented	Consumer-oriented	Both	Total	
B2B Influence Factors	9	2	2	13	4%
Brand Attitude	17	33	6	56	16%
Customer Relationship Management	10	2	2	14	4%
Customer Loyalty	5	19	0	24	7%
Diffusion Process	10	8	3	21	6%
Effects on Consumer Review	6	16	3	25	7%
Manager Responses in SNS	6	1	0	7	2%
Motivation/ Attitude/ Acceptance/ Sharing	14	53	7	74	21%
Relevance for Firms	30	10	2	42	12%
Success with SMM	42	32	5	79	22%
Total	149	176	30	355	100%
	42%	50%	8%	100%	

The most common key topic of the reviewed publications is the success of social media marketing campaigns and how to implement them to increase their success (e.g., Kamal *et al.*, 2013; Xie & Lee, 2015; Jones *et al.*, 2018). In contrast to the previously considered topic (motivation/attitude/acceptance/ sharing) (e.g., VanMeter *et al.*, 2018), this topic considers more provider-oriented research. The results show a more pronounced distribution of research perspectives for studies dealing with customer relationship management and studies exploring the relevance of social media marketing for companies. In contrast, the other topics do not show such significant differences.

Summarizing the research foci of the different publications, it is clear that articles dealing with the success factors of SMM are of central importance for SMM research. Articles analyzing the motivation to use and the attitude towards SMM, as well as its acceptance and the intention to share by users, come in second place in the ranking of famous research topics (some examples here are Wang *et al.*, 2019; Şahin *et al.*, 2019 or Witkemper *et al.*, 2012).

Against this background, Table 3 illustrates the lack of empirical SMM research on managers' responses in SNS, B2B influence factors, CRM, effects of consumer reviews, customer loyalty, and diffusion process. Each topic accounts for less than 10% of the total research, and together these topics account for only 30% of the body of quantitative empirical social media marketing research.

Several research questions can be derived from these findings: As one of the most important issues for practitioners, it would be interesting to investigate the return on investment of SMM. Understanding the return on investment of SMM could help companies assess the extent to which they need to pay attention to their social media presence. Furthermore, more research is needed on manager responses, which could also be combined with issues raised by the effects of consumer reviews, e.g., a comparison of the effectiveness of manager responses and consumer reviews. In doing so, research may be able to identify implications for social media marketing strategies and efforts.

Since B2B influence factors are also among the topics that lack an empirical foundation, research questions regarding the actual influence of social media on other companies are possible for future research. These research questions may also consider the return on investment, but beyond that, the importance of specific B2B social media sites is of particular interest to managers and practitioners. Considering the numerous possibilities and different ways of marketing offered by social media, their comparison offers a huge research potential while providing added value to practitioners. By presenting these comparisons, it is possible to differentiate between research perspectives, e.g., comparing the most attractive customer applications with those for suppliers.

For this reason, the analysis and comparison of scientific questions in SMM marketing reveals a great potential for quantitative empirical research. In addition to the topics already presented, it can be stated that research could be expanded in the future to include both provider-oriented and consumer-oriented research perspectives. For example, comparing the most important usage criteria or analyzing the most appealing content from the provider's and user's points of view indicates promising avenues for further research.

Research Goals of SMM Literature

Apart from the current research potential, there is room for improvement regarding the nature and goals of the SMM literature (see Table 4). More than two-thirds of all reviewed studies (74%) are confirmatory (e.g., Milewicz & Saxby, 2013; Hahn *et al.*, 2016; Huh, 2018). Moreover, the number of confirmatory studies is higher than the number of their exploratory counterparts in all key topics. This result is atypical; on the contrary, there are surprisingly many confirmatory publications for such a young research field as SMM and its innovative aspects. In the first ten years after the emergence of a new field, extensive exploratory approaches appear, aiming to find new analytical facts. In contrast, confirmatory research follows exploratory research to verify or falsify the results of previous research. However, these exceptional results for social media marketing may be explained by the focus on quantitative research and the dominance of structural equation modeling in international double-blind peer-reviewed journals.

Table 4: Key Topics and Research Goals of the Investigated Quantitative Empirical Studies

Key topic	Confirmatory	Exploratory	Total
B2B Influence Factors	9	4	13
Brand Attitude	47	9	56
Customer Relationship Management	11	3	14
Customer Loyalty	20	4	24
Diffusion Process	11	10	21
Effects on Consumer Review	21	4	24
Manager Responses in SNS	6	1	7
Motivation/ Attitude/ Acceptance/ Sharing	61	13	74
Relevance for Firms	22	20	42
Success with SMM	55	24	79
Total	263	92	355
	74%	26%	100%

Thus, the dominance of confirmatory research in the areas of motivation, attitude, acceptance, sharing, and success with SMM may be explained by the frequent use of covariance-based structural equation models to study these topics (e.g., Minton *et al.*, 2012; Anderson *et al.*, 2014; Shareef *et al.*, 2019). Although the quantitative empirical research in social media marketing seems to be well-studied according to this result, the variance in some key topics between confirmatory and exploratory publications is not too high in some key topics, and the need for more exploratory research remains. This is particularly the case for the effects on consumer reviews. Confirmatory research also dominates this focus (e.g., Choi *et al.*, 2016). However, it provides an example of a key topic that does not sufficiently address social media marketing theories. For example, exploratory interviews can build a comprehensive exploratory base with managers or social media representatives. A similar approach can be taken for managers of SNS and customer relationship management.

For those cases that exemplify a balance between confirmatory and exploratory research, it is also appropriate to conduct further exploratory research. For example, research questions in the area of B2B influence factors could address the influence of network size on marketing success or the influence of the network on like and share behavior.

Examining the evolution of the various key topics over time, we found an upward trend in the number of publications dealing with the success of SMM and publications analyzing its motivation, acceptance, and attitudes toward it. In addition, we identify brand attitude as the most recent area of SMM research to emerge in recent years.

Statistical Methods Used in SMM Literature

Next, we turn to the analytical methods used in empirical SMM research. Most publications use simple and multiple regression and covariance-based structural equation modeling (e.g., Sohail *et al.*, 2020; Chawla & Chodak, 2021). Partial least squares structural equation modeling (e.g., Keinänen & Kuivalainen, 2015; Yee *et al.*, 2021) ranks third in usage and is less popular among scholars than the CB SEM. Nevertheless, regressions and structural equation modeling are the preferred approaches in 79% of the reviewed studies (see Figure 3).

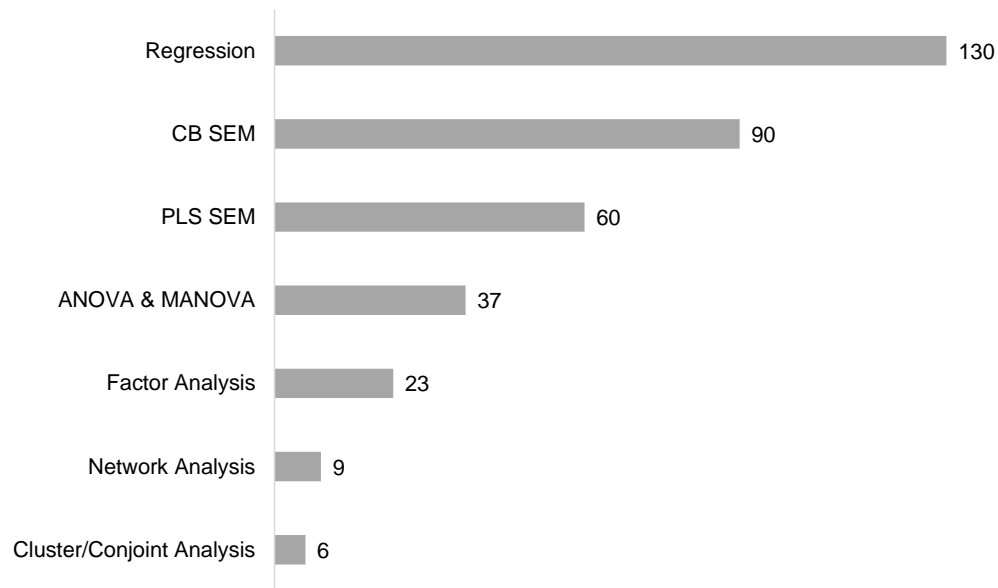


Figure 3: Number of Studies According to the Applied Statistical Methods

Data Collection Methods Used in the SMM Literature

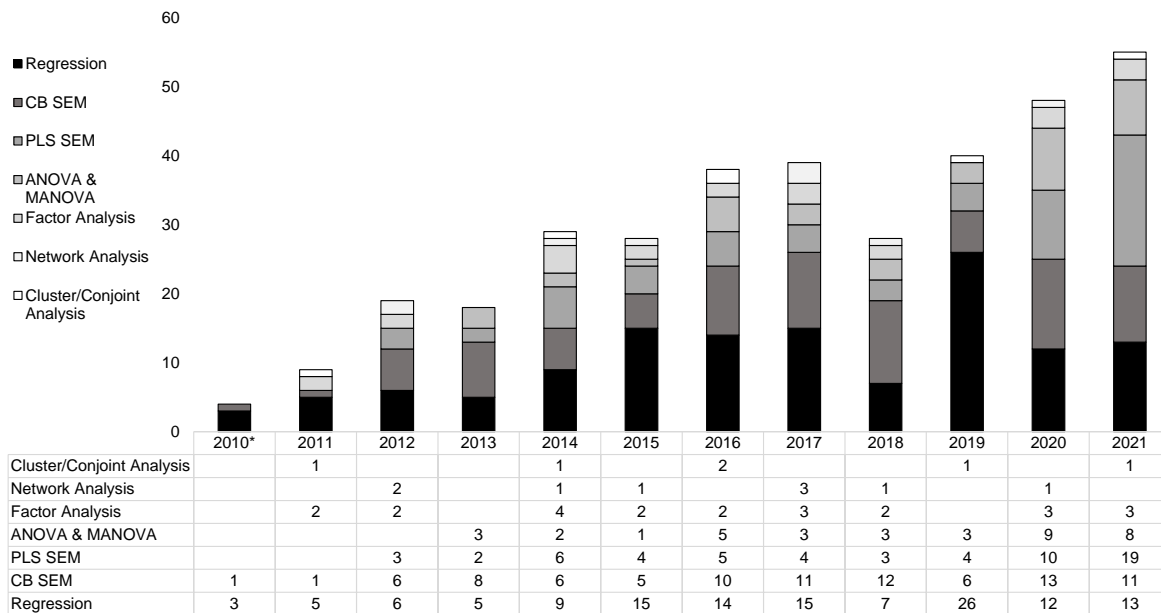
In addition to statistical methods, it is important to consider the type of data collection used in previous research. Regarding data collection, 216 out of 355 studies rely on a questionnaire, while 175 conduct confirmatory research (e.g., Thao & van Anh, 2020; S. Wu, 2020; Vinerean & Opreana, 2021). Furthermore, 48 out of 355 articles use a field study to collect the necessary data (e.g., Delbaere *et al.*, 2021), and 54 articles base their research on secondary data (e.g., Besana & Esposito, 2019), including 21 articles that pursue exploratory objectives (e.g., Vagianos & Koutsoupias, 2021). Surprisingly, only seven articles based their work on interviews (e.g., Badi *et al.*, 2017), even though SMM offers a wide range and excellent accessibility of respondents. In addition, conducting interviews is described as a useful way to collect data and generate foundational knowledge that can be used for further research. Moreover, the interviews' exploratory

nature helps lay the foundation for further exploratory research efforts and further research to confirm the findings.

Finally, 30 articles used a combination of different data collection strategies for their research. The most preferred combinations are field study and questionnaire (e.g., Kumar *et al.*, 2016) and questionnaire and secondary data (e.g., Mathur, 2019). Overall, these findings suggest that questionnaires and field studies are the most popular methods for data collection in the context of SMM and confirmatory research. In contrast, secondary data is preferred for exploratory approaches. It should be noted, however, that combining different exploratory data collection methods increases the explanatory power of a young field of research by allowing new aspects to be uncovered. Therefore, these data collection methods should not be underestimated but used more often in future SMM research.

Research Periods in the Area of SMM

In summary, it can be stated that quantitative empirical research focusing on SMM gained momentum in 2012 and has been growing steadily since then, resulting in an average of 36 peer-reviewed empirical publications per year. At the same time as the increase in publications, empirical SMM research faces an increase in articles using structural equation modeling, especially covariance-based structural equation modeling, and simple or multiple regression, while factor analysis has not grown in importance in the same way (see Figure 4).



*cumulation of 2004 to 2010

Figure 4: Method-Related Evaluation of Quantitative Empirical Articles About Social Media Marketing²

In addition to the methods used, we also looked at the key topics and the theories used within the different years. In this way, we identify a total of four research periods within SMM research: (1) the emergence of SMM research from 2004 to 2011; (2) the growing interest from 2011 to 2014 with the first developments regarding preferred theories; (3) the underpinning of the theories with further research from 2014 to 2016; and (4) the paradigm shift in research from 2016 onward. Especially in the last year of each period, SMM research undergoes a major transformation, with more and more publications showing characteristics of the new period. Therefore, we avoid naming a clear delineation of the years and refer to overlaps that illustrate a fluid transition to the next period.

The first period (2004 to 2011) contains the smallest number of publications and primarily refers mainly to the first analyses within the research field of SMM. These first papers mainly deal with diffusion and electronic word of mouth (WOM). As can be seen in Figure 4, research during this period relied heavily on regression analysis. For example, Trusov *et al.* (2009) compare the effects of online and offline WOM and identify monetary and other incentives that encourage customers to give positive recommendations. This finding accounts for both online and offline WOM. In addition, the authors highlight the importance of WOM for their customer acquisition. These results illustrate the growing importance of SMM during the first period.

From 2011 to 2014, research interests and activities in SMM gained momentum, resulting in a dynamic research field. During this period, SMM research began diversifying regarding research foci and applied methodologies. At the same time, researchers favored basic theories within behavioral research, the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Theory of Reasoned Action (TRA). By examining organizational leaders' use of social media for inbound customer communication, Milewicz and Saxby (2013) use the Theory of Planned Behavior with the Technology Acceptance Model to formulate their conceptual and hypotheses. The authors hypothesize that the perceived usefulness (of social media for inbound customer communications) represents one of the main factors in the Technology Acceptance Model and influences satisfaction with social media for marketing communications, influencing the intention to use social media for inbound customer communications. The results of an OLS regression support these hypotheses and thus strengthen the Technology Acceptance Model in combination with the Theory of Planned Behavior.

² Master search May 2022

The subsequent third research period, 'the underpinning of the theories' (2014 to 2016), is characterized by a fragmentation of research foci. For example, the first research on using SMM to increase brand loyalty appeared during this period. Meanwhile, research on successful SMM has made tremendous progress, leading to a near leap in its insights. The three theories have proven themselves in research. Research in the period between 2014 and 2016 supports these theories and shows their validity in the field of social media marketing. However, none of the theories has prevailed over the others. Due to the overall increase in the amount of research on SMM, the use of quantitative empirical methods increased significantly during this period, showing a great emphasis on regression analysis in the third period. The research provided by Siamagka *et al.* (2015) represents one of the very specific research foci, namely the use of social media marketing in the B2B marketing field. The authors use the Technology Acceptance Model and the Resource-Based View for their conceptual model. Following this theoretical combination and using structural equation modeling, perceived usefulness and organizational innovativeness can be identified as the most important drivers for adopting social media for B2B marketing.

Starting in 2016, the last period shows a paradigm shift within SMM research. The research focus shifts from the acceptance of social media to the benefits of using different social media applications. Corresponding to this development, there is a change within the theoretical perspectives, such that the Uses & Gratifications approach appears as the most frequently used theoretical model in the recent history of SMM research. At the same time, structural equation modeling and regression analysis have become more prominent in empirical research. Future literature reviews could use these findings as a basis for their research and highlight further developments within SMM research, as the paradigm above shift may lead to further changes in research foci and corresponding changes in the underlying theoretical basis. Against this background, Vale and Fernandes (2018) apply the Uses and Gratifications Theory to identify information (need), integration, and social interaction as the main drivers of sports page consumption on Facebook. Based on a regression analysis of follower decisions of top UEFA soccer clubs, the authors claim that information (need) influences page consumption more than integration and social interaction.

Google Scholar Citations in SMM Literature

In line with the other systematic reviews in SMM, we decided to enrich the quantitative analysis of our literature review with meaningful data from articles collected in the Google Scholar Citations (GSC). These results allowed us to gain insight into the scientific impact of specific research areas and their importance to the scientific community. The Google Scholar Citation Score is designed to count the number of articles that cite a specific publication. By referring to this score, it is possible to benchmark the

impact of a study in the scientific literature (Google, 2018). Table 5 shows the results for GSC.³

Table 5: Google Scholar Citation Research Area Analysis

Key topic	Sum of Average GSC per year	Sum of Average GSC per year in %	Number of Publications	Number of Publications in %	Sum of Average GSC per year / Number of Publications
B2B Influence Factors	305.2	3.8%	13	3.7%	23.5
Brand Attitude	1144.1	14.3%	56	15.8%	20.4
Customer Relationship Management	371.6	4.7%	14	3.9%	26.5
Customer Loyalty	292.6	3.7%	24	6.8%	12.2
Diffusion Process	317.7	4.0%	21	5.8%	15.1
Effects on Consumer Review	621.8	7.8%	25	7.0%	24.9
Manager Responses in SNS	321.8	4.0%	7	2.0%	46.0
Motivation/ Attitude/ Acceptance/ Sharing	1681.6	21.1%	74	20.8%	22.7
Relevance for Firms	952.9	11.9%	42	11.8%	22.7
Success with SMM	1978.7	24.8%	79	22.3%	25
Total	7987.9	100%	355	100%	22.5

We used average GSC scores to reduce the biasing effects of different publication periods. Therefore, we divided the total number of citations (GSC score) by the years since the article was published. Based on these calculations, we could compare the importance of the different research areas.

The GSC analysis reveals a high relevance of those key topics where the number of publications and the average number of citations per publication differ significantly. This is especially the case for research dealing with manager responses in SNS. In this case, each of the seven publications is cited an average of 46 times. Although these seven articles represent only 4% of all SMM publications, they seem highly important due to their citation frequency (e.g., Kumar *et al.*, 2016). Therefore, it can be concluded that this topic represents an important and expandable avenue for further research. This finding confirms the need for further exploratory research on manager responses in SNS. Another key topic, according to the GSC, is the exploration of CRM (as there is, for example, Wang and Kim, 2017). This key topic has the second-highest average number of citations per publication (26.5 citations on average for 14 articles) and is, therefore, also of high scientific relevance.

Although success with SMM has the highest sum of average GSC per year at 24.8%, the average number of citations per article is below that of manager responses in SNS.

³ The data was collected on 12th August 2022.

Nevertheless, this topic represents a scientifically relevant area of research as it is an important reference for SMM research.

Customer loyalty ranks last in the average number of citations per article, with 12.2 citations for 24 publications, which does not mean this key topic is unimportant. Since the 24 publications represent only 3.7% of all publications, research is needed despite the low number of citations. However, its importance is not as great as for manager responses in SNS.

Apart from manager responses in SNS, the GSC analysis confirms the abovementioned results. The results show that a large number of publications does not necessarily imply high importance of the topic, which might be the case in some cases of motivation/attitude/acceptance/sharing. Figure 5 illustrates this phenomenon by plotting the average annual GSC and the number of publications over time.

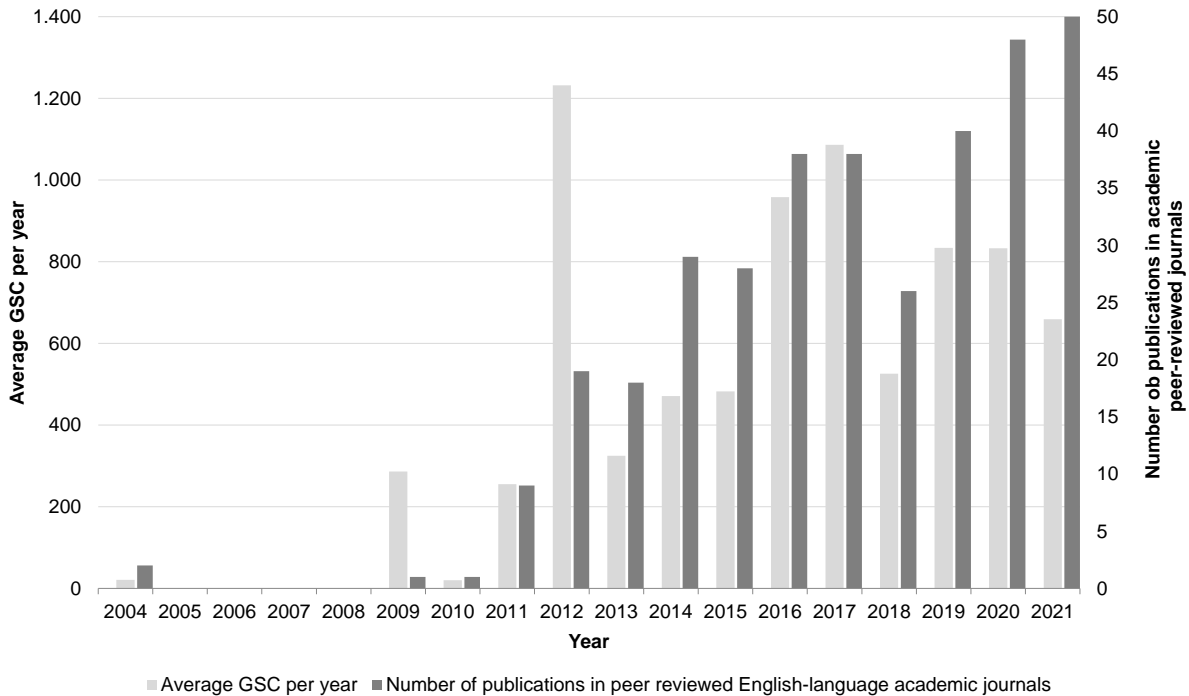


Figure 5: Comparison of Average Google Scholar Citations and Number of Publications Over Time

Looking at the results shown in Figure 5, the scientific efforts from the years 2009 and 2012 seem to be of high interest, as for these years, some highly cited outliers had a significant impact on the average GSC score. In 2009, one of the first articles focusing on SMM (Trusov *et al.*, 2009) was published and received 3,722 citations. In 2012, the article published by Kim and Ko (2012) gained great attention from the scientific community (2,779 citations), followed by Vries *et al.* (2012) with (2,649 citations). Both articles are of quantitative empirical nature and follow a confirmatory research approach.

Journals in SMM Literature

Finally, we look at the journals containing social media marketing literature. Our literature database contains 179 journals, with 117 appearing only once in our list and another 28 appearing only twice. This result is consistent with the findings presented by Hester and Vargo (2013) in their literature review: the literature on SMM is very diverse and difficult to find in specific journals, even though it is a marketing topic. Most papers were published in *Industrial Marketing Management* (10 publications each) (e.g., Wang *et al.*, 2016). This journal mainly covers the field of marketing research dissemination. The most used journal that pursues specific issues, but mostly with a marketing background, is the *Journal of Retailing and Consumer Services* (10 publications) (e.g., Shareef *et al.*, 2019). Other journals refer to marketing and advertising topics in their names and focus on the dissemination of marketing. For example, the *Conference Proceedings of the American Academy of Advertising* (e.g., Lee *et al.*, 2011), the *Journal of Interactive Advertising* (e.g., Chi, 2011), and the *Journal of Marketing* (e.g., Kumar *et al.*, 2016) each contribute eight publications to the field of SMM. On the other hand, the *Journal of Marketing for Higher Education* focuses on the link between marketing and higher education (6 publications) (e.g., Shields and Peruta, 2019). In contrast to the aforementioned journals, *Decision Support Systems* deals with decision theory, computer-supported collaborative work, and psychology (5 publications) (e.g., Chang *et al.*, 2018), illustrating a combination of different research topics in marketing research. Today, social media marketing represents a diverse field of research that goes beyond a limited number of scientific marketing journals. Consequently, a comprehensive view into different directions within SMM research could help assess the contemporary dimension of this research field.

Discussion and Conclusion

Summary of Research Approach and Findings

The starting point of this study was to provide an adequate overview of the existing literature base of articles focusing on SMM to uncover research gaps. A review of previous attempts to scrutinize the current state of SMM research revealed that most of the available literature reviews on this topic are limited in terms of topic coverage and database. To our knowledge, no literature review has yet focused on quantitative empirical SMM research, leading to an urgent need to address this deficiency. Therefore, this literature review explicitly clusters and analyzes quantitative empirical research systematically according to its key topics, research objectives, empirical methodology, data collection, and research orientation.

First, we noticed a growing interest in social media marketing over the years, as the number of articles published per year focusing on social media marketing tripled

from 2011 to 2014. Although social media is a relatively young research topic, 355 quantitative empirical publications are available.

Furthermore, we were able to identify four distinct SMM research periods. Our first two periods correspond to the second and third eras Lambertson and Stephen (2016) identified in their analysis. The period, as well as the research foci, are almost identical. However, Lambertson and Stephen (2016) analyzed both conceptual and empirical literature on social media and digital and mobile marketing. However, these are why we could not recognize the first period of Lambertson and Stephen (2016). Moreover, our results of the following periods confirm the predictions made by Lambertson and Stephen (2016) according to the connection with psychological theories and the combination of several data sources.

Our findings are also consistent with Alves *et al.* (2016), who identifies the consumer perspective as a focus of research and success with SMM for companies. They also call for further research “exploring the perspectives of companies” (p. 1036). In addition, we identified similar future research questions as Arora and Sanni (2019) regarding the impact of user-generated content or the factors influencing companies’ use and behavior in social media. In summary, we were able to confirm the previous findings of the literature reviews, and, in addition, we were able to provide further insights into the SMM literature, which allows us to provide more precise suggestions for future research.

Although this study provides an adequate overview of the existing literature, our analysis is subject to several limitations. First, although the present literature review provides clues and systemic guidance for empirical SMM research, it only partially reflects the literature and neglects conceptual and theoretical studies. Therefore, the present study does not provide insights into social media marketing research. Second, as already mentioned, we cannot confirm that all relevant publications dealing with quantitative empirical research in social media marketing have been identified. However, using various search terms and a large online database, we are confident that the final database adequately represents all published articles. Third, we know the potential loss of information due to the aggregation clustering of publications. However, this method is particularly helpful in providing structured results. As stated in Section 2, we confirm that careful filtering and aggregation of the available data reduces the risk of information loss to an acceptable minimum.

Implications For Future Quantitative Empirical Research

Given the findings and limitations of this systematic literature review, quantitative empirical research in social media marketing is becoming increasingly important and remains an open research area. Therefore, the field offers several avenues for further research.

The lack of a both-sided research orientation (customer and provider) provides a foundation for future research, especially regarding manager responses in SNS and customer loyalty. These two topics represent interesting areas of research, especially for practitioners. This finding is confirmed by the citation frequency of the related publications and reveals manager responses in SNS as a key topic for empirical SMM research. The seven publications in the manager responses in the SNS section have the highest average number of citations per publication, illustrating high research interest and relevance.

Although Arrigo (2018) limited her study to publications on luxury brands, her findings also identified a lack of work on marketing outcomes. Our results confirm these findings, as SMM success reflects high importance in the scientific community and can therefore be considered an important research topic. In this case, research on manager responses compared to the impact of consumer reviews helps managers optimize their social media performance and plan further social media marketing strategies. These goals must be achieved through explorative interviews, as the existing base of explorative research work is not sufficiently grounded. In these cases, it is also interesting to identify the most appealing content for users or managers. In addition, usage criteria can be explored and compared between users and providers, thus closing the research gap between the two sides.

The average number of citations per publication indicates a strong interest in research on the impact of CRM and success with SMM. Although the latter's publications are remarkably high, the papers show high scientific relevance. As an indication of research potential, further exploratory research could uncover innovative research questions in this context. A combination of data collection methods suggests another viable approach. Manager interviews combined with user surveys could provide insights into successful SMM policies.

In addition, little research on social media marketing in a business-to-business context is available, which again is important for companies trying to use social media marketing to connect with other companies. In this context, the return on investment analysis is of great interest. This is also the case for “normal” non-business customers, as Alves *et al.* (2016) explained. In this context, our results also confirm the proclaimed importance of both perspectives, i.e., customer-oriented and provider-oriented perspectives. Since Buratti *et al.* (2018) have dealt extensively with B2B-related work, the authors were able to derive statements about regions where little B2B research has taken place so far. Although the present approach does not consider a geographical analysis of research contributions, the results presented above broadly point to the same research gaps, such as identifying B2B as an under-researched topic in the case of social media. A comparison between the most popular applications of companies and customers is also one of the possibilities for future research on this key topic.

Since more than half of the articles analyze the motivation, attitude, acceptance, and sharing of social media from the consumer's point of view, few researchers aim to work on this opportunity from the provider's perspective, e.g., barriers that arise for companies implementing SMM. It would be interesting to elaborate on the specifications and implications of these SMM barriers and discover ways to overcome them. Analyzing the influence of specific SMM applications is a promising approach to start research in this direction of thought. Considering the large number of publications concerning this topic and the low citation rate per article, more research on this topic is less important than manager responses in SNS or the effects of consumer reviews. Since the research on manager responses is already widespread, the scientific and practical added value is not expected to be as extensive as the other topics.

In addition, comparisons of different social media applications may interest researchers and practitioners. Examining the audiences reached by specific applications is helpful and also opens up an innovative avenue for further research, as different applications use different ways of communicating with customers. Instagram mainly uses images, while Facebook and Twitter focus on text messages. In this respect, we again agree with Arrigo (2018), who also criticizes the small number of publications dealing with the most advantageous social media platforms. In this context, it is also possible to compare the evolution of different social media applications since social media are prone to constant change and progress (Ahlquist, 2014). In this regard, the findings of this literature review could provide valuable guidance for the study of social media applications.

By summarizing the demands for further research (e.g., Alves *et al.*, 2016; Felix *et al.*, 2016; Keegan & Rowley, 2017) and the results of our literature review, we identified a vast research potential for SMM for interested researchers. Given the results of the clustering and classification of empirical quantitative SMM research and the associated GSC analysis, the prospective research avenues derived from cluster analysis, as well as the associated statements about the expected significance of the topics based on the GSC, provide valuable guidance for research aimed at expanding the frontiers of SMM. Table 6 summarizes the potential future research topics identified in this analysis. The implications in Table 6 are clustered according to the key to which they relate. We named the research area within the key topics, sorted them according to their perspective, and assessed the research need using a Harvey Balls representation. To facilitate the formulation of research questions for future researchers, we have briefly described the research area and formulated some research questions.

Table 6: Summary of Research Implications

Prospects for Further Research			
Research Area	Research Perspective	Description of Research Need	Top-relevant Research Questions
Success with SMM & Effects on Consumer Reviews			
Successful SMM activities 3	Both (User and Provider)	describes the need for further research examining the factors positively or negatively influencing SMM for companies in order to give managers well-founded recommendations for future SMM activities, i.e. preparing a To-Do or Not-To-Do-List for SMM actions	<ul style="list-style-type: none"> Which factors influence SMM activities in a positive way? What kind of consumer review impacts a SMM campaign in a positive manner? What kind of consumer review impacts a SMM campaign in a negative manner?
Identification of application 2	Provider	describes the need for further research to explore the right SM application for different target groups	<ul style="list-style-type: none"> Which are the most popular SM applications across countries? How do different SM applications vary according to their mode of communication? Given a specific target area or target group, which SM applications do customers prefer the most?
B2B Influence Factors			
Return on Investment 4	Both (User and Provider)	describes the need for further research focusing the return on investment of using SM for specialized campaigns to address other firms, and the identification of useful criteria to create special B2B marketing campaigns in the context of SMM	<ul style="list-style-type: none"> How does the preparation of specialized B2B SMM campaigns affect the intended return on investment? To what extent should companies use SM in order to draw the attention of other firms? What are characteristics of a successful B2B marketing campaign on SNS?
Identification of application 3	Provider	describes the need for further research to identify the most popular SM applications in B2B marketing	<ul style="list-style-type: none"> What are the most popular SM applications used in B2B markets? Do popular SM applications in B2B markets differ across business sectors or countries? Given a specific market structure, which SM applications do companies prefer the most?
Motivation/ Attitude/ Acceptance/ Sharing			
Barriers for SMM 3	Provider	describes the need for further research to uncover the barriers that companies face in implementing SM in their marketing strategy and how companies might cope with these barriers	<ul style="list-style-type: none"> Which barriers deter companies from implementing SMM in their business conduct? Are the characteristics of different SMM applications decisive for the extent of these barriers? What is the most efficient way for companies to overcome these barriers?
Development of SM applications 1	Both (User and Provider)	describes the need for further research to elaborate on the evolution of SM applications during the past decade	<ul style="list-style-type: none"> For what reasons and to what extent did the various SM applications change in the past decade? What is the impact of fluctuating popularity on design and features of SMM applications? Are there tendencies towards convergence in the evolution of SMM applications?
Manager Responses in SNS			
Influencing SMM campaigns 2	Both (User and Provider)	describes the need for further research dealing with the effects of managerial responses on SNS concerning associated marketing activities, as well as with the impact of consumer reviews on managerial decisions upon SMM strategies	<ul style="list-style-type: none"> To what extent do manager responses to customer feedback on SNS affect SMM campaigns? What are the characteristics of the most appealing managerial content on SNS and which impact does this content pose to a SMM campaign?

Research need mentioned in the literature: 0 : < 2 Studies ; 1 : 3 – 7 Studies ; 2 : 8 – 12 Studies ; 3 : 13 – 17 Studies; 4 : >18 Studies

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Appendix A: Overview of Social Media Marketing Literature Reviews

Author(s)	Year	Title	Subject area	Analysed article types
Arora, A. S. and Sanni, S. A.	2019	Ten Years of 'Social Media Marketing' Research in the Journal of Promotion Management: Research Synthesis, Emerging Themes, and New Directions	General overview	Conceptual & empirical
Arrigo, E.	2018	Social media marketing in luxury brands	Luxury brands	Conceptual & empirical
Buratti, N.; Parola, F. and Satta, G.	2018	Insights on the adoption of social media marketing in B2B services	B2B services	Conceptual & empirical
Zahoor, S. Z. and Qureshi, I.H.	2017	Social Media Marketing and Brand Equity: A Literature Review	Brand equity	Conceptual & empirical
Alves, H., Fernandes, C. and Raposo, M.	2016	Social Media Marketing: A Literature Review and Implications	General overview	Conceptual & empirical
Lamberton, C. and Stephen A. T.	2016	A Thematic Exploration of Digital, Social Media, and Mobile Marketing: Research Evolution from 2000 to 2015 and an Agenda for Future Inquiry	Digital, social media, and mobile marketing	Conceptual & empirical
Dwivedi, Y.; Kapoor, K. and Chen, H.	2015	Social media marketing and advertising	General overview	Conceptual & empirical
Teng, S., Khong, K. W. and Goh, W. W.	2015	Persuasive Communication: A Study of Major Attitude-Behavior Theories in a Social Media Context	Attitude-Behavior Theories	Conceptual & empirical
Hester, J. B. and Vargo, C. J.	2013	Social Network Sites and Social Media: A new Research Paradigm for Strategic Communication?	General overview	Conceptual & empirical

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Bernd W. Wirtz is a Full Professor and holds the Chair for Information and Communication Management at the German University of Administrative Sciences Speyer (Germany). He received his doctorate in the field of new media and competition strategies (Doctorate in Business Administration). After finishing his studies, Prof. Wirtz worked as a consultant with Roland Berger & Partners as well as Anderson Consulting/Accenture (Manager in the field of new media/electronic commerce) and as a Lecturer at the University of Zurich. His publications focus on media and Internet management, business model management, marketing, electronic business and digital government (approximately 350 publications).

Isabell Balzer is a PhD candidate of Information and Communication Management at the German University of Administrative Sciences in Speyer. She holds a Master's Degree in Sociology from the Johannes Gutenberg University in Mainz. Her research focuses on social media marketing and the factors that influence its use.

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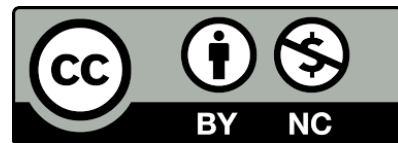
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