

12-24-2024

Corporate Social Responsibility, Economic, Ethical-Legal, and Philanthropic Performances in Ghanaian Banks Using Big Data Analytics

Mohammed Alhassan Adams
Walden University

Follow this and additional works at: <https://scholarworks.waldenu.edu/dissertations>

This Dissertation is brought to you for free and open access by the Walden Dissertations and Doctoral Studies Collection at ScholarWorks. It has been accepted for inclusion in Walden Dissertations and Doctoral Studies by an authorized administrator of ScholarWorks. For more information, please contact ScholarWorks@waldenu.edu.

Walden University

College of Management and Human Potential

This is to certify that the doctoral dissertation by

Mohammed Alhassan Adams

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee

Dr. Karina Kasztelnik, Committee Chairperson, Management Faculty

Dr. David Bouvin, Committee Member, Management Faculty

Chief Academic Officer and Provost

Sue Subocz, Ph.D.

Walden University
2024

Abstract

Corporate Social Responsibility, Economic, Ethical-Legal, and Philanthropic
Performances in Ghanaian Banks Using Big Data Analytics

by

Mohammed Alhassan Adams

MPhil, Walden University, 2023

MS, Texas A&M University-Central Texas, 2013

BS, Texas A&M University-Central Texas, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

December 2024

Abstract

Corporate social responsibility (CSR) is becoming increasingly essential for Ghanaian banks to reconcile financial growth with ethical, legal, and civic obligations amid escalating societal expectations. The specific research problem was that the extent to which Ghanaian banks employed big data analytics (BDA) to boost multidimensional CSR performance encompassing economic, ethical-legal, and philanthropic dimensions was unknown. The purpose of this quantitative correlational study was to examine the potential impacts of BDA use and overall CSR performance on Ghanaian banks' economic, ethical-legal, and philanthropic dimensions of CSR. Using stakeholder theory and a resource-based view, BDA was applied as a strategic tool for enhancing CSR. Data from 103 Ghanaian bank employees were analyzed via multivariate regression. The analysis demonstrated that BDA use is significantly associated with ethical-legal and philanthropic CSR performance, limited influence on economic performance, and reinforcing their role in advancing responsible business practices. BDA use had a statistically significant effect on the combined CSR outcomes, $\Lambda = .348$, $F(34, 166) = 3.397$, $p < .001$, indicating that BDA use significantly influences the CSR dimensions. The results suggested that BDA can improve compliance and social contributions, yet improving financial returns might require better infrastructure and expertise. The implications for positive social change include the potential for Ghanaian bank leaders to navigate the evolving landscape of data technologies with advanced analytics and robust CSR frameworks to balance profitability and societal responsibility in Ghana and beyond.

Corporate Social Responsibility, Economic, Ethical-Legal, and Philanthropic
Performances in Ghanaian Banks Using Big Data Analytics

by

Mohammed Alhassan Adams

MPhil, Walden University, 2023

MS, Texas A&M University-Central Texas, 2013

BS, Texas A&M University-Central Texas, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

December 2024

Dedication

This dissertation is dedicated to those whose belief in me never wavered, whose words uplifted me, and whose sacrifices made my dreams a reality. To my wife, Aisha—your unwavering encouragement, patience, and love have been my foundation. To my children, Malba, Suhuyini, and Balimini—thank you for your laughter, understanding, and joy during this journey’s most challenging moments. To Mr. Baba Amadu, your mentorship directed me down this trajectory, and your faith in my capabilities remained unwavering. Your mentorship has been a lasting source of strength. To Dr. Erasmus Addae, your support and advice have profoundly influenced my attitude to this profession and life. To my friend Adam Mohammed, whose continuous encouragement and support have been pivotal throughout this journey. This dissertation reflects the principles you imparted to me and acknowledges your sacrifices. Upon concluding this chapter, I retain the lessons, affection, and motivation each of you has imparted, influencing not only this dissertation but also my development as a researcher and individual.

Acknowledgments

I extend my profound appreciation to everybody who facilitated our voyage. To Dr. Karina Kasztelnik, my dissertation chair, whose prompt and thorough feedback has been vital in refining this work—your mentorship has illuminated this journey. I extend my profound gratitude to Dr. Emmet Fritch, my former chair, for your invaluable insights and assistance during the developmental stages that facilitated my progression to PhD candidacy. To Dr. David Bouvin, I express my gratitude for your patience, perceptive feedback, and steadfast support, which enhanced the quality of this research.

To Dr. Abdallah Ibrahim, your advice and connections in Ghana were instrumental. My sincere thanks to Mr. John Awuah of the Ghana Association of Banks for facilitating this study and to Musah Abdallah and Mr. Hamza Adam for their assistance with data collection. To my colleagues and my dedicated team members—Piyush Manglani, Anderson Fernandes, Robert Reese, and Robert Stebbins—your constant support and encouragement meant the world to me.

To my family, whose love and understanding made this journey possible: Aisha, my wife, whose unwavering encouragement was the bedrock of my resilience, and my children, Malba, Suhuyini, and Balimini—thank you for your patience, for proofreading, and for helping me rehearse presentations. Your help maintained my stability and concentration. To my extended family, friends, and those who have supported me, especially the Ghanaian financial community, your contributions have been vital to the success of this project. This dissertation belongs equally to all of you as it does to me.

Table of Contents

List of Tables	vii
List of Figures	viii
Chapter 1: Introduction to the Study.....	1
Background of the Study	2
Problem Statement	6
Purpose of the Study	7
Research Questions and Hypotheses	8
Theoretical Foundation	11
Nature of the Study	13
Definitions.....	15
Assumptions.....	17
Scope and Delimitations	19
Limitations	20
Significance of the Study	22
Significance to Theory	24
Significance to Practice.....	25
Significance to Social Change	26
Summary and Transition.....	27
Chapter 2: Literature Review	29
Literature Search Strategy.....	30
Theoretical Foundation	31

Literature Review.....	35
Stakeholder Theory	36
Resource-Based View	41
Corporate Social Responsibility	51
Big Data Analytics.....	55
Corporate Social Responsibility Performance	59
Big Data Analytics Use.....	66
Summary and Conclusions	70
Chapter 3: Research Method.....	72
Research Design and Rationale	74
Methodology	78
Population	79
Sampling and Sampling Procedures	80
Procedures for Recruitment, Participation, and Data Collection	82
Instrumentation and Operationalization of Constructs	83
Data Analysis Plan.....	85
Data Cleaning.....	86
Preliminary Analysis.....	88
Primary Analysis.....	92
Post Hoc Analysis	102
Threats to Validity	103
External Validity	103

Internal Validity	104
Construct Validity	104
Ethical Procedures	105
Summary	107
Chapter 4: Results	110
Data Collection	113
Sample Characteristics and Descriptive Statistics	115
Bivariate Correlation Analysis.....	119
Spearman’s Correlation Result	122
Assumption Checks for Regression Analysis	123
Independence of Observations	124
Multicollinearity	124
Linearity	125
Normality of Residuals	127
Outliers and Influential Points	130
Homoscedasticity	131
Handling Heteroscedasticity and Outliers	132
Hypothesis Testing.....	133
Model 1: Big Data Analytics Use and CSR Outcomes.....	134
Model 2: CSRP and CSR Outcomes.....	137
Post-Hoc Analysis: Interaction Between BDAU and CSRP	141
Summary	143

Chapter 5: Discussion, Conclusions, and Recommendations	145
Interpretation of Findings	147
Economic Performance	147
Ethical-Legal Performance	149
Philanthropic Performance.....	150
The Role of CSRP.....	152
Interaction Between BDAU and CSRP	153
Limitations of the Study.....	154
Recommendations.....	157
Expand Longitudinal Big Data and CSR Research	157
Incorporate AI/ML Into CSR Strategies	158
Broaden CSR Context Beyond Three Dimensions	158
Compare Banking Sectors and Regions.....	159
Explore Factors Moderating Big Data and CSR Outcomes.....	160
Assess Ethical Issues of Big Data in CSR	161
Implications.....	161
Social Change	162
Methodological Implications	164
Theoretical Implications	165
Empirical Implications.....	166
Recommendations for Practice	166
Conclusions.....	168

References.....	170
Appendix A: A Priori Power Analysis Result	199
Appendix B: ICT Use Instrument	200
Appendix C: Big Data Analytics Use Adapted From ICT Use Instrument.....	201
Appendix D: Corporate Social Responsibility Instrument	202
Appendix E: Corporate Social Performance Adapted From Corporate Social Responsibility Instrument	203
Appendix F: Site Authorization	205
Appendix G: Full Survey	206
Appendix H: Copyright Permission for Big Data Analytics Use Instrument	209
Appendix I: Copyright Permission for CSR Performance Instrument	210
Appendix J: Online Consent Form	211
Appendix K: Result Summary Webpage.....	212
Appendix L: Post Hoc Power Analysis Result	213
Appendix M: Case Summary.....	214
Appendix N: Normal Q-Q Plots	217
Appendix O: Scatterplots Independent Variables Vs Dependent Variables.....	220
Appendix P: Boxplots of Key Variables.....	223
Appendix Q: Scatterplots of Standardized Residuals Vs Predicted Values	224
Appendix R: Partial Regression Plots.....	226
Appendix S: Normal P-P Plots of Regression Standardized Residual	229
Appendix T: Histograms of Regression Standardized Residual	231

Appendix U: Python Code for Breusch-Pagan Test	232
Appendix V: Post Hoc Interaction Overall Model Result	233
Appendix W: Post Hoc Interaction Results	234
Appendix X: SPSS Output Model 1 Multivariate Tests	235
Appendix Y: SPSS Output Model 1 Univariate Tests	236
Appendix Z: SPSS Output Model 2 Multivariate Tests.....	237
Appendix AA: SPSS Output Model 2 Univariate Tests	238

List of Tables

Table 1. Sample Characteristics.....	117
Table 2. Descriptive Statistics for Key Constructs	118
Table 3. Reliability for Key Constructs	119
Table 4. Tests of Normality	121
Table 5. Spearman’s Correlations Coefficients for Key Variables.....	123
Table 6. Durbin-Watson Statistics for Regression Models.....	124
Table 7. Collinearity Statistics.....	125
Table 8. Cases With High Studentized Deleted Residuals	130
Table 9. Cases With High Leverage Values	131
Table 10. Breusch-Pagan Test for Heteroscedasticity in Multivariate Models	132
Table 11. Model 1 Wilks’ Lambda Multivariate Test Results.....	134
Table 12..Model 1 Tests of Between-Subjects Effects on CSR Outcomes	136
Table 13. Model 2 Wilks’ Lambda Multivariate Test Results.....	138
Table 14. Model 2 Tests of Between-Subjects Effects on CSR Outcomes	140

List of Figures

Figure 1. Research Model	12
Figure 2. G*Power Version 3.1 Sample Size Test.....	82
Figure 3. Regression Standardized	126
Figure 4. Regression Standardized Residual Normal P-P Plots	128
Figure 5. Regression Standardized Residual Histograms	129

Chapter 1: Introduction to the Study

Organizations in various sectors are increasingly pressured to reconcile financial growth with ethical, legal, and voluntary citizenship responsibilities, making corporate social responsibility (CSR) essential in light of intensified societal scrutiny (Asiedu et al., 2020; Crişan-Mitra et al., 2020; Freeman et al., 2021). This mandate is articulated within the highly regulated and economically significant banking industry (Sarpong et al., 2023). Although literature acknowledges the capacity of data-driven techniques to enhance bank productivity (Alyahya et al., 2023), their consequences for philanthropy and governance aspects are inadequately examined, particularly in developing nations like as Ghana (Apreku-Djana et al., 2023). This disparity continues to exist despite the increasing digitization of banking operations and heightened public accountability issues, as evidenced by CSR trends across many sectors in Ghana (Amo-Mensah, 2021; Boateng et al., 2022). Consequently, prompt research elucidating big data analytics (BDA) convergence and comprehensive CSR performance (CSRP) necessitates investigation.

This quantitative, cross-sectional survey study addressed this literature void by investigating potential statistically significant predictive relationships between banks' investments in BDA capabilities and realized CSRP across economic, ethical-legal, and philanthropic realms. Gathering perceptions of bank executives and employees on usage and optimization offered actionable insights on elevating productivity alongside positive citizenship to balance stakeholder expectations leveraging data science innovations (Asiedu et al., 2020; Freeman et al., 2021). Findings may inform policy modifications that promote responsible digitization and improve sustainability in this crucial sector

(Sarpong et al., 2023). This research sought to clarify the relationships between technology strategy and diverse performance to inform data-driven methods for integrating banking innovations with ethical obligations in practice and regulation.

This chapter provides an overview justifying examining this technology-ethics intersection. It covers the background of the study, problem statement, research purpose, research questions and hypotheses, theoretical foundation, nature of the study, definitions, assumptions, scope and delimitations, limitations, and the study's significance.

Background of the Study

The Ghanaian banking sector, an essential element of the national financial framework, has experienced significant growth and transformation in recent years (Amoh et al., 2020; Obeng & Mkhize, 2019). Accounting for approximately 70% of Ghana's financial industry (Nyarku & Hinson, 2018), the banking sector plays a crucial role in influencing economic activities, guiding fiscal policy development, and supporting government initiatives aimed at macroeconomic stability. The sector's expansion and the economy's liberalization in the late 1980s have significantly contributed to its growth and competitive advantage (Amoako et al., 2021; Nyarku & Hinson, 2018). Implementing universal banking policies and their later liberalization have fostered competition and promoted private sector participation (Narteh & Braimah, 2020). The proliferation has significantly increased banking entities and branches, promoting heightened competition and a focus on customer needs. The Ghanaian banking sector has emerged as one of the most dynamic and innovative in the West African subregion (Amoh et al., 2020; Nyarku

& Hinson, 2018). The sector's competitive landscape and focus on customer service have notably enhanced Ghana's financial environment (Mensah, 2019).

In 2022, Ghana's urbanization rate was 58.62% (O'Neill, 2024), suggesting significant implications for the banking sector. The increasing urban population heightens reliance on banking services, thus amplifying the sector's societal influence.

Urbanization, in conjunction with economic development, has altered consumer expectations concerning businesses' ethical and social responsibilities, including financial institutions (Apreku-Djana et al., 2023; Boadi et al., 2019; Muthuri et al., 2020). The CSRP of organizations, especially banks, is increasingly scrutinized to ensure alignment with societal standards and positive contributions to social and environmental welfare (Apreku-Djana et al., 2023; Muthuri et al., 2020). The discussion of CSR in the Ghanaian banking sector has garnered significant attention because of its potential effects on economic, ethical-legal, and philanthropic aspects.

The banking sector's embracement of BDA marks a significant technological evolution. Afful et al. (2018) observed that business leaders globally, including those in Ghana's banking sector, recognize the indispensability of data in operational strategies. Kwarko (2020) reported that among organizations surveyed, 60% believed big data technologies were important, and most were either utilizing or planning to integrate these technologies, signifying a paradigm shift towards data-driven decision-making. This growing inclination towards BDA in the sector is relevant for enhancing CSRP.

Recent developments have increased the examination of the ethical and social responsibilities of banks in Ghana. Research has demonstrated a growing expectation for

banks to conduct activities that yield profit while providing social benefits (Asiedu et al., 2020; Boachie, 2020). The dual mandate poses a significant management challenge, requiring banks to align their core financial operations with the diverse expectations of stakeholders, especially regarding CSR. Organizations' CSR includes voluntary actions aimed at mitigating their societal and environmental impacts, extending beyond legal requirements to benefit diverse stakeholders (Adu-Gyamfi et al., 2021). Recent scholarly discussions highlight the significance of CSR within the banking sector and its potential effects on economic, ethical-legal, and philanthropic aspects (Asiedu et al., 2020; Yohannes, 2022).

CSR in banking includes economic viability, adherence to ethical and legal standards, and philanthropic activities (Gasti et al., 2021; Nguyen, 2022; Nireesh & Silva, 2018). Stakeholder groups, including consumers and regulatory bodies, are becoming more attentive to these dimensions (Miah et al., 2019; Nguyen, 2022). The banking industry's heavily regulated nature renders the ethical-legal aspect crucial, requiring strict adherence to legal and ethical standards (Asiedu et al., 2020). Philanthropic initiatives significantly influence public perceptions of banking institutions (Amoako et al., 2021). The necessity for banks to vigorously participate in CSR activities is further emphasized by the changing societal expectations in the context of escalating urbanization and economic development in Ghana (Asiedu et al., 2020; Boachie, 2020; Deigh & Farquhar, 2021). Ghanaian banks increasingly acknowledge the importance of integrating CSR into their fundamental strategies to meet regulatory requirements and build trust and goodwill with their stakeholders.

Notwithstanding the extensive literature on CSR and BDA across various sectors, a discernible research gap exists regarding their integration within the Ghanaian banking sector. Studies like Adu-Gyamfi et al. (2021) and Agyapong et al. (2023) have delved into the CSR endeavors of banks in Ghana, underscoring their significance and positive impact on bank performance. However, these studies primarily concentrate on CSR in isolation, without integrating BDA. In contrast, some, like Afful et al. (2018) and Akhtar et al. (2019), have focused more on BDA's operational and decision-making impacts, emphasizing the potential of these techniques to improve organizational outcomes. However, they do not specifically address how big data can augment CSRP in banking. Alyahya et al. (2023) emphasized the important role of BDA in organizational success; however, their analysis does not pertain to the banking sector or the context of Ghana. The lack of research highlights insufficient scholarly investigation into the synergistic potential of BDA to improve CSRP, especially in the Ghanaian banking sector. The integration is essential for comprehending and utilizing the complete potential of CSR activities supported by data-driven insights in this sector.

This research examined how BDA may enhance CSRP in Ghanaian banking institutions. Given the growing reliance on data-driven strategies and the increasing significance of CSR, the study aimed to elucidate the interplay between technological innovation and social responsibility in the banking sector, thereby providing valuable insights into aligning banking practices with societal expectations while improving operational efficiency. This study's conclusions have significance for policymakers,

banking executives, and stakeholders, providing a thorough grasp of the interplay between contemporary technology and social accountability in the banking industry.

Problem Statement

As Ghanaian banks strive to align profit-seeking motives with rising multistakeholder demands regarding CSR, they grapple with effectively balancing financial targets with environmental and societal obligations (Apreku-Djana et al., 2023; Asiedu et al., 2020; Boadi et al., 2019). This management challenge is further exacerbated by the accelerated adoption of BDA (Breidbach et al., 2019; Mikalef et al., 2020), which risks overprioritizing profits and quantitative performance indicators while inadvertently obscuring ethical, legal, and philanthropic aspects of CSR (Da Bormida, 2021; Kusi-Sarpong et al., 2021; Lutfi et al., 2022).

Although prior research has examined the relationship between CSR and financial performance, there remains a gap in understanding how BDA may improve CSRP, specifically in the context of Ghanaian banks (Apreku-Djana et al., 2023; Boadi et al., 2019; Muthuri et al., 2020). This gap is particularly salient amidst escalating public concern regarding corporate ethical and social responsibilities, including for banks, during rapid economic growth and urbanization (Asiedu et al., 2020; Boachie, 2020; Deigh & Farquhar, 2021). Further, the burgeoning use of BDA in business operations underscores the necessity to comprehend its implications on CSR endeavors (Breidbach et al., 2019; Calic & Ghasemaghaei, 2021). The specific research problem was that the extent to which Ghanaian banks employed BDA to boost multidimensional CSRP encompassing economic, ethical-legal, and philanthropic dimensions was unknown.

By addressing this literature lacuna, this study aimed to contribute to academic discourse and practical applications within the banking industry by examining the relationship between CSRP, economic performance, ethical-legal performance, philanthropic performance, and the utilization of BDA in Ghanaian banks. Moreover, this study gains significance as it aligns with the ethos of positive social change. It addresses the burgeoning expectations for corporations to engage in profit-making activities while concurrently contributing to societal well-being. By probing into the prospects of BDA to bolster CSRP, this research may offer invaluable insights for banks and other enterprises striving to synchronize their operations with broader stakeholder expectations, fostering sustainable development.

Purpose of the Study

The purpose of this quantitative correlational study was to examine the potential impacts of BDA use (BDAU) and overall CSRP on Ghanaian banks' economic, ethical-legal, and philanthropic dimensions of CSR. By examining the BDA usage and the broader CSR efforts, the study aimed to understand their specific impacts on these key performance areas—economic, ethical-legal, and philanthropic.

The independent variables are BDAU and CSRP. BDAU defines the extent to which banks employ technologies, techniques, and talent involving large, complex, multistructured data sets with advanced algorithms to derive actionable insights that enhance organizational decision-making. CSRP refers to how effectively a bank meets its CSR obligations to stakeholders.

The dependent variables are economic performance, ethical-legal performance, and philanthropic performance, which are facets of CSR. The economic performance involves fiscal discipline, efficiency, value creation, and shareholder returns—profit maximization. Ethical-legal performance includes adhering to moral standards and regulations and avoiding societal harm. Philanthropic performance refers to voluntary contributions that advance social welfare causes.

This study analyzed the impacts of BDAU and CSRP on Ghanaian banks' economic, ethical-legal, and philanthropic dimensions of CSR. Specifically, it examined how BDAU influences these CSR facets, with CSRP controlled as a variable. Conversely, when investigating the impact of CSRP on these facets, BDAU was held constant to isolate its effects. This approach provided a detailed understanding of each variable's role in shaping CSR outcomes.

Research Questions and Hypotheses

The following research questions (RQs) guided this study, and their matching hypotheses were tested:

RQ1: To what extent is there a statistically significant relationship between big data analytics use and economic performance in Ghanaian banks while controlling for overall corporate social responsibility performance?

$H1_0$: There is no statistically significant relationship between big data analytics use and economic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

H1_a: There is a statistically significant relationship between big data analytics use and economic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

RQ2: To what extent is there a statistically significant relationship between big data analytics use and ethical-legal performance in Ghanaian banks while controlling for overall corporate social responsibility performance?

H2₀: There is no statistically significant relationship between big data analytics use and ethical-legal performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

H2_a: There is a statistically significant relationship between big data analytics use and ethical-legal performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

RQ3: To what extent is there a statistically significant relationship between big data analytics use and philanthropic performance in Ghanaian banks while controlling for overall corporate social responsibility performance?

H3₀: There is no statistically significant relationship between big data analytics use and philanthropic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

H3_a: There is a statistically significant relationship between big data analytics use and philanthropic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

RQ4: To what extent is there a statistically significant relationship between corporate social responsibility performance and economic performance in Ghanaian banks while controlling for big data analytics use?

$H4_0$: There is no statistically significant relationship between corporate social responsibility performance and economic performance in Ghanaian banks while controlling for big data analytics use.

$H4_a$: There is a statistically significant relationship between corporate social responsibility performance and economic performance in Ghanaian banks while controlling for big data analytics use.

RQ5: To what extent is there a statistically significant relationship between corporate social responsibility performance and ethical-legal performance in Ghanaian banks while controlling for big data analytics use?

$H5_0$: There is no statistically significant relationship between corporate social responsibility performance and ethical-legal performance in Ghanaian banks while controlling for big data analytics use.

$H5_a$: There is a statistically significant relationship between corporate social responsibility performance and ethical-legal performance in Ghanaian banks while controlling for big data analytics use.

RQ6: To what extent is there a statistically significant relationship between corporate social responsibility performance and philanthropic performance in Ghanaian banks while controlling for big data analytics use?

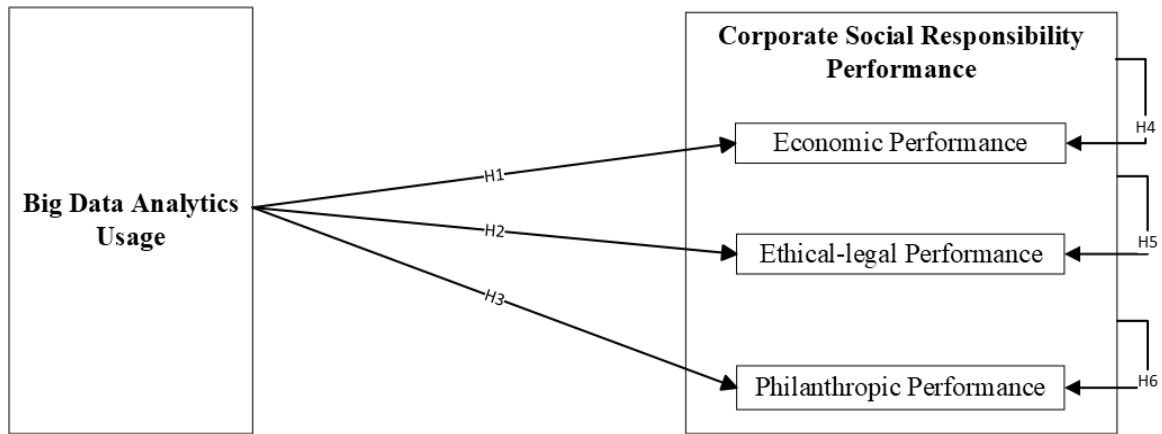
H_{6_0} : There is no statistically significant relationship between corporate social responsibility performance and philanthropic performance in Ghanaian banks while controlling for big data analytics use.

H_{6_a} : There is a statistically significant relationship between corporate social responsibility performance and philanthropic performance in Ghanaian banks while controlling for big data analytics use.

Theoretical Foundation

The stakeholder theory (Freeman, 1984) and the resource-based view (RBV; Barney, 1991) as complementary lenses were applied in this study. Stakeholder theory emphasizes that firms bear obligations to shareholders and other entities such as employees, consumers, and communities (Donaldson & Preston, 1995). This viewpoint corresponds with the study's multidimensional perspective of CSRP. From a complementary perspective, the RBV highlights utilizing organizational resources to attain competitive advantage (Barney, 1991; McGahan, 2021).

These theories connote using BDA to enhance CSRP across economic, ethical-legal, and philanthropic dimensions. As depicted in Figure 1, the research model shows the connections between BDAU (RBV) and various CSRP facets (stakeholder theory; McGahan, 2021; Ozdemir et al., 2023). The model also shows the link between overall CSRP and the same facets.

Figure 1*Research Model*

The research questions probe the extent to which the use of BDA influences economic, ethical-legal, and philanthropic performances within Ghanaian banks, all while considering the impact of CSRP. Additionally, this study examined the interplay between CSRP and its economic, ethical-legal, and philanthropic outcomes while accounting for the use of BDA techniques. The study sought to meticulously evaluate the interactions between technology used in Ghanaian banking institutions and their stakeholders, employing established metrics for previously mentioned constructs (Salmones et al., 2005; Yunis et al., 2018). This methodology broadens the existing theoretical framework to encompass a novel context, employing multivariate techniques for analysis (Calic & Ghasemaghaei, 2021; Choi & Park, 2022; Li et al., 2022). Through this perspective, the research offered an in-depth exploration of how BDA can function to improve corporate social performance and address stakeholders' varied requirements within the Ghanaian banking sector.

Nature of the Study

The nature of this study was a non-experimental quantitative, correlational study employing a cross-sectional survey design to examine potential predictive relationships between BDAU and CSR across three performance dimensions—economic, ethical-legal, and philanthropic—within Ghanaian banks. Utilizing validated survey instruments and multivariate multiple regression techniques enabled the descriptive quantification of connections between variables at a singular point, achieving the study’s purpose in an expedited timeframe aligned with doctoral constraints (Stockemer, 2019; Wang & Cheng, 2020).

A cross-sectional quantitative methodology facilitates statistical modeling of predictive links between BDA investments and CSR outcomes (Wang & Cheng, 2020). This approach has proven effective for technology utilization assessments. Mikalef et al. (2020) demonstrated its application by examining big data ties to competitive performance, and Calic and Ghasemaghaei (2021) established its value in determining information systems’ social influences. While the simultaneous gathering of independent and dependent data restricts internal causal validity, the design remains ideal for elucidating explanatory contributions and guiding decision-making (Leedy et al., 2019). This timely evidence-based insights generation also addresses calls to clarify an expanding discipline intersection centered on optimizing banks’ economic, social, and environmental objectives using data-centric techniques (Chatterjee et al., 2022).

One of this study’s two independent variables, BDAU, encompasses banks’ employment of technologies and algorithms leveraging large, high-velocity datasets to

extract actionable insights for enhancing judgments (Chatterjee et al., 2022; Choi & Park, 2022; Li et al., 2022). The other independent variable, CSRP, quantifies a bank's effectiveness in fulfilling its CSR obligations towards stakeholders. The dependent variables represent three CSR facets—economic, ethical-legal, and philanthropic (Amo-Mensah, 2021; Carroll, 1991; Salmones et al., 2005). Economic CSR involves profit maximization through efficient operations while meeting stakeholder financial expectations (Freeman, 1984). Ethical-legal CSR constitutes adhering to regulations, norms, and consumer transparency/fairness standards (Rehman et al., 2020). Finally, philanthropic CSR encompasses voluntary community support initiatives (Salmones et al., 2005).

Respondents from commercial, regional, rural, and community banks across roles engaged with analytics/CSR initiatives were recruited based on suitable expertise levels to provide meaningful insights (Etikan et al., 2016). Structured online questionnaires gathered self-reported data on CSRP dimensions and BDAU extent through validated multi-item reflective scales exhibiting strong psychometric properties evidenced by past, composite reliability, AVE, VIF, and Cronbach's alpha statistics (Calic & Ghasemaghaei, 2021; Hair et al., 2019; Stockemer, 2019). After screening outliers and testing assumptions, multiple linear regression determined the predictive capacity, significance, direction, and effect size of relationships addressed across six hypotheses. These hypotheses were connected to six corresponding research questions focused on modeling BDA's links to CSR's economic, ethical-legal, and philanthropic outcomes (Pituch & Stevens, 2018; Tabachnick & Fidell, 2019).

This cross-sectional survey design aligns with the study's descriptive goals of quantifying predictive connections between banks' BDA investments and multifaceted CSRP at a specific point economically through validated instrumentation and multivariate statistics. The independent variable of usage and three CSR-related dependent variables are clearly defined. Simultaneously, the summarized procedures link recruiting appropriately knowledgeable respondents to gather meaningful self-reported data analyzed with ideal tests. Though internal validity limitations persist, evidence-based insights can guide decision-making amid calls to optimize varied performance objectives using data analytics.

Definitions

Big data: Extremely large, complex sets of structured and unstructured data have the characteristics of high volume, velocity, variety, and veracity of data. Big data refers to massive datasets that are so large and complex that traditional data processing software tools cannot manage and process them effectively (Afful et al., 2018; Otchere et al., 2021).

Big data analytics capabilities: An organization's adeptness in effectively gathering, processing, analyzing, and leveraging insights from extensive datasets, developed through investments in data infrastructure, analytical expertise, and managerial competencies to enable data-driven decision-making (Mikalef et al., 2021).

Big data analytics use: The extent to which companies employ technologies, techniques, and talent involving large, complex, multistructured data sets with advanced

algorithms to derive actionable insights that enhance organizational decision-making (Chatterjee et al., 2022; Otchere et al., 2021).

Big data utilization: Strategically employing big data resources within organizational processes encompasses big data utilization. Big data utilization involves collecting, managing, and using large datasets to inform and enhance strategic decisions and operational efficiencies (Calic & Ghasemaghaei, 2021).

Corporate social responsibility: The voluntary actions an organization implements to fulfill economic, legal, ethical, and philanthropic duties to benefit society and the environment by exceeding basic legal compliance and shareholder wealth maximization to satisfy wider stakeholder expectations (Carroll, 1991; Freeman, 1984).

Corporate social responsibility performance: Researchers and stakeholders assess how effectively a firm fulfills its CSR duties to evaluate CSRP. Measuring performance encompasses assessments across multiple dimensions, including the financial, ethical-legal, and philanthropic impact of an organization's activities on its stakeholders and the environment (Salmones et al., 2005).

Economic performance: A dimension of CSRP focused on fulfilling stakeholder expectations related to indicators of fiscal discipline, efficiency, value creation, quality goods/services provision, shareholder returns maximization and contributing to wider prosperity through tax payments and wealth generation (Elkington, 1997; Freeman et al., 2021; Rehman et al., 2020).

Ethical-legal performance: A facet of CSRP composed of adhering to conventions, regulations, and moral standards around truthful advertising to consumers,

fair competition, protecting consumer rights, ensuring information transparency and accountability, and avoiding societal harm (Asiedu et al., 2020; Mikalef et al., 2021; Rehman et al., 2020).

Philanthropic performance: A component of CSRP focused on voluntary contributions transcending legal or economic dictates aimed at advancing charitable, educational, environmental, health, cultural, or other social welfare causes as manifestations of good corporate citizenship (Carroll, 1991; Freeman et al., 2021).

Resource: An organizational asset a firm can draw upon in pursuing its strategies, satisfying market demands, managing day-to-day operations, or achieving other business objectives (Barney, 1991; Wernerfelt, 1984).

Stakeholder: Any group or individual tangibly impacted by, or who can substantively influence, the activities or outcomes of a given corporation, including but not limited to employees, shareholders, investors, customers, suppliers, vendors, regulators, communities, ecosystems, and civil society institutions (Carroll, 1991; Freeman, 1984).

Assumptions

A fundamental assumption made in this study was that survey participants from Ghanaian banks had sufficient familiarity with and understanding of their organization's BDA investments and CSR programs to provide meaningful perspectives when responding to the questionnaires utilized for data collection (Asiedu et al., 2020; Rehman et al., 2020). This assumption regarding the knowledge level of participants is critical because the quantitative analysis relies entirely on self-reported subjective measures

rather than objective evaluations to explore relationships between variables (Curtis et al., 2016; Leedy et al., 2019). Researchers emphasize that those responding to surveys must have adequate exposure to the phenomena of interest to furnish reliable, insightful data related to the research questions (Fan & Yan, 2010; Stockemer, 2019).

Additionally, it was presumed that the validated survey instruments chosen to measure BDAU, economic CSRP, ethical-legal CSRP, and philanthropic CSRP would exhibit robust statistical characteristics, including internal reliability and construct validity when utilized in the relatively unexamined context of Ghanaian banks (Chatterjee et al., 2022; Mikalef et al., 2020; Salmones et al., 2005). The ability to meaningfully measure these latent constructs and analyze relationships between them is contingent on the chosen scales and subscales exhibiting rigorous psychometric qualities, such as Cronbach's alpha values over 0.70, specifically when applied to this sample (Curtis et al., 2016; Tabachnick & Fidell, 2019). Researchers have emphasized that utilizing published measures with prior evidence of reliability and validity enhances methodological rigor in survey-based investigations (Curtis et al., 2016).

Furthermore, it was assumed that stakeholder theory (Freeman, 1984) and RBV (Barney, 1991) offered complementary perspectives to examine whether and how banks' BDA aimed at extracting consumer, market, operational, and societal insights can strengthen monitoring and optimization of economic, community, and environmental impacts (Calic & Ghasemaghaei, 2021; Chatterjee et al., 2022). Grounding this study on established conceptual frameworks supports arguing for generalizability and theoretical contributions of findings to some degree (Grant et al., 2019; Stockemer, 2019).

Management scholars posit that anchoring the investigation of contemporary phenomena like BDA and CSRP to well-known models enables cumulative progress in disciplines (Kabir & Chowdhury, 2023; Ozdemir et al., 2023).

Additionally, an inherent assumption is made that the conceptual definitions of BDAU and multifaceted CSRP can be effectively translated into observable and quantifiable proxies using validated survey instruments with multi-item reflective scales (Ghasemaghaei, 2019; Salmones et al., 2005; Yunis et al., 2018). While having objective organizational data would be ideal, the abstract concepts need to logically and reliably connect to established measurement tools that provide measurable manifestations capable of empirical examination using multivariate statistics (Curtis et al., 2016; Hughes, 2018; Wulff et al., 2023).

Scope and Delimitations

This study investigated the potential relationships between investments in BDA and the fulfillment of CSR in relevant performance domains such as financial discipline, legal and ethical compliance, and voluntary citizenship programs within banks in Ghana. The objective involves statistically evaluating whether applying improved data extraction and analysis methods correlates with enhanced monitoring and achievement of economic, community, and environmental standards through multivariate regression approaches. Although links between technology and social performance remain under analyzed, particularly in emerging country contexts, concentrating the lens on the intersection of big data and CSR in Ghanaian banks offers an opportunity for initial clarification while recognizing that further scholarship is necessary for full elucidation.

This study investigated the relationships between BDAU and CSRP among Ghana's registered commercial, regional, rural, and community banks. The admission criteria comprise managerial, technical, and CSR-focused individuals capable of offering valuable insights on big data and CSR activities within their banks. However, smaller informal financial entities and banking institutions in other geographic contexts beyond Ghana are excluded. Furthermore, the focus is on social performance indicators around economic, ethical-legal, and philanthropic realms. Conversely, environmental or overall governance factors are excluded due to their less direct connection to the study's primary research questions and the applied CSR model. The decision to focus on these facets connects directly to the research questions and applied CSR model, drawn from Carroll (1991) and Salmons et al. (2005) frameworks. Furthermore, only prominent and established theories, such as stakeholder theory (Freeman, 1984) and the RBV (Barney, 1991), were chosen for this study, as they offer extensive frameworks for comprehending the relationship between BDA and CSRP in banking. Other emerging or limited viewpoints like CSR, big data, or bank performance are omitted as foundations for framing and analysis.

Limitations

A core limitation of this quantitative, cross-sectional study was the inability to determine internal causality between BDA investments and optimized CSRP due to the descriptive, non-experimental methodology (Curtis et al., 2016). Although regression analysis can reveal predictive relationships, establishing definitive causal sequences requires longitudinal tracking of variables over extended periods or experimental

manipulations (Leedy et al., 2019). Management scholars assert that cross-sectional surveys provide valuable, timely snapshots of data but are unable to substantiate causal claims without temporal precedence or controlled experimental interventions (Stockemer, 2019; Wang & Cheng, 2020).

Additionally, reliance on subjective perceptual estimates from bank employees as proxies for BDAU and CSRP introduces possibilities of biases and distortions compared to objective behavioral assessments or financial data (Wulff et al., 2023). However, gathering insights from those familiar with technology and social initiatives still carries value for elucidating predictive connections (Curtis et al., 2016). Researchers have noted that self-reported measures yield meaningful approximations within pragmatic constraints despite validity concerns (Fan & Yan, 2010).

Furthermore, concentrating analysis on economic, ethical-legal, and philanthropic realms excluded other facets like environmental stewardship and governance impacts, precluding comprehensive corporate social performance measurement (Afful et al., 2018). Still, concentrating on these areas connects directly to the research aims and the applied CSR model (Salmones et al., 2005). Scholars have observed that focusing on key issues of interest counterbalances breadth concerns while upholding alignment (Leedy et al., 2019).

Additionally, the cross-sectional methodology precludes discerning evolutionary patterns, trading off depth for timely snapshot illuminations per doctoral period constraints (Gaille, 2017). However, such preliminary elucidations can inform future longitudinal examinations by academics and institutions to bolster insights over the long

run (Wang & Cheng, 2020). Management scholars noted that initial exploratory instantiations lay foundations and justify subsequent dynamics monitoring (Grant et al., 2019).

Finally, bank-specific contextual variables, such as data infrastructure maturity, availability of specialized analytics talent, leadership support, and broader institutional dynamics, can moderate the extent to which technology-enabled CSRP improvements are realized (He et al., 2022; Mikalef et al., 2021). Despite these limitations, the diversity of sampled banks at different stages of technology adoption provides a more comprehensive cross-section of industry perspectives (Etikan et al., 2016). Research emphasizes that gathering perceptions across diverse organizational settings offers a more robust understanding of contingencies than focusing on single entities (Serra et al., 2018).

Significance of the Study

This study analyzed the integration of BDA on enhancing CSRP in Ghanaian banks, contributing to theoretical advancement, implementation in practice, and promoting positive social change. Societal expectations necessitate that banks align financial growth with ethical, legal, and voluntary citizenship responsibilities, thereby emphasizing the importance of optimizing various performance dimensions (Asiedu et al., 2020; Boachie, 2020). Increasing investments in advanced analytics to utilize data for consumer insights, risk management, and competitive viability necessitate a clear understanding of the governance implications associated with this technology (He et al., 2022; Mikalef et al., 2021).

While existing literature acknowledges the economic potential of big data (Afful et al., 2018; Alyahya et al., 2023) and the positive effects of ethical banking on customer loyalty (Boateng et al., 2022; Sarpong et al., 2023), there is a paucity of research exploring their intersection, especially regarding implications for legal, ethical, and philanthropic domains. The gap is particularly significant in light of public concern regarding bank accountability during Ghana's development, offering an opportunity for socio-technological insights (Apreku-Djana et al., 2023). As analytics becomes integral to banking, elucidating its connections with comprehensive CSRP facilitates the strategic management of innovation for financial and societal advancement (Chatterjee et al., 2022; He et al., 2022; Mikalef et al., 2021).

This study addressed this literature gap by offering integrated empirical, practical, and social change contributions. The application of complementary theoretical lenses expands established frameworks on synchronizing technology and ethical performance in a new context (Chatterjee et al., 2022; Sarpong et al., 2023). Findings can provide bank executives with insights on elevating economic, legal, and voluntary citizenship outcomes using data analytics to fulfill rising public expectations (Asiedu et al., 2020; Choi & Park, 2022). Mindset shifts promoting responsible digitization across sectors may arise by motivating innovations advancing inclusion, community assistance, and sustainability (Dubey et al., 2019; Zhang et al., 2022).

The revelations on leveraging data for balanced productivity and social welfare may inspire positive change through responsible decisions, enabling banks to integrate economic performance with legal compliance and citizenship initiatives fostering

prosperity (Asiedu et al., 2020; Boachie, 2020). This research investigated an underexplored niche where technology strategy intersects with ethical obligations, offering integrated empirical, practical, and social change contributions. The next sections outlined this study's significance across theoretical, practical, and social change dimensions.

Significance to Theory

This research addressed gaps in understanding connections between technology investments and optimizing multidimensional CSRP, especially across ethical, legal, and philanthropic realms, within the underexamined context of Ghanaian banking (Adu-Gyamfi et al., 2021; Afful et al., 2018; Akhtar et al., 2019). While studies have analyzed BDA adoption in banking operations and CSRP in isolation, limited research has examined their intersection, particularly impacts on ethical, legal, and philanthropic realms, presenting a literature gap this study can address (Apreku-Djana et al., 2023; Boadi et al., 2019).

The application of complementary theoretical lenses—stakeholder theory (Freeman, 1984) and RBV (Barney, 1991)—demonstrated adaptability in investigating contemporary phenomena at the intersection of digitization strategy and governance (Grant et al., 2019; Stockemer, 2019). Integrating these established models to explore alignments between advanced analytics capabilities and holistic CSRP can spur cumulative progress by expanding conceptual frameworks on synchronizing technology innovations with ethical obligations (Calic & Ghasemaghaei, 2021; Li et al., 2022).

Scholars have critiqued stakeholder theory for diluting profit focus and lacking empirical validation, while critiques of RBV highlight inattention to societal considerations (Bansal & DesJardine, 2014; O’Connell & Ward, 2020). This study’s examination of analytics-enabled CSRP optimization provides an opportunity to address these limitations, fuse the models, and reignite their relevance amidst the increasing complexity of technology strategy and ethical governance issues (Barney, 2018; Dmytriiev et al., 2021; Freeman et al., 2021). It may inspire new theoretical developments and research trajectories, illuminating responsible and sustainable innovation pathways.

Significance to Practice

For bank executives, findings may provide data-driven insights guiding policies and resource allocation aimed at elevating economic, ethical, and voluntary citizenship performance to balance financial growth with positive community relations (Asiedu et al., 2020; Boachie, 2020; Chatterjee et al., 2022). The results of this study could indicate ways to optimize advanced analytics adoption, fulfilling escalating public expectations around social accountability and profitability (Choi & Park, 2022; Deigh & Farquhar, 2021). Elucidating trade-offs and synergies between technology investments and CSR optimization can assist management in channeling resources strategically (Variyath & Brobbey, 2020).

For regulators and policymakers, findings may highlight supervision mechanisms assessing digitization integration within socially responsible bank governance per global accountability standards (Boateng et al., 2022; Sarpong et al., 2023). Outcomes

emphasizing links between analytics and legal compliance can shape the sector's reporting protocols and disclosure requirements. Ultimately, a nuanced understanding of bank analytics ramifications can spur guidelines fostering innovation aligned with positive social performance.

Significance to Social Change

By investigating linkages between analytics investments and multifaceted impacts, the findings of this study could promote mindset shifts towards ethical digitization across sectors (Sarpong et al., 2023). Insights on leveraging data for balanced financial and societal objectives may compel service innovations advancing inclusion, community assistance, and sustainability (Zhang et al., 2022). Clarifying this intersection could motivate stakeholders like managers, technologists, and regulators to evaluate social returns alongside efficiency when adopting new technologies, shaping perspectives on aligning innovations with public welfare (Dubey et al., 2019; Freeman et al., 2021).

Consequently, responsible data-driven decisions that allow banks to align economic objectives with legal obligations and voluntary citizenship may enhance financial inclusion, community development, and equitable prosperity (Asiedu et al., 2020; Boachie, 2020). The findings could lead to banking innovations or reforms that improve economic participation and outcomes for marginalized groups. Thus manifesting positive social change through rising prosperity and living standards. This study examined the intersection of technology strategy and ethical obligations, contributing to theory, practice, and social change. It offers insights into balancing productivity, compliance, and citizenship through data-driven approaches in an underexplored context.

Summary and Transition

This quantitative study addressed gaps in understanding how investments in BDA may be associated with optimizing CSRP in Ghanaian banks' economic, ethical-legal, and philanthropic domains. The background section delineates the changing environment in which increasing dependence on data-driven insights coincides with heightened public scrutiny regarding banks' societal responsibilities. The problem and purpose statements crystallize the need and intentions to explore potential statistically significant predictive relationships between banks' analytics usage and multifaceted CSR outcomes. The methodology details the cross-sectional survey procedures for modeling these connections to offer timely, meaningful evidence advancing academic discourse and practical policies in this emerging domain.

While limitations persist regarding inferring causality from subjective indicators, the significance highlights potential integrated empirical, practical, and positive social change contributions. Theoretical lenses fuse to expand conceptualizations of synchronizing technology and ethical performance innovations. Findings could guide bank executives in leveraging analytics to balance financial growth with legal duties and voluntary citizenship. Responsible digitization mindsets prioritizing welfare alongside efficiency may arise across sectors. The holistic performance optimization insights could shape sustainable pathways, enabling banks to drive prosperity through data-enabled decisions that meet economic goals, regulations, and community expectations.

Transitioning to Chapter 2, the literature review synthesized scholarship on the constituent elements of this study. The section reviews and critiques CSRP assessment

research, dimensions like economic, ethical-legal, and philanthropic realms, resource-based technology capabilities view, stakeholder perspectives, and BDA adoption within emerging country banking contexts. Gaps in integrating these domains were highlighted before summarizing this study's potential contributions.

Chapter 2: Literature Review

Ghana's fast changing financial sector offers a unique opportunity to explore the incorporation of BDA into corporate governance frameworks, given its growing usage of contemporary technologies. Recent studies (Afful et al., 2018; Apreku-Djana et al., 2023; Boadi et al., 2019; Choi & Park, 2022) have revealed the potential of data-driven approaches to enhance CSR in various sectors, including banking. Prior research has highlighted the importance of BDA in improving economic performance and operational efficiencies (Afful et al., 2018; Choi & Park, 2022), as well as its influence on internal outcomes such as employee performance and corporate identification (Boadi et al., 2019). There is a paucity of research examining the influence of BDA on the ethical-legal and philanthropic dimensions of CSR within Ghanaian banks (Afful et al., 2018; Boadi et al., 2019; Gaayire et al., 2023). The growing importance of transparency and accountability in the financial sector necessitates further research to thoroughly explore BDA's potential to improve the ethical and philanthropic aspects of corporate governance in Ghana's banking sector (Sarpong et al., 2023; Van Der Merwe & Achkar, 2022).

This study employed stakeholder theory (Freeman, 1984) as its theoretical framework, asserting that companies can improve their performance by addressing the wants and concerns of various stakeholders. The RBV (Barney, 1991) elucidates how banks can leverage BDA as a strategic asset to attain a competitive advantage and improve CSRP. Stakeholder theory evolved to align with contemporary demands, encompassing increased transparency, social responsibility, and ethical accountability. Recent research (Bousdekis et al., 2021; Choi & Park, 2022; Niu et al., 2021) has

indicated that incorporating advanced analytical tools augments decision-making processes and promotes CSR outcomes.

This study employed a quantitative non-experimental cross-sectional correlational design to assess how Ghanaian banks utilize BDA to elevate their CSRP across economic, ethical-legal, and philanthropic dimensions. Building upon the foundations laid by previous research on stakeholder theory and the RBV, the purpose of this study was to contribute novel insights into the strategic alignment of CSR and BDA within Ghana's banking industry. Through a comprehensive analysis employing multivariate regression techniques, the study aimed to illuminate the intricacies of CSRP in the burgeoning field of BDA.

Literature Search Strategy

The study's literature review involved an exhaustive search of pertinent sources from multiple databases, such as the Business Market Research Collection, Business Source Complete, EBSCO, Federal Agency Participation, Google Scholar, Mergent Online, ProQuest, ScienceDirect, and Web of Science. The employed search terms, individually or in combination, encompassed critical concepts such as *big data analytics*, *corporate social responsibility*, *economic performance*, *ethical-legal performance*, *philanthropic performance*, *Ghanaian banks*, *stakeholder theory*, and *resource-based view*. Boolean operators were utilized to improve the search, guaranteeing the chosen information's relevancy and precision. Priority went to peer-reviewed publications and papers from 2018 onwards to include the field's most current and pertinent discoveries. However, seminal works such as Wernerfelt's (1984) "A Resource-Based View of the

Firm,” Freeman’s (1984) *Strategic Management: A Stakeholder Approach*, and Barney’s (1991) “Firm Resources and Sustained Competitive Advantage,” were incorporated for their essential insights, regardless of their publication dates.

The foundational works acted as key reference points for the literature review. Recent research provided a comprehensive examination of the evolution and contemporary relevance of stakeholder theory and the RBV. The contributions made by authors such as Freeman et al. (2021), McGahan (2021), and Ozdemir et al. (2023) in these areas were subjected to critical analysis. This research provides a detailed examination of the integration of BDA in corporate governance and CSR, with a specific focus on the banking sector in Ghana. The literature review sought to delineate the evolution of these theories within the framework of contemporary technological developments and their relevance in improving CSRP in the banking sector. This method facilitates a thorough analysis of the existing state of CSR within Ghanaian banks, especially considering the influence of new technological advancements such as BDA.

Theoretical Foundation

This study applied stakeholder theory (Freeman, 1984) and the RBV (Barney, 1991) as complementary frameworks to examine how Ghanaian banks can utilize BDA capabilities to improve the economic, ethical-legal, and philanthropic aspects of CSRP. Stakeholder theory and the RBV are pertinent as they offer theoretical frameworks for analyzing the interactions between banks and their stakeholders and the strategic resources that banks can leverage to attain competitive advantage. This section on theoretical foundations analyzes literature regarding the relationship between BDAU

(RBV) and diverse CSRP (stakeholder theory) to meet the needs of various stakeholders (Calic & Ghasemaghaei, 2021; Ozdemir et al., 2023). The theories' origins are detailed in the subsequent literature review sections.

Stakeholder theory asserts that businesses bear responsibilities to multiple groups beyond just shareholders, including employees, customers, suppliers, communities, and the environment (Donaldson & Preston, 1995; Freeman et al., 2021). This theory directly aligns with the study's multidimensional conceptualization of CSRP. A substantial amount of CSR literature integrates stakeholder theory with associated frameworks (Agyapong et al., 2023; Apreku-Djana et al., 2023; Ozdemir et al., 2023; Sarpong et al., 2023). Stakeholder theory has been extensively utilized in previous CSR research to comprehend CSR, employing frameworks such as Mitchell et al.'s (1997) stakeholder salience model to identify and prioritize stakeholders selected for this study. Stakeholder theory is a fundamental framework highlighting corporate responsibilities in economic, ethical-legal, and philanthropic contexts. This theory provides a comprehensive perspective for examining how BDAU engages with diverse stakeholder interests.

Complementing stakeholder theory, the RBV focuses on how organizations can leverage their internal resources and capabilities as sources of competitive advantage and performance improvements (Barney, 1991; Wernerfelt, 1984). Recent studies have analyzed how technology resources such as BDA can be inimitable capabilities, providing competitive edges (Choi & Park, 2022; Ghasemaghaei, 2019). Researchers have also investigated the application of BDA within the context of CSR, suggesting that

resource orchestration through data-driven insights can optimize economic, social, and environmental responsibilities in tandem (Calic & Ghasemaghaei, 2021).

Scholarly work by authors such as Calic and Ghasemaghaei (2021), Freeman et al. (2021), and Ozdemir et al. (2023) provides insights needed to advance a theoretical framework that integrates stakeholder theory and the RBV in the context of CSR and BDA. Measuring and optimizing CSRP requires a comprehensive understanding of stakeholder interests and the effective utilization of organizational resources (Choi & Park, 2022). As depicted in Figure 1, the theoretical framework illustrates the interplay between BDAU (RBV) and CSRP (stakeholder theory).

Ozdemir et al. (2023) integrated stakeholder theory and the RBV—and its offshoot, the knowledge-based view—to show the impact of stakeholder diversity on collaborative innovation. Similarly, Sarpong et al. (2023) proposed that integrating digital environmental, social, and governance (ESG) practices with stakeholder interests enhances brand equity and financial performance by improving customer loyalty and stakeholder engagement. Further, Singh et al. (2021) combined stakeholder theory and the dynamic capability view, an offshoot of the RBV, to explore the role of stakeholder engagement in enhancing sustainable competitive advantage. Indeed, Freeman et al. (2021) suggested that stakeholder theory can enhance the RBV by considering the interests and perspectives of various stakeholders and how they can contribute to organizational resources and capabilities.

Past research has examined how adopting and using information and communications technology (ICT) impacts organizational performance. For example,

using the RBV lens, Yunis et al. (2018) studied this relationship in the Lebanese market while also considering the potential moderating effect of corporate entrepreneurship. In a similar vein but drawing from stakeholder theory, Salmones et al. (2005) investigated the influence of CSR on customer loyalty and service valuation in the Spanish mobile telephone industry. Recent research built on these studies by adapting and validating measures of key constructs for new contexts. Specifically, Ghasemaghaei (2019) developed and validated measures for examining BDA usage and its impacts on firm decision-making quality. Additionally, Calic and Ghasemaghaei (2021) demonstrated that economic, ethical-legal, and philanthropic dimensions can comprehensively assess CSRP across diverse stakeholder groups. The present study disaggregates CSRP into these distinct measurable dimensions to enable a more granular analysis of the concept and its outcomes.

Drawing from these insights, the theoretical framework for this study integrated stakeholder theory and RBV to examine the role of BDA in addressing multifaceted stakeholder interests and optimizing CSR efforts. Integrating these perspectives, this study is grounded in the premise that investments in BDA capabilities, as valuable and rare resources, can allow Ghanaian banks to improve their corporate social performance across economic, ethical-legal, and philanthropic dimensions by addressing the needs of varied stakeholders through data-supported insights (Dubey et al., 2019; Mikalef & Gupta, 2021). As informed by stakeholder and resource-based logic, the research questions probe the potential linkages between BDAU and CSRP facets. The study used

BDA metrics (Yunis et al., 2018) and comprehensive CSRP indicators (Salmones et al., 2005), gathering primary data from surveys of Ghanaian banks and their stakeholders.

By adapting validated measures, the current research strives to contribute new insights while building on the cumulative progress of past studies. Consistent with previous research (e.g., Calic & Ghasemaghaei, 2021; Ghasemaghaei, 2019), this approach performed analysis using multivariate techniques. The Ghanaian context provides an opportunity to extend and validate the integrated theoretical framework linking stakeholder theory, the RBV, and CSR in a new setting.

Literature Review

This literature review provides an overview and synthesis of academic work related to the key concepts underpinning the proposed study on CSRP in Ghanaian banks. The review focuses on the theoretical frameworks of stakeholder theory and RBV, tracing their evolution and recent applications to CSR. I then analyze literature around BDA, CSR, and varied performance metrics under the CSR umbrella. The geographical context is centered on Ghana, with insights from wider African and global perspectives where relevant. The objectives are to establish the current state of academic discourse concerning these topics, identify meaningful research gaps, and highlight studies that justify the significance of the proposed approach to address gaps investigating the use of BDA in CSRP assessment across economic, ethical-legal, and philanthropic dimensions within Ghana's banking sector.

Stakeholder Theory

The stakeholder theory, introduced by R. Edward Freeman in 1984, presents a significant divergence from the dominant corporate responsibility perspectives, especially those Milton Friedman expressed in the 1970s. Friedman's (1970) shareholder theory asserted that the foremost obligation of a business is to enhance shareholder value. This viewpoint frequently neglects to consider the effects of business operations on various stakeholders.

Friedman (1962, 1970) contended, particularly in his 1962 work *Capitalism and Freedom* and his 1970 article for *The New York Times*, that the primary objective of a corporation ought to be maximizing profits for its shareholders. He contended that business executives, serving as representatives of the shareholders, ought to concentrate exclusively on financial returns. Friedman (1970) posited that allocating resources toward social objectives fundamentally undermines the company's obligation to its shareholders. This methodology was founded on the conviction that free markets operate with remarkable efficiency and that economic expansion, propelled by profit-seeking enterprises, would eventually serve the greater good of society (Rendtorff, 2021).

Conversely, Freeman's (1984) stakeholder theory, presented in *Strategic Management: A Stakeholder Approach*, broadens the emphasis on corporate responsibility. The assertion is made that enterprises possess ethical responsibilities towards their shareholders and a wider array of stakeholders, encompassing employees, customers, suppliers, lenders, and the community at large. Freeman posited that enterprises ought to harmonize the interests of diverse stakeholders rather than

exclusively prioritizing the interests of shareholders. He asserted that this methodology is more ethically justifiable and may yield superior long-term results for the organization (Freeman et al., 2021).

This difference points to a fundamental shift in how responsibilities are being theorized for firms within societies (Freeman et al., 2021). Friedman's (1970) shareholder view fits the traditional, profit-based notion for corporate purposes. Freeman's 1984 stakeholder theory stands out for a broader and more encompassing approach that also contemplates social dimensions related to different segments across society impacted by what corporations do. This has major implications for corporate governance, strategic decision-making processes and the broader understanding of what success and sustainability are in a corporation.

According to Freeman (1984), the stakeholders that organizations need to consider go beyond financial shareholders to include employees, customers, suppliers, lenders, and communities—essentially, any party that “can affect or is affected” by the activities of an enterprise (p. 46). This encompassing view necessitates balancing potentially divergent interests of various stakeholders in guiding business strategy and operations rather than a narrow concentration on profits alone. Freeman argued that effectively engaging stakeholders by aligning with their needs and priorities can improve organizational performance in the long run.

Core Propositions and Assumptions

The assumptions underlying stakeholder theory include the following (Freeman et al., 2021):

1. Businesses operate within a broader social system encompassing diverse interest groups beyond economic shareholders.
2. Effective stakeholder participation and engagement are vital for organizational success and sustainability.
3. Stakeholder interests have intrinsic value beyond purely instrumental interpretations as a means to an end.
4. Business activities have significant economic and social impacts that must be responsibly managed by acknowledging obligations to various stakeholders.

These assumptions posit that while shareholder interests hold importance, businesses must balance financial objectives with ethical and social responsibilities towards affected groups like employees, customers, suppliers, communities, and ecosystems. This integration of business operations with an awareness of multidimensional impacts forms the crux of stakeholder theory.

Applications in Extant Literature

Stakeholder theory provided a paradigmatic shift from the narrow shareholder primacy view that dominated much of 20th-century management thinking (Freeman & Dmytriiev, 2017). It catalyzed research exploring the ethical dimensions of business-society relations by ascribing intrinsic importance to non-shareholding groups. Scholars underscore the importance of stakeholder inclusion in the implementation of environmentally sustainable practices (Dubey et al., 2019), enabling advantageous application of emerging technologies such as BDA (Breidbach et al., 2019; Van Der Merwe & Achkar, 2022) and enhancing CSR initiatives (Choi & Park, 2022; Sarpong et

al., 2023). Research has indicated that successfully including stakeholders results in favorable individual and organizational outcomes, such as trust, loyalty, and enhanced corporate performance (Boadi et al., 2019; Dekoulou et al., 2023).

Critiques and Evolutionary Path

Stakeholder theory has faced criticisms regarding practical difficulties in reconciling numerous stakeholder demands and determining which groups are real stakeholders (Freeman et al., 2021). The theory has also been criticized for undermining company objectives by diminishing the emphasis placed on shareholder wealth development within the profit maximization framework (Rendtorff, 2021). Moreover, empirical studies that substantiate the theory's assertions can produce inconclusive results (Freeman & Dmytriiev, 2017).

Responding to these concerns, Freeman and Dmytriiev (2017) acknowledged that organizations cannot fulfill every potential stakeholder demand due to intrinsic resource constraints. They argued that businesses should aim to foster opportunities for creating value together. These opportunities involve voluntary managerial initiatives that benefit multiple stakeholders simultaneously without any inherent tradeoffs (Freeman & Dmytriiev, 2017). The scholars asserted that shareholder interests do not intrinsically conflict with other groups if firms adhere to an ethical purpose that aligns with stakeholder welfare. This links with evolving notions of “enlightened shareholder value,” balancing investor returns with social welfare through responsible, transparent, and accountable practices (O’Connell & Ward, 2020, p. 5).

Other scholars have proposed modifications and extensions to stakeholder theory in response to these issues. These include integrating moral agency into stakeholder salience assessments and exploring the role of trust in stakeholder relationships (Freeman et al., 2021).

Stakeholder theory evolves as scholars grapple with the complexities of ethical business conduct (Dmytriiev et al., 2021). Its relevance and applicability in contemporary business contexts remain a subject of debate and inquiry, making it a crucial area for future research. As businesses encounter progressively more complex challenges and stakeholders demand greater accountability, stakeholder theory offers essential insights for reconciling diverse interests and promoting collective welfare. Thus assisting organizations in adeptly managing the expectations of various stakeholders (Calic & Ghasemaghaei, 2021). Consequently, it is an essential framework for comprehending the ethical obligations of corporations in contemporary society.

Relationship With Corporate Social Responsibility

Stakeholder theory provides a supportive foundation for CSR, emphasizing businesses' accountability to society beyond economic performance. Researchers ground studies on CSR practices (Choi & Park, 2022), stakeholder engagement (Sarpong et al., 2023), and corporate sustainability within this framework. Findings confirm CSR's positive impacts on brand reputation, customer loyalty, and financial outcomes when firms acknowledge obligations to varied stakeholders rather than shareholders alone (Boadi et al., 2019; Freeman et al., 2021).

Nevertheless, research cautions against viewing CSR as inferior or incompatible with shareholder interests (Freeman & Dmytriiev, 2017). Scholars have argued that responsible and ethical practices that yield mutual benefits, including employee retention, positive media coverage, and investor trust, may ultimately create value for both shareholders and the organization (Calic & Ghasemaghaei, 2021). This interdependency underlines stakeholder theory's relevance in guiding businesses towards ethical, socially conscious practices encapsulated within holistic CSRP.

The relationship between stakeholder theory and CSR is multifaceted. Freeman et al. (2021) posited that the two concepts are complementary rather than competing frameworks. Stakeholder theory delineates the ethical responsibilities of corporations to various groups, while CSR offers a practical framework for actualizing such obligations via strategic efforts that correspond with stakeholder expectations (Dmytriiev et al., 2021). This integration bolsters corporate legitimacy and promotes sustainable, long-term organizational performance.

Resource-Based View

The RBV of the firm, as formulated by researchers such as Barney (1991), Wernerfelt (1984), Peteraf (1993), and Grant (1991), proposes a unique perspective on strategic management that emphasizes internal abilities as the foundation of competitive advantage. This diverges from the dominant perspectives in strategic management, especially those grounded in the industrial organization (IO) paradigm, which prioritizes external market influences.

Wernerfelt's (1984) seminal exposition of RBV in his paper "A Resource-Based View of the Firm" emphasized the significance of a firm's internal resources as a foundation for strategy. He suggested that both tangible and intangible assets could provide a competitive advantage if they had value, rarity, and were challenging for competitors to replicate or replace. This perspective directly opposed the IO framework's emphasis on industry structure and external market forces as the principal determinants of competitive strategy and firm performance.

Grant (1991) expanded this paradigm by emphasizing integrating a firm's resources and competencies to provide a sustained competitive advantage. He underscored the need to acquire distinctive resources and adeptly employ and integrate them. Barney's (1991) seminal research advanced the RBV by presenting the VRIN framework. The VRIN paradigm asserts that organizational resources must be "valuable, rare, imperfectly imitable, and non-substitutable" to confer a lasting competitive advantage (Barney, 1991, p. 117). Kamboj and Rana (2023) further elucidated how these criteria enhance competitive advantage in contemporary supply chains. As highlighted in the IO framework, this concept redirected attention from external market factors to a firm's internal strengths and shortcomings.

In contrast, the prevailing IO paradigm, shaped by economists such as Michael Porter, was promoted. This framework emphasizes industry structure, competitive forces, and market positioning as the primary determinants of competitive advantage (Porter, 1980). This perspective posits that a firm's performance and strategic decisions are

predominantly influenced by external factors, such as competition, customer demand, and supplier power.

Thus, whereas the IO framework emphasized external market dynamics and positioning, the RBV focused on a firm's distinctive internal resources and capabilities. This viewpoint signified a substantial paradigm shift in strategic management, emphasizing the significance of internal strengths, resource acquisition, and capability development in attaining and maintaining competitive advantage. RBV's focus on internal resources as the principal source of competitive advantage indicates that firms within the same industry might thrive through distinct strategies derived from their distinctive resource endowments. Hence, RBV contests the uniform approach championed by the IO framework.

Barney's (1991) RBV model proposed that resources must meet four empirical indicators of strategic value—valuable, rare, imperfectly imitable, and non-substitutable (VRIN criteria)—to facilitate enduring competitive advantages. Resources that meet these VRIN criteria can withstand replication by competitors, thus promoting differentiation and enhanced financial performance. RBV emphasizes a firm's distinct internal resource configurations, offering a novel perspective that contests IO models centered on external market positioning (Barney, 1991; McGahan, 2021).

Core Propositions and Assumptions

The RBV paradigm rests on the following theoretical propositions (Barney, 1991):

1. Firms possess a heterogeneous distribution of strategic resources due to intrinsic firm-level differences and resource-access barriers.
2. Resource heterogeneity can be lasting if underpinned by limits to resource mobility across firms.
3. Resources must fulfill VRIN criteria to differentiate firms and drive competitive advantages unaffected by competitor imitation.
4. VRIN resources can generate economic rents or above-normal returns since they resist rivals' duplication.

These conceptual foundations signal RBV's emphasis on intangible, socially complex resources and capabilities embedded in the fabric of organizations, which competitors struggle to replicate. By black-boxing the firm to study rare organizational competencies, knowledge stocks, and managerial capacities resisting straightforward acquisition, RBV provided potent analytical constructs influencing management strategy research and practice.

Extension Into Knowledge-Based and Dynamic Capabilities Views

Scholars have acknowledged that knowledge and capabilities are crucial strategic assets for modern enterprises, resulting in heightened attention to logical extensions of the resource-based perspective, particularly the knowledge-based view (KBV). This approach analyzes knowledge stocks, technical expertise, and innovation capacity as essential components for ongoing value creation and the maintenance of temporary competitive advantages in dynamic markets (Hermes et al., 2019; Mikalef et al., 2020; Ritala et al., 2021). RBV and KBV recognize that assets' uniqueness, durability, and

replicability challenges are critical determinants of competitive advantage (Elayan et al., 2022; Khan et al., 2018; Varadarajan, 2023). KBV emphasizes the importance of intangibles, such as human capital, know-how, learning routines, and absorptive capacities, particularly those that are difficult to replicate or distribute among organizations (Asiaei et al., 2023). From the perspective of KBV, it is essential for companies to modify their culture to seize opportunities and respond to market changes, thereby promoting a culture centered on knowledge and ongoing learning.

Unlike RBV's focus on static resource endowments, the dynamic capabilities view (DCV) highlights how organizations can develop and transform resources over time as key sources of sustainable competitive advantage (Teece, 2007, 2018; Teece et al., 1997). DCV argues that firms with superior dynamic capabilities in sensing, seizing, and reconfiguring resources can out-innovate competitors consistently. This stream also conceptualizes knowledge-intensive assets like technological capabilities, product innovation systems, and processes as determinants of strategic flexibility, market adaptation, and fit (Salunke et al., 2019). DCV highlights the role of strategic intent, routines, processes, and competencies as critical drivers of sustained competitive advantage in dynamic environments (AlShehhi et al., 2023; Capurro et al., 2021; Horng et al., 2022).

The impact of RBV on management strategy research and practice is evident through its extensions into associated theoretical frameworks such as KBV and DCV. These streams collectively recognize the significance of internal resources and capabilities in attaining and maintaining competitive advantage, emphasizing the

necessity for firms to invest in cultivating unique resources and adeptly utilizing them in a dynamic business landscape (Alyahya et al., 2023; McGahan, 2021). The RBV paradigm is an essential instrument for strategic analysis, directing companies to develop and sustain a robust resource foundation that fosters long-term success (Alyahya et al., 2023). Consequently, managers must acknowledge the importance of acquiring distinctive and valuable resources, improving their competencies, and adjusting to evolving market conditions to maintain a competitive advantage.

Notwithstanding subtleties, these enhancements preserve the core of RBV about the diverse skills of firms developed over time, which rivals find difficult to imitate. In the current hypercompetitive landscape, firms must continually invest in developing unique resources and capabilities to sustain their competitive edge (Khan et al., 2018). This position requires a deep understanding of internal strengths, limitations, and external market dynamics to effectively leverage resources and develop dynamic capabilities for enduring success (Kabeyi, 2019). The RBV paradigm is a relevant and influential framework in strategic management, providing essential insights into how organizations can achieve and maintain a competitive advantage in today's dynamic business environment.

Applications in Extant Literature

RBV is widely applicable for examining how firms utilize unique, difficult-to-replicate resources to achieve business excellence, owing to its intuitive nature and analytical flexibility. Researchers have utilized the RBV for multilevel analyses across functions, industries, and nations to assess the relationships between valued

organizational capabilities and enhanced performance. Research such as Ozdemir et al. (2023) emphasized that utilizing big data capabilities as a strategic asset allows companies to achieve a competitive edge, particularly when data-driven insights are employed in innovation management and product creation.

Similarly, Akhtar et al. (2019) demonstrated the influence of big data on improving business performance across several sectors. Horng et al. (2022) illustrated applying dynamic capabilities through big data to enhance competitive advantage in the hospitality industry. Munir et al. (2022) examined the impact of BDA on improving innovation performance in the pharmaceutical sector. The actual application of RBV involves numerous strategic concerns, such as mergers and acquisitions, organizational expansion, competitive dynamics, innovation management, alliances and collaborations, internationalization, diversification, human resource management, and sustainability reporting.

Kamboj and Rana (2023) employed RBV to examine the influence of big data-driven supply networks on corporate sustainable performance, with supply chain performance as the mediating variable. Their research proves the RBV's relevance in analyzing how businesses might leverage their distinctive resources and skills to attain sustained success. Likewise, research has utilized RBV to examine the influence of dynamic capacities on organizational performance (Zahra et al., 2022), highlighting the enduring significance of RBV in modern strategic management scholarship. Ozdemir et al. (2023) broadened the relevance of the RBV by integrating stakeholder theory to

investigate how engagement with various stakeholders might yield distinct innovations and beneficial results for a corporation.

Recently, RBV has been investigated concerning digitalization and technology-driven capabilities, with research analyzing how organizations can effectively leverage their knowledge and skills to adopt and utilize emerging technologies for competitive advantage (Lin & Lin, 2023; Shahadat et al., 2023). These applications illustrate the ongoing significance and flexibility of RBV in comprehending and evaluating critical strategic challenges in the swiftly evolving corporate environment of today.

Critiques and Responses

Although highly influential, RBV has faced valid criticisms. Academics have challenged its premise of resource immutability and its focus on maximizing shareholder value without regard for societal wellbeing. Critics have frequently highlighted a propensity to claim that every prosperous company exhibited unique competencies, whereas struggling companies appeared to lack these distinguishing attributes (Bansal & DesJardine, 2014; Pirson, 2019). The emphasis on monopolistic market domination contradicted the principles of creative destruction that support innovation (Griffith & Van Reenen, 2021). Furthermore, RBV has been criticized for its excessive focus on internal issues, overlooking the influence of external elements like industry dynamics and market forces on business performance (Dembek et al., 2018).

Pirson (2019) argued that the traditional economic focus, including RBV, neglected to incorporate essential humanistic elements such as dignity and social wellbeing. By neglecting these dimensions, RBV risked reducing human actors to mere

instruments of resource optimization rather than acknowledging their intrinsic value. This omission created a gap in management theory, which should have instead emphasized ethical resource stewardship and stakeholder well-being alongside economic performance.

In response to these critiques, scholars proposed extensions and modifications to the RBV framework. Barney (2018) expanded the original VRIN framework by integrating a stakeholder perspective, arguing that a firm's unique resources must provide economic benefits while aligning with ethical practices prioritizing stakeholder welfare.

The integration of RBV and stakeholder theory illustrates the evolving role of CSR in resource management, emphasizing the necessity for companies to reconcile financial returns with social accountability. This viewpoint recognized that organizations frequently required access to essential resources from diverse internal and external stakeholders to achieve economic benefits. Barney's (2018) research emphasized that resources cultivated through firm-specific investments can attain value and uniqueness, enhancing a firm's competitive edge.

A further response to RBV's critiques was incorporating institutional theory, emphasizing the significance of external factors, like organizational culture, norms, and values, in influencing business behavior and performance (Dembek et al., 2018). The extensions and adjustments further augmented the applicability and relevance of the RBV in strategic management research.

RBV theorists recognized these constraints concerning change integration and ethical considerations (McGahan, 2021). Recent studies, like Freeman et al. (2021), have

included stakeholder theory to rectify the deficiencies of RBV, resulting in a more comprehensive and socially aware framework for strategic management. This integration addressed issues by explicitly including stakeholders in capability development and value allocation, facilitating thorough and ethical resource orchestration.

Relevance to Corporate Social Responsibility and Performance

Scholars increasingly acknowledge that responsible resource management reconciles various stakeholder requirements and is essential for sustainable success (Barney, 2018; Freeman et al., 2021; McGahan, 2021). Empirical evidence indicated that both resource-rich and resource-limited enterprises could adopt CSR strategies that emphasize multistakeholder well-being rather than short-term profit maximization (Shakil et al., 2019). Furthermore, sophisticated analytical methods facilitated the nuanced understanding of stakeholder perceptions, informing data-driven adjustments to company offers and procedures for enhanced capability development (Mikalef et al., 2021). Choi and Park (2022) revealed that companies possessing robust BDA capabilities improved their CSRP, especially regarding environmental impact and corporate governance. This highlighted the increasing synergy between RBV's emphasis on strategic resources and the broader, multidimensional performance goals encompassed within contemporary CSR initiatives.

Furthermore, RBV offered a versatile analytical framework to examine how ESG practices could translate into competitive advantages.

Research conducted by Chatterjee et al. (2022) and Choi and Park (2022) utilized RBV to investigate the utilization of sustainability-oriented resources and capabilities for

sustainable success. Other studies examined the impact of aligning employee human capital with the firm strategy on sustainability performance (Tran & Adomako, 2020). The increasing body of literature utilizing RBV underscores its ongoing importance in understanding how organizations can strategically manage resources to achieve financial success while positively influencing societal well-being (Calic & Ghasemaghaei, 2021).

Corporate Social Responsibility

CSR has evolved into a critical strategic issue for organizations, moving beyond peripheral philanthropy to initiatives closely aligned with core business capabilities (Choi & Park, 2022; Mariani et al., 2021). In the banking sector, CSR adoption has shifted from merely managing reputational risks to embracing competitive initiatives (Amoako et al., 2021; Deigh & Farquhar, 2021; Nyarku & Hinson, 2018). Given this shift, evaluating the outcomes of bank CSR efforts using multidimensional indicators—encompassing economic, ethical-legal, and philanthropic dimensions—has become essential.

CSR encompasses voluntary actions by organizations aimed at generating social benefits and mitigating negative impacts alongside their core operations (Brin & Nehme, 2019; Carroll, 1991). It extends beyond legal obligations, reflecting businesses' responsibility to the societies in which they operate (Carroll, 1991). CSR builds upon stakeholder theory by emphasizing corporate citizenship and ethical responsibilities, creating value for stakeholders beyond shareholders (Dmytriiev et al., 2021). Initially studied primarily in Western and manufacturing contexts, CSR has evolved from its philanthropic roots into a strategic priority that significantly influences organizational performance (Mariani et al., 2021).

Conceptual Models of Corporate Social Responsibility

Various conceptual frameworks characterize CSR grounded in dimensions like economic, legal, ethical, and discretionary responsibilities (Carroll, 1991), and internal/external orientations (Andersson et al., 2022). Carroll's (1991) multidimensional model is extensively applied in assessing CSR, encompassing:

1. Economic duties: Being profitable through efficient provision of goods/services.
2. Legal duties: Complying with laws and regulations.
3. Ethical duties: Doing what is morally right; avoiding harm.
4. Discretionary duties: Voluntary philanthropy and community engagement.

Later, scholars combined legal and ethical aspects into a single "ethical-legal" dimension, recognizing their conceptual convergence (Salmones et al., 2005, p. 375). This three-pronged taxonomy operationalizes CSRP through economic, ethical-legal, and philanthropic dimensions.

Elkington's (1997) triple-bottom-line paradigm classifies CSR impact into economic, environmental, and social dimensions. This approach highlights business sustainability and responsiveness to social (people), environmental (planet), and economic (earnings) dimensions (Andersson et al., 2022; Brin & Nehme, 2019). Although it intersects with Carroll's (1991) model, which encompasses economic, legal, ethical, and philanthropic duties, Elkington's (1997) model has become more prominent, especially in sustainability reporting research.

Despite the availability of various CSR frameworks, Carroll's (1991) four-part model, along with adaptations such as Salmons et al.'s (2005) three dimensions, remains influential in delineating CSR components. These dimensions provide measurable categories for evaluating economic, ethical-legal, and philanthropic CSR.

Bank Corporate Social Responsibility

In the banking industry, CSR frequently manifests as a technique for managing reputational risk during crises rather than as a fundamental transformation initiative (Amoako et al., 2021). CSR has transitioned from a marketing instrument to a fundamental governance concern, aligning with banks' main skills to provide legitimacy and competitive advantage rather than concentrating on ancillary philanthropic endeavors (Nyarku & Hinson, 2018; Sarpong et al., 2023). Banks are adopting extensive CSR policies, encompassing integrated reporting frameworks and performance metrics focusing on sustainable lending, financial inclusion, responsible investments, climate risk management, workforce diversity, and community development (Deigh & Farquhar, 2021).

Empirical Outcomes of Bank CSR

The impact of CSR in banking reflects both stakeholder and shareholder priorities. Social outcomes include community contributions, mitigation of environmental impacts, consumer protection, employee satisfaction, ethical governance, and responsible supply chains (Boadi et al., 2019). On the business side, CSR initiatives influence efficiency, profitability, innovation, risk management, and investor confidence (Chatterjee et al., 2022). However, the effects of CSR on performance vary based on

measurement approaches, geographical context, and timeframes (Crişan-Mitra et al., 2020; Fisher, 2021; Ilseven & Puranam, 2021). For example, Asiedu et al. (2020) demonstrated that CSR practices in Ghanaian banks enhance customer loyalty, promote word-of-mouth recommendations, and positively impact financial performance. This underscores the importance of multidimensional indicators—such as economic, ethical-legal, and philanthropic metrics—over narrower performance measures.

Innovative techniques like BDA can improve the evaluation and reporting of CSR impacts, providing more thorough insights to bolster bank CSR activities and their results. Choi and Park (2022) underscored the significance of BDA capabilities in enhancing CSRP. In contrast, Calic and Ghasemaghaei (2021) illustrated how big data can foster societal advantages via innovation, reinforcing CSR initiatives.

Scholarly research underscores the strategic transition in CSR implementation within the banking sector. Sarpong et al. (2023) extensively analyzed conceptual CSR models, highlighting Carroll's (1991) multidimensional framework that assesses CSRP across economic, legal, ethical, and philanthropic dimensions. Nyarku and Hinson (2018) noted that contemporary banking practices integrate CSR with banks' fundamental competencies, indicating a transition of CSR into a strategic governance imperative. This transformation indicates a shift from viewing CSR as a marginal marketing instrument to its incorporation as a fundamental element of company strategy focused on enhancing legitimacy and competitive advantage.

Moreover, Chatterjee et al. (2022) examined quantifiable results across social performance indicators, including community development and commercial metrics such

as profitability, innovation, and risk management. Their findings indicate that the influence of CSR differs by context, underscoring the necessity for additional research employing multidimensional performance metrics to guide policy and practice. The literature collectively outlines the progression of CSR strategy in the banking industry, highlighting the importance of shared value creation and the necessity for thorough assessment of economic, ethical-legal, and charitable results.

Big Data Analytics

Recent studies define BDA as a collection of techniques and tools for analyzing vast, complex, multistructured data to facilitate corporate decision-making processes (Akhtar et al., 2019; Otchere et al., 2021). BDA constitutes a significant asset defined by its high “volume, velocity, variety, veracity, and value” (Edu, 2022, p. 572), which, when effectively utilized, can markedly improve organizational processes, provide competitive advantages, and generate new opportunities (Calic & Ghasemaghahi, 2021; Otchere et al., 2022). The principal advantage of BDA is its capacity to produce actionable insights that enable firms to enhance their operations and capitalize on new opportunities (Olabode et al., 2022).

Conceptual Models of Big Data Analytics

The framework of BDA delineates essential competencies, including data acquisition, storage, analysis, visualization, and the utilization of sophisticated machine-learning methodologies (Akter et al., 2016; Mikalef et al., 2020). These competencies allow firms to identify market possibilities, allocate resources, and adjust their strategies to get improved results based on data-driven insights (Mikalef et al., 2021). Research

indicates that BDA is progressively infiltrating several company activities, including risk management, product development, and marketing, signifying a shift toward data-driven corporate cultures (Calic & Ghasemaghahi, 2021; Li et al., 2022). Nonetheless, despite increasing use, numerous organizations continue to depend on fundamental querying instead of utilizing sophisticated modeling strategies (Hung et al., 2020; Shakya & Smys, 2021).

A growing body of research stresses the need to develop multidimensional measures to assess BDA capabilities within organizations (Bertello et al., 2020; Ghasemaghahi, 2019). This assessment involves evaluating factors such as data management infrastructure, personnel skills, and specific analytic techniques like predictive modeling and real-time analytics. These measures include perceived ICT use (Yunis et al., 2018), which focuses on infrastructure and employee capability, and big data utilization measures (Calic & Ghasemaghahi, 2021), which evaluate infrastructure, employee skills, and data properties. Other important frameworks, such as BDA capability (Gupta & George, 2016), gauge managerial and technical skills, while BDA adoption measures assess the use of advanced tools like Hadoop, in-memory analytics, and machine learning (ML; Sabharwal & Miah, 2021). Testing these models empirically is critical for benchmarking BDA maturity across various industries.

This study adopts the ICT use instrument from Yunis et al. (2018) to assess BDAU. The instrument conceptualizes and measures the extent of big data use and associated analytics techniques within organizations, focusing on data infrastructure, human skill sets, and integration across business functions. Prior research has highlighted

that perceived usage indicates an organization's maturity in leveraging BDA to improve decision-making and overall performance (Ghasemaghaei & Calic, 2019). Usage levels indicate how deeply BDA has permeated an organization, and the application of this instrument in studies like Li et al. (2022) demonstrates its effectiveness in evaluating BDA's influence on decision-making capabilities. Its focus on multidimensional usage makes it highly relevant for investigating BDA's links to organizational performance outcomes.

Bank Big Data Analytics

BDA enables banks to enhance customer intelligence, improve risk management, detect fraud, optimize trading analytics, and provide personalized product recommendations and targeted marketing (He et al., 2022; Li et al., 2022). Additionally, BDA facilitates improvements in credit underwriting, anti-money laundering (AML) monitoring, and process automation by combining internal and external data sources (Singarimum et al., 2022). However, fragmented data infrastructure, skills gaps, inadequate data governance, and leadership constraints often limit the scope of BDA adoption (Firempong-Boakye & Navarra, 2023; Yunis et al., 2018). The positive outcomes of BDA in banks are contingent on bank-specific resource alignments, as explained by the RBV, which elucidates enduring capability asymmetries between firms (He et al., 2022; Mikalef et al., 2020).

Research indicates that while BDA adoption is growing, its implementation among banks and financial institutions is expansive yet uneven. Surveys have shown that analytics are deployed for risk management, fraud detection, customer segmentation,

marketing campaign optimization, trading strategies, and regulatory compliance (Chatterjee et al., 2022; Li et al., 2022; Mikalef et al., 2020). However, the degree of complexity in analytics usage varies, with predictive modeling and ML techniques growing, while basic querying, reporting, and visualization remain prevalent in many contexts (Hung et al., 2020; Shakya & Smys, 2021). The emergence of fintech ecosystems, driven by BDA innovations, highlights the increasing reliance of 21st-century banking on data-driven insights and real-time analytics (Chatterjee et al., 2022).

Empirical Outcomes of Bank BDA

While the potential for BDA remains high, empirical evidence presents a mixed picture regarding its performance impacts in banking. Qualitative assessments reveal that analytics are still largely restricted to descriptive reporting in many institutions, with opportunities for advanced decision support remaining underutilized (Firempong-Boakye & Navarra, 2023). Survey data and financial analyses occasionally uncover positive links between BDA initiatives and efficiency, productivity, and revenue growth among adopters. However, negative or non-significant relationships have also emerged (Li et al., 2022; Nasrollahi et al., 2021). Scholars suggest that the variation in outcomes is explained by factors such as bank-specific contexts, data infrastructure maturity, talent availability, and managerial capabilities, all of which significantly influence the successful implementation of BDA (He et al., 2022; Mikalef et al., 2021).

Recent evaluations indicate that BDA adoption in banking has led to variable performance impacts, often dependent on context. In many developing countries, current usage is confined to basic reporting; however, there remains significant potential for

more advanced applications (Firempong-Boakye & Navarra, 2023). Among early adopters, evidence is mixed: in some cases, BDA initiatives have enhanced efficiency and increased revenues (Li et al., 2022; Yunis et al., 2018), while in others, the absence of supportive data infrastructure or managerial capabilities has constrained effectiveness (Nasrollahi et al., 2021). These studies emphasize the critical role of bank-specific factors, talent availability, and institutional dynamics in determining BDA's success in improving processes, risk management, and performance across various settings (He et al., 2022; Mikalef et al., 2021). As investments in infrastructure and human capital grow, the links between BDA and positive performance outcomes may strengthen further (Appiahene et al., 2019; Edu, 2022; Ekeocha et al., 2021). However, managerial vision and the ability to translate analytics into effective decision support remain key moderators of successful adoption (Mikalef et al., 2021).

Corporate Social Responsibility Performance

CSRP denotes the degree to which companies meet their ethical, legal, economic, and philanthropic obligations to stakeholders, including social, environmental, and economic dimensions (Carroll, 1991; Elkington, 1997; Salmones et al., 2005). Carroll's (1991) CSR pyramid methodically classifies the primary realms of CSR responsibilities into economic, legal, ethical, and philanthropic categories. Elkington's (1997) triple-bottom-line model emphasizes strategic approaches related to social, environmental, and economic performance pillars. Salmones et al. (2005) developed a multidimensional model that offers a quantitative method for assessing CSR effectiveness across many dimensions, grounded in stakeholder views.

The CSR pyramid emphasizes the congruence between corporate goals and societal objectives (Carroll, 1979, 1991). It underscores corporate citizenship as a mutual obligation between businesses and the communities they serve (Rendtorff, 2021). Elkington's (1997) model, heavily influenced by stakeholder theory, necessitates that organizations harmonize the interests of various stakeholders—economic, social, and environmental—while accounting for future generations (Brin & Nehme, 2019). Salmones et al. (2005) explicitly utilize stakeholder theory to assess CSRP by examining enterprises' fulfillment of their perceived obligations to both internal and external stakeholders (Beldad et al., 2019; Dekoulou et al., 2023).

While Carroll's (1991) pyramid and Elkington's (1997) triple bottom line model offer valuable conceptual frameworks, Salmones et al.'s (2005) approach advances the field by enabling a more rigorous, multidimensional assessment of how well companies fulfill their economic, ethical, legal, and philanthropic responsibilities based on stakeholder perceptions. This multidimensional approach provides a more detailed analysis of CSRP, capturing the complexity of corporate responsibility across different domains.

Economic Performance

The economic performance aspect of CSR encompasses a company's obligation to achieve productivity and profitability and sustain robust financial returns (Carroll, 1991; Elkington, 1997; Salmones et al., 2005). Companies must deliver equitable returns on investments to shareholders, guarantee fair compensation for employees, manufacture excellent consumer goods at competitive prices, and remit taxes to facilitate socio-

economic development (Brin & Nehme, 2019; Carroll, 1991). Salmones et al. (2005) evaluate economic CSR in relation to product quality, pricing, financial reporting transparency, legal compliance, and employee remuneration. These responsibilities embody Elkington's (1997) profits-pillar of the triple bottom line, highlighting efficiency, competitiveness, wealth generation, and social and environmental responsibility. Across these frameworks, the shared emphasis remains on firms' core economic responsibilities towards shareholders and societal stakeholders (Calic & Ghasemaghaei, 2021; Wang et al., 2020). Salmones et al.'s (2005) model specifically measures stakeholder perceptions of corporate fulfillment of these economic responsibilities.

Prior studies, such as Calic and Ghasemaghaei's (2021) and Li et al.'s (2022), have investigated the impact of BDA on company practices and economic responsibilities. Calic and Ghasemaghaei (2021) found that the application of big data improves enterprises' financial performance by reducing costs, increasing revenues, and enabling the development of data-driven products that create new value streams. Li et al. (2022) demonstrated that the augmented usage of BDA improves decision-making about resource allocation and cost optimization, enhancing enterprises' ability to meet wages, investor returns, and consumer value promises.

Collectively, these studies demonstrate that advanced data analytics bolsters corporate initiatives to sustain growth, uphold fiscal discipline, and ensure equitable value distribution among stakeholders, all of which are essential elements of responsible governance in meeting economic obligations (Shakil et al., 2019; Wang et al., 2020). Quantitatively assessing stakeholder perceptions allows for a deeper understanding of

whether emerging data innovations help or hinder corporate performance in the economic dimension, benefiting shareholders, employees, and broader national prosperity (Öberseder et al., 2013).

Ethical-Legal Performance

Legal responsibilities in CSR involve a company's obligation to comply with laws and regulations concerning sectoral standards, labor codes, and transparency requirements set by governmental and regulatory authorities (Brin & Nehme, 2019; Carroll, 1991). Salmones et al. (2005) integrated legal and ethical factors in their scale, including adherence to fair competition policies, truthful advertising, consumer rights protection, and information transparency. These responsibilities align with Elkington's (1997) "people/social" pillar of the triple bottom line, which encompasses human rights, labor standards, and justice concerns, as further discussed by Andersson et al. (2022) and Brin and Nehme (2019). Carroll's (1991) pyramid also emphasizes avoiding societal harm, respecting moral rights, and adhering to value systems, highlighting the importance of ethical conduct. The combined ethical-legal dimension thus assesses stakeholder perceptions of corporate behavior concerning established legal frameworks, ethical customs, and moral obligations (Brin & Nehme, 2019). Salmones et al.'s (2005) stakeholder-based scale addresses the limitations of corporate self-evaluations, which are often subject to biases, thereby helping to mitigate "greenwashing" concerns and making ratings more objective (Liu et al., 2023).

Research has suggested that BDA can enhance corporate leadership's sensitivity to ethical business practices, transparency, and adherence to legal obligations. Choi and

Park (2022) found that organizations with strong BDA capabilities are more proactive in stakeholder engagement, which positively influences ethical practices and transparency—key aspects of legal-ethical responsibilities. This implies that data-driven insights can help leadership align with values-based duties.

Further, Kusi-Sarpong et al. (2021) demonstrated that integrating BDA can enhance organizational capabilities for socially responsible governance, particularly in vendor selection and supply chain accountability. These studies underscore how BDA adoption can shift corporate culture and governance structures toward fulfilling legal and ethical responsibilities (Sabharwal & Miah, 2021; Su et al., 2021). Quantitative investigations into stakeholder perceptions can thus help assess whether emerging data innovations facilitate or hinder corporate social performance in legal-ethical dimensions, including values congruence, community impact ownership, and proactive compliance with policies.

Philanthropic Performance

Philanthropic CSR represents a company's voluntary efforts to support charitable, educational, and environmental causes, contributing positively to the community beyond its business operations (Brin & Nehme, 2019; Carroll, 1991). Elkington's (1997) "planet/environmental" pillar emphasizes ecological stewardship and sustainability, which aligns with corporate philanthropy's focus on community and environmental support. Salmones et al. (2005) further assessed corporate philanthropy by measuring stakeholders' perceptions across dimensions like charitable donations, event sponsorships, and employee volunteerism. These activities exceed basic economic and

legal expectations, aiming to foster broader societal welfare (Sarpong et al., 2023; Zayyad et al., 2020). The strength of Salmones et al.'s (2005) approach lies in its ability to capture multistakeholder perceptions, moving beyond corporate self-reported disclosures.

Research has indicated that leveraging data-driven insights on societal needs and interests can enhance strategic corporate citizenship initiatives aimed at fulfilling philanthropic responsibilities. Sarpong et al. (2023) found that digitizing ESG practices positively impacts brand equity and financial performance, particularly in rural banks, through stakeholder engagement and loyalty. This suggests that identifying key impact areas can help design outreach initiatives aligning with community expectations. However, Deigh and Farquhar (2021) revealed that commercial banks often involve minimal stakeholder consultation in their philanthropic activities, highlighting a need for greater data-enabled co-creation to address societal needs more effectively. Studies suggest that the use of big data in directing corporate citizenship initiatives is contingent upon integrating stakeholder participation to maximize the effectiveness of philanthropic efforts aimed at community enrichment (Akbari & McClelland, 2020; Kruggel et al., 2020; Van Der Merwe & Achkar, 2022).

Measuring Corporate Social Responsibility Performance

Multiple frameworks have been established for conceptualizing and assessing CSR, including the seminal works of Carroll (1991), Elkington (1997), and Salmones et al. (2005). Carroll's (1991) CSR pyramid delineates four key domains of CSR—economic, ethical, legal, and philanthropic responsibilities—that businesses have toward

society. Elkington's (1997) triple bottom line model highlights three pillars of CSR performance focusing on social, environmental, and economic dimensions that companies should balance for holistic value creation. Lastly, Salmones et al. (2005) provide a multidimensional CSR scale that evaluates stakeholder perceptions around corporate behaviors in meeting expectations across relevant CSR domains.

Carroll's (1991), Elkington's (1997), and Salmones et al.'s (2005) models all recognize the multidimensionality of CSR, spanning economic obligations and voluntary eco-social contributions made by companies as good corporate citizens (Adamska & Dąbrowski, 2021; Kuokkanen & Sun, 2019; Rendtorff, 2021). However, only Salmones et al.'s (2005) scale operationalizes the quantitative measurement of CSRP. While Carroll (1991) focuses on classifying CSR domains, Elkington (1997) emphasizes balancing pillars for value creation, and Salmones et al. (2005) assess the perceived fulfillment of responsibilities from a stakeholder viewpoint.

By enabling statistical analysis of the perceived alignment between corporate behaviors and economic/eco-social expectations, Salmones et al.'s (2005) stakeholder-based model offers advantages for quantitative CSRP evaluations (Cillo et al., 2020). Furthermore, this scale has been applied to assess the impacts of information systems and BDA on corporate social performance (Calic & Ghasemaghaei, 2021; Li et al., 2022). Combined with parsimonious multidimensional factors and a strong theoretical foundation from Carroll's (1991) framework, Salmones et al.'s (2005) measurement scale is appropriate for quantitative CSR assessment, especially in the context of advanced data analytics (Du et al., 2022).

Salmones et al.'s (2005) model was chosen for this study due to its strong theoretical grounding, stakeholder-based approach, and multidimensional structure. These features make it particularly suitable for assessing CSRP in advanced data analytics, allowing for a comprehensive and nuanced evaluation of how well banks fulfill their economic, ethical-legal, and philanthropic responsibilities. Additionally, the model's focus on stakeholder perceptions mitigates potential biases associated with corporate self-evaluations, ensuring a more objective assessment of CSRP.

Big Data Analytics Use

BDAU denotes the utilization of sophisticated computational methods and technology to extract significant insights from extensive, intricate data sets (Mikalef et al., 2019). Instead of depending exclusively on traditional business intelligence derived from structured internal data, BDA employs vast quantities of unstructured data from many internal and external sources (Ghasemaghaei, 2019). BDA facilitates advanced quantitative analysis, predictive modeling, data mining, ML, and additional techniques to reveal concealed patterns and derive significant insights to enhance company strategy and decision-making (Calic & Ghasemaghaei, 2021).

The RBV posits that leveraging rare, specialized, and difficult-to-imitate organizational resources can confer sustained competitive advantages (Barney, 1991). BDA is an inimitable resource providing differential value (Mikalef et al., 2021). RBV scholars have used dynamic capabilities and evolutionary fitness perspectives to position BDA capabilities as bundles of specialized talent and technologies that enhance sensing,

seizing, and reconfiguring abilities, thereby influencing performance (Mikalef et al., 2019, 2020). This perspective underscores analytics capability as an impactful resource.

Leveraging BDA for the economic facets of CSR entails employing predictive insights to inform pricing strategies, optimize expenditures and investments, and improve various financial results (Hung et al., 2020). Nasrollahi et al. (2021) discovered that technological, managerial, and environmental big data capabilities favorably impacted the economic performance of SMEs in Iran. However, as the study relied on subjective measures and a narrow context, further research using objective financial metrics could clarify economic impacts within other settings like banking (Nasrollahi et al., 2021). While BDA demonstrates the potential to strengthen the economic dimensions of corporate social performance, additional empirical evidence across contexts is warranted (Calic & Ghasemaghaei, 2021).

Emerging studies emphasize rising concerns related to privacy, transparency, and algorithmic bias when businesses use advanced analytical approaches (Breibach et al., 2019; Cillo et al., 2020). Mikalef et al. (2021) contended that tackling these ethical difficulties requires robust data governance systems in conjunction with ongoing engagement between companies and stakeholders. However, limited research has examined concrete actions firms might implement to enhance the ethical and legal dimensions of CSR programs. This topic constitutes a critical domain for additional investigation.

Concerning philanthropic initiatives, big data methods could uncover localized insights about societal needs, optimizing relief efforts during crises (Calic &

Ghasemaghaei, 2021; Zhang et al., 2022). Still, there is limited research on deploying predictive analytics and ML specifically for corporate giving programs to maximize social impacts. Additional studies should address this gap by empirically examining how data-driven approaches could systematically guide corporate philanthropy.

Despite BDA's potential to improve CSR, substantial research gaps on its usage on economic, ethical-legal, and philanthropic performance persist (Calic & Ghasemaghaei, 2021; Du et al., 2022; Wang et al., 2020). This study sought to fill gaps in the underresearched Ghanaian banking sector by examining the relationships between BDA utilization and various CSR outcomes. The findings may offer banks practical recommendations for leveraging analytics to gain a competitive edge through enhanced economic, legal, and philanthropic social performance.

Measuring Big Data Analytics Use

Big data utilization (Calic & Ghasemaghaei, 2021), BDA capabilities (Mikalef et al., 2021), and BDAU (Li et al., 2022) represent related but distinct concepts in understanding organizations' application of large datasets. Specifically, big data utilization refers broadly to the extent to which firms collect, store, manage, and leverage large volumes of data—often unstructured—across business functions to enhance processes, decisions, and performance (Calic & Ghasemaghaei, 2021; Shabbir & Gardezi, 2020). In contrast, BDA capabilities denote an organization's combined managerial, technical, and talent capacities to adopt and implement analytical tools and techniques (Gupta & George, 2016; Mikalef et al., 2021).

As the key independent variable in this study, BDAU captured the breadth and depth of an organization's actual application of analytical methods to extract insights from big datasets that inform business outcomes (Li et al., 2022; Lutfi et al., 2022). Compared to big data utilization, BDAU has a narrower focus on realizing value through advanced analytics rather than data management. Moreover, unlike capabilities, BDAU represents proven application rather than potential (Li et al., 2022). Assessing actual system use provides a proximate measure for determining big data's impacts on banks' CSRP.

In examining BDA measures, Yunis et al.'s (2018) eight-item measure emphasizes usage behaviors related to information and communication technologies. Li et al. (2022) adapted it as a four-item measure of technology-enabled BDAU on a 5-point scale. In contrast, Ghasemaghahi's (2019) eight-item measure is more application-focused, assessing data-driven decision-making and information sharing. Mikalef et al. (2021) used an abbreviated version of Gupta and George's (2016) original 11-item measure encompassing managerial, technical, and talent capabilities. Finally, Lutfi et al. (2022) proposed a six-item multidimensional measure spanning usage behavior, management support, external expertise, and technology facilitation.

Considering the focus on exploring the link between BDAU and CSRP in Ghanaian banks, Yunis et al.'s (2018) scale provides a validated, streamlined assessment of actual system usage behaviors. Unlike Lutfi et al.'s (2022) broader measure or Gupta and George's (2016) composite capabilities construct, it directly gauges usage rather than adoption or capabilities. Further, it captures the execution of analytical techniques, unlike

Ghasemaghaei's (2019) utilization scale, which emphasizes decision-making. Following Li et al. (2022), this measure can be adapted to the banking context to assess the breadth and depth of BDAU and its role in extracting insights that influence bank outcomes, including CSRP.

Summary and Conclusions

The literature review on BDA and CSRP in the banking sector uncovers significant gaps in understanding the convergence of these two concepts. While some studies have examined BDA in banking operations, there is a paucity of studies precisely evaluating its impact on various dimensions of CSRP, especially in emerging regions like sub-Saharan Africa. Specifically, there is little comprehension of how BDAU might enhance CSRP's ethical, legal, and philanthropic dimensions within the Ghanaian banking sector. Furthermore, there is a lack of research examining the potential trade-offs and synergies that may emerge from integrating BDA into CSR programs in underrepresented countries such as sub-Saharan Africa.

This study examined the correlation between BDA and CSRP within the underrepresented setting of the Ghanaian banking sector. This study employed twin theoretical frameworks of stakeholder theory and RBV to examine the statistical significance of the relationship between CSRP and three dimensions: economic, ethical-legal, and philanthropic. This action aids in bridging the knowledge gap on using BDA to enhance CSRP in emerging regions while illuminating possible trade-offs and synergies.

The following chapter details the methods used in this study, including data collection and analysis procedures. This study sought to enhance comprehension of the

role of BDA in boosting CSRP within the banking sector by answering significant research questions and filling gaps in the existing literature. This research has substantial implications for theoretical and practical perspectives, providing opportunities for future studies to enhance and broaden our comprehension of the crucial junction between technology and CSR. Ultimately, this study promotes a more informed and socially responsible approach to big data adoption in the banking industry, benefiting financial performance and societal well-being.

Chapter 3: Research Method

This non-experimental correlational quantitative study examined the relationship between BDAU and CSRP regarding Ghanaian banks' economic, ethical-legal, and philanthropic dimensions of CSR outcomes to understand the specific impacts of BDA application and overall CSR initiatives on these critical performance areas. The conceptual framework integrates stakeholder theory (Freeman, 1984) and RBV (Barney, 1991). Stakeholder theory posits that firms should consider the interests of all stakeholders, including shareholders, employees, consumers, and communities, in their decision-making processes (Freeman, 1984). Carroll (1991) elaborated on this concept, delineating that enterprises possess economic, legal, ethical, and philanthropic obligations to their stakeholders. This theory corresponds with the multidimensional CSR model encompassing various performance domains. The RBV posits that enterprises can get competitive advantage by utilizing resources that are precious, uncommon, inimitable, and non-substitutable (Barney, 1991; Kamboj & Rana, 2023). This paper asserted that banks could leverage BDA as an internal resource to enhance CSRP by synthesizing insights from stakeholder theory and RBV.

This chapter delineates the research methodology employed to fulfill the study's objectives and the research questions and hypotheses. This chapter includes the research design and rationale, methodology, target population, sampling strategy and procedures, data collection protocols, instrumentation and operationalization of constructs, data analysis plan, threats to validity, and ethical procedures.

The research design section delineates the variables of interest in the study and justifies the choice of a quantitative, cross-sectional correlational methodology to investigate the correlations among these variables. The methodology outlined allows other researchers to duplicate this work (Curtis et al., 2016; Stockemer, 2019; Wang & Cheng, 2020). The target population is defined, including its key characteristics and estimated size. The sampling strategy and required procedures are delineated, justified, and connected to a power analysis to determine an adequate sample size (Kang, 2021). Recruitment, participation, and data collection protocols specify how study data were ethically gathered. The instrumentation section describes published scales used to measure the constructs in this study, along with evidence of their validity and reliability. The operationalization of study variables is also addressed to connect the conceptual definitions to their measurement.

The data analysis plan aligns with the stated research questions and hypotheses, outlining the statistical procedures used to analyze the quantitative data. Threats to the validity of the hypothesized relationships likely to be found in the data are also put forth. Finally, meticulous attention is given to detailing ethical procedures related to permissions, recruitment, data management, and other pertinent issues to certify an ethical study. The conclusion provides a concise summary and transition to Chapter 4. The next section delves into the specifics of the research design and rationale selected for this quantitative, correlational study on using BDA to improve CSRP in Ghanaian banks.

Research Design and Rationale

This non-experimental correlational quantitative study investigates the potential impact of BDA on various facets of CSRP within Ghanaian banks. The independent variable, BDAU, encompasses the utilization of sophisticated technologies, methodologies, and expertise in handling vast, complex, and varied data sets (Chatterjee et al., 2022; Li et al., 2022; Nasrollahi et al., 2021). These analytical practices extract actionable insights, facilitating superior organizational decision-making processes (Gaayire et al., 2023). On the other hand, CSRP, the dependent variable in this context, quantifies a bank's effectiveness in fulfilling its CSR obligations towards stakeholders. This study delves into three critical dimensions of CSRP as dependent variables: economic, ethical-legal, and philanthropic performance (Boateng et al., 2022; Calic & Ghasemaghaei, 2021; Rehman et al., 2020; Zayyad et al., 2020). Economic performance focuses on fiscal prudence, operational efficiency, value creation, and delivering returns to shareholders, essentially encapsulating profit maximization strategies. Ethical-legal performance evaluates adherence to moral principles and regulatory standards while aiming to minimize societal harm. Philanthropic performance, meanwhile, assesses the voluntary efforts undertaken by banks to promote social welfare initiatives.

The aim is to explore the relationships between the application of BDA and the different aspects of CSRP, with a particular interest in understanding how these relationships manifest within the banking sector of Ghana. This exploration examines how BDAU influences banks' CSRP, which impacts economic, ethical-legal, and philanthropic outcomes. The study leverages multivariate regression analysis and other

statistical techniques to assess these potential relationships, providing a comprehensive understanding of how BDAU correlates with and possibly affects CSRP in the banking industry.

Non-experimental research does not involve manipulating variables or controlling the environment in which the research is conducted (Curtis et al., 2016; Seeram, 2019). It is observational in nature, where researchers observe and collect data without interfering. Adopting a cross-sectional correlational approach, this research design is particularly suited to identifying and analyzing the predictive associations between the levels of BDA application and the measures of CSRP at a singular point in time (Curtis et al., 2016; Leedy et al., 2019; Wang & Cheng, 2020). Such a design facilitates rapid data collection, a critical factor considering the time constraints typically associated with dissertation research (Leedy et al., 2019; Stockemer, 2019; Wang & Cheng, 2020). Furthermore, this methodology aligns well with the study's objective to quantify and elucidate the predictive relationships between the independent variable (BDAU) and the dependent variables (economic, ethical-legal, and philanthropic performance), thereby shedding light on the potential impacts of BDA on CSR outcomes within the context of Ghanaian banking institutions (Curtis et al., 2016; Seeram, 2019; Stockemer, 2019; Variyath & Brobbey, 2020).

A cross-sectional correlational design is appropriate for analyzing relationships between BDAU and CSRP indicators within banks at a single point in time using validated survey instruments and multivariate regression techniques (Curtis et al., 2016; Leedy et al., 2019; Stockemer, 2019; Wang & Cheng, 2020). This approach's descriptive

emphasis on quantifying predictive connections between variables matches the study's purpose (Seeram, 2019; Stockemer, 2019). Cross-sectional designs enable relatively quick data gathering, an important consideration given dissertation constraints (Leedy et al., 2019; Stockemer, 2019; Wang & Cheng, 2020).

Several studies have effectively employed cross-sectional surveys and regression analytics to examine links between technology utilization and corporate responsibility facets (Calic & Ghasemaghaei, 2021; Nasrollahi et al., 2021; Yunis et al., 2018). Mikalef et al. (2020) demonstrated this design's utility for assessing BDA ties to competitive performance using surveys and partial least squares structural equation modeling. Calic and Ghasemaghaei (2021) established the value of cross-sectional approaches in determining information systems' influence on social outcomes using mediation analysis. These examples exhibit the methodology's potential to clarify relationships between banks' big data investments and economic, community, and innovational impacts (Calic & Ghasemaghaei, 2021; Mikalef et al., 2020; Nasrollahi et al., 2021). Hence, it integrates the firm's resource-based perspective with stakeholder theory.

Understanding links between BDAU and multifaceted performance measures represents an expanding discipline intersection spanning technology strategy and CSR domains (Chatterjee et al., 2022; Kamboj & Rana, 2023). The intent of this study was to make empirical contributions around information systems decisions that potentially heighten banks' financial, social, and environmental outcomes. Examining predictive connections between BDA utilization and economic, legal, and philanthropic performance should address calls for greater clarity within this developing cross-section

while providing bank executives with data-centric guidance on optimizing varied aspects of success.

Previous scholarship has supported using this quantitative cross-sectional correlational design to analyze the links between big data and CSRP, offering practical and theoretical insights within resource constraints. The current study's approach is similar to that of Li et al. (2022), who used a quantitative design to explore how BDA usage affects decision-making quality. However, unlike Li et al., whose study involved Chinese agricultural firms, this current study focuses on banks in Ghana and their CSR outcomes. Another relevant study is Calic and Ghasemaghaei's (2021) exploration of the relationship between big data utilization and corporate social performance using a similar methodology. While they included innovation as a mediator in their study, this current research focuses on the relationship between BDAU and CSRP without a mediator variable. Big data utilization encompasses the wide application of large datasets through collection to management for strategic purposes within organizational processes (Calic & Ghasemaghaei, 2021; Shabbir & Gardezi, 2020). On the other hand, BDA specifically aims to extract insights from these datasets through advanced analytical techniques for business advantage (Li et al., 2022; Mikalef et al., 2021; Shabbir & Gardezi, 2020). Building upon these examples, the next section details this study's quantitative replication-oriented methodology focused on clarifying how investments in advanced analytics influence CSR efforts within Ghana's banking sector.

Methodology

This quantitative study employed a cross-sectional survey methodology using structured online questionnaires to gather data about BDAU and CSRP from employees across commercial banks in Ghana. Aligning with previous effective applications, the cross-sectional design captured a snapshot of analytics investments and CSR efforts at a specific time (Calic & Ghasemaghaei, 2021; Nasrollahi et al., 2021). Questionnaires were distributed electronically to allow rapid compilation of response data suitable for statistical analysis using validated instruments identified as ideal for the constructs of interest.

The survey implementation incorporated lessons from prior banking-focused studies successfully examining technology or CSR connections (Anim et al., 2021; Asiedu et al., 2020; Mikalef et al., 2020; Zayyad et al., 2020). Considerations around maximizing response rates for online organizational surveys also guided administration procedures (Fan & Yan, 2010; Serra et al., 2018). Strategies such as personalized, targeted contact through publicly available information, optimized survey length and design, mobile optimization, and incentive options were incorporated based on evidence supporting their efficacy in improving participation (Brosnan et al., 2019; Fan & Yan, 2010; Nkyekyer et al., 2021; Serra et al., 2018; Smith et al., 2019).

The structured questionnaires measured BDAU through a four-item scale validated by Li et al. (2022) and Yunis et al. (2018), assessing the extent of reliance. CSR utilized an 11-item multidimensional scale developed by Calic and Ghasemaghaei (2021) and Salmones et al. (2005), encompassing economic (three-item), ethical-legal (four-

item), and philanthropic (four-item) subscales. These instruments demonstrate strong reliability and validity in prior technology-CSR research. Specifically, Li et al. showed BDA usage scale indicator loadings from 0.616 to 0.862, AVE scores from 0.510 to 0.700, VIF values between 1.212 and 1.787, Cronbach's alpha of 0.774 to 0.786, and composite reliability values from 0.822 to 0.875. The CSR scale exhibited Cronbach's alpha values of 0.79–0.84, composite reliability of 0.87–0.89, and AVE ranging from 0.79–0.84 across performance dimensions (Calic & Ghasemaghaei, 2021). These results affirm the methodological rigor and suitability of these validated measures.

Population

The target population was employees across Ghana from commercial, regional, rural, and community banks. Specifically, it included executives, managers, and staff in CSR, BDA, and organizational strategy roles. Choosing Ghana enables exploring these relationships in a developing economy context, addressing calls for more research beyond large Western multinationals (Mariani et al., 2021; Muthuri et al., 2020).

Ghana's banking industry comprises various institutions, including commercial, regional, rural, and community banks. Ghana has approximately 147 registered rural/community banks and 25 commercial/regional banks (Bank of Ghana, 2024), representing over 35,000 commercial bank employees (Bank of Ghana, 2021). Although bank account ownership is projected to increase from 50% in 2022 to 78% by 2028, a considerable rural–urban banking access divide persists, with only 3.3% of rural populations currently having access compared to 51% of urban populations (Sasu, 2023).

Focusing on the diverse Ghanaian banking industry facilitates investigating connections between analytics investments and CSR efforts across varied organizational settings aligned with the study's purpose and constraints. Including employees across functions like strategy, marketing, operations, finance, risk, compliance, social outreach, and information technology provides a comprehensive perspective on how CSR and analytics initiatives integrate across departments. This approach aligns with the emphasis of prior research on examining CSR and technology implementation holistically across contexts (Asiedu et al., 2020; Chatterjee et al., 2022).

Sampling and Sampling Procedures

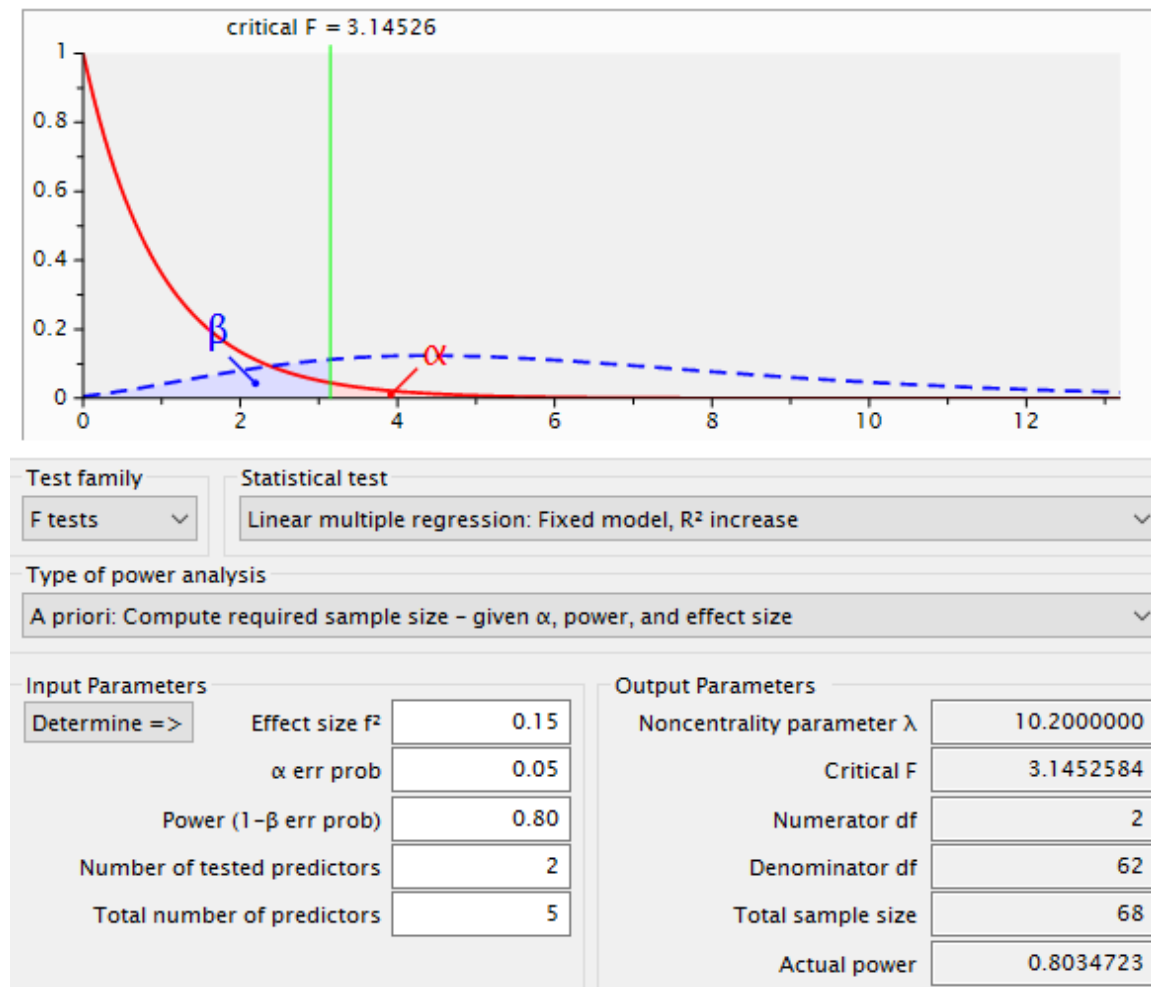
A nonprobability purposive sampling approach was used to target participants for this study. Purposive sampling represents a common technique employed in organizational research to identify information-rich cases related to the phenomenon of interest (Etikan et al., 2016). I used a purposive sampling approach to select participants who likely have experience and knowledge about BDA in their bank. This approach maximized the sample variation and increased the chances of finding relationships between the variables of interest (Etikan et al., 2016). Etikan et al. (2016) argued that this approach facilitates research aiming to generate theoretical insights on phenomena of interest. This approach allowed for the deliberate selection of suitable banks and knowledgeable professionals engaged with corporate social initiatives and data analytics based on specified eligibility criteria. Participants were recruited from multiple commercial, regional, rural, and other retail banks in Ghana to compile a representative cross-section of the industry.

Eligibility criteria required respondents to hold positions involving oversight, decision-making, or extensive knowledge regarding their bank's CSR programs and utilization of data analytics. Additionally, participating banks must exhibit clear evidence of corporate social performance disclosures and data analytics adoption. These criteria ensured that participants were recruited with relevant expertise to provide meaningful insights concerning the research questions. The diversity of banks and respondents meeting the requirements should facilitate valuable revelations about whether and how BDAU relates to various facets of CSR.

An a priori power analysis was conducted to determine the appropriate sample size for regression-based analysis (Faul et al., 2009). Kang (2021) recommended utilizing the G*Power software to calculate the necessary sample size. Cohen (1988) specified standards often used in social science research: an alpha of 0.05, a power level of .80, and a medium effect size ($f^2 = 0.15$). Following these guidelines and inputting the number of predictors into G*Power, the power analysis indicated that a minimum sample of 68 respondents would be required for the study (see Figure 2). However, the study aimed for 100 participants to ensure a robust sample size, enhancing statistical power and accounting for potential dropouts or incomplete responses.

Figure 2

*G*Power Version 3.1 Sample Size Test*



Note. Data retrieved using G*Power 3.1 software (Faul et al., 2009)

Procedures for Recruitment, Participation, and Data Collection

Participants were recruited through the Ghana Association of Banks (GAB), which represents the interests of 25 member institutions and serves as the advocacy lead and voice for universal banks in Ghana. Recruitment methods included utilizing publicly available contact information, direct contacts as authorized in Appendix F, referrals from GAB, snowball sampling, and the assistance of key informants.

Participants received an online informed consent form outlining the study's purpose, participation requirements, potential risks and benefits, and measures to ensure confidentiality. By voluntarily completing the online survey, participants gave their implied consent by clicking "I agree" on the form, allowing them to withdraw at any time without penalty while ensuring the anonymity of their responses (see Appendix J). Participants were contacted individually via email using public contact information or referrals, and no extravagant compensation or pressure from superiors was involved, ensuring a non-coercive recruitment process.

As the sole researcher, I administered the survey using Google Forms, a secure and user-friendly online platform. The survey was crafted using structured questionnaires with validated instruments from Yunis et al. (2018) and Salmones et al. (2005) to measure BDAU and dimensions of CSRP, respectively. The full survey (see Appendix G) includes sections to collect non-identifiable organizational and respondent demographic information. Links to the Google Forms survey were texted or emailed directly to eligible participants, and reminder prompts were sent to encourage timely participation. After approximately a month and a half of data collection, responses were compiled, cataloged, and securely stored for analysis. Participants can access a summary of the findings and implications on a dedicated webpage (see Appendix K). Provisions were made to address requests to withdraw data or address concerns promptly.

Instrumentation and Operationalization of Constructs

To optimize the reliability and validity of the measurements in this study, published survey instruments that demonstrated rigorous psychometric properties across

multiple prior empirical studies were utilized with permission (see Appendices H and I). The independent variable of BDAU was measured through a scale developed by Yunis et al. (2018) that encompasses four items focused on the extent of reliance on analytics techniques, data, and capabilities. This scale has shown consistently strong composite reliability values exceeding 0.80 and AVE scores surpassing the 0.50 threshold across studies, indicating good convergent validity (Li et al., 2022; Yunis et al., 2018). Li et al. (2022) also found VIF statistics between 1.212 and 1.787 for the scale items, evidencing the absence of multicollinearity issues. High Cronbach's alpha values ranging from 0.774 to 0.875 further verify exceptional internal consistency and reliability (Li et al., 2022; Yunis et al., 2018). These multiple statistical assessments affirm this instrument's methodological rigor for capturing BDAU.

CSRP-dependent variables relied on a multidimensional 11-item scale developed by Salmones et al. (2005) encompassing economic, ethical-legal, and philanthropic dimensions. The scale has exhibited high convergent validity with AVE scores between 0.79 and 0.84 across the CSRP facets (Calic & Ghasemaghaei, 2021). Composite reliability values surpassing 0.80 have also been consistently demonstrated (Calic & Ghasemaghaei, 2021), aligning with recommended standards (Salmones et al., 2005). Cronbach's alpha statistics ranging from 0.79 to 0.84 across studies further verify the scale's exceptional reliability and internal consistency (Calic & Ghasemaghaei, 2021; Salmones et al., 2005). These findings substantiate this scale's methodological rigor and suitability for measuring multifaceted CSRP.

The independent variable of BDAU was operationalized as a ratio scale variable using the composite mean score for the four items from Yunis et al.'s (2018) validated scale. Likewise, the three CSRP-dependent variables were represented as ratio scale measures using composite mean scores for the associated three-item economic subscale, four-item ethical-legal subscale, and four-item philanthropic subscale from Salmones et al.'s (2005) instrument. Maintaining ratio scales enables running multivariate regression analyses to determine the relationships between variables and the amount of shared variance (Grant et al., 2019; Tabachnick & Fidell, 2019). Ensuring alignment between conceptual definitions and measurement operationalization through the selected survey instruments helps safeguard construct validity in this empirical examination.

Data Analysis Plan

The statistical analysis of the collected survey data was primarily conducted using IBM SPSS Statistics (Version 29), a powerful software package that enables robust examination of the quantitative relationships of interest. SPSS offers a comprehensive set of tools for importing and manipulating data, conducting multivariate analyses, and generating a wide range of tables and visualizations, making it an ideal choice for this study. In alignment with best practices, the data analysis followed four phases: necessary data cleaning, preliminary analysis, primary analysis, and post-hoc exploratory analysis (Pallant, 2020; Tabachnick & Fidell, 2019). This systematic approach ensured the data were properly prepared, explored, and analyzed, yielding reliable and meaningful results addressing the research questions and hypotheses.

Data Cleaning

Initial Data Inspection

The data cleaning process began with exporting the dataset from Google Sheets, where responses from Google Forms were stored, and then importing it into SPSS 29 for an initial inspection. This crucial step helps identify data entry errors or missing values, ensuring the dataset's integrity before proceeding with deeper analysis (Field, 2018; Pallant, 2020). By thoroughly examining the data at this stage, potential issues can be detected and addressed early on, preventing them from affecting subsequent analyses and compromising the validity of the results (Field, 2018).

Handling Missing Values

The missing value analysis technique was utilized to identify patterns of missingness in the dataset. Little's MCAR methodologies were employed to ascertain whether the missing values are missing completely at random (MCAR; Cho et al., 2020; Coertjens et al., 2017). If the data were MCAR, listwise deletion was utilized; however, if the data were not MCAR, suitable imputation techniques were employed based on the characteristics of the missing data. For data missing at random (MAR), methodologies such as expectation maximization (EM) or full information maximum likelihood (FIML) were utilized (Cho et al., 2020; Shantal et al., 2023). More sophisticated techniques, such as multiple imputations, would have been employed in missing data not at random (MNAR; Shantal et al., 2023). The selected technique was meticulously recorded to guarantee transparency and reproducibility of the findings (Wilkinson & Task Force on Statistical Inference, 1999).

Identifying and Removing Outliers

The Explore function in SPSS produced boxplots for each variable of interest to discover outliers. Outliers were flagged based on their z -scores, with values exceeding $|3|$ standard deviations from the mean considered potential outliers (Garson, 2012).

Furthermore, Mahalanobis distance was computed to identify multivariate outliers, with values surpassing the essential chi-square threshold at $p < .001$ designated for additional scrutiny (Tabachnick & Fidell, 2019). Each outlier was evaluated separately to ascertain whether it should be eliminated, preserved, or modified based on its influence on the comprehensive study. Outliers were deleted solely with robust justification, such as evident measurement errors, to prevent the unwarranted elimination of useful data points (Garson, 2012).

Ensuring Data Normality

Assessing data normality is essential for meeting the assumptions required for multivariate multiple linear regression analysis. The Shapiro-Wilk test was conducted to test for normality, with a non-significant result ($p > .05$), indicating that the data are approximately normally distributed (Flatt & Jacobs, 2019). Visual inspection of histograms and Q-Q plots were also used to assess the normality of each variable (Laerd Statistics, n.d.). If the data are non-normal, appropriate logarithmic or square root transformations were attempted to improve the distribution (Flatt & Jacobs, 2019; Tabachnick & Fidell, 2019). The choice of transformation depended on the nature and severity of the non-normality to achieve a more normal distribution while maintaining the interpretability of the results (Tabachnick & Fidell, 2019).

Preliminary Analysis

Descriptive Statistics

Descriptive statistics were generated for all key variables involved in the study using SPSS 29. This essential step comprehensively explains the data's central tendencies, dispersion, and distribution shapes (Field, 2018; Pallant, 2020). The descriptive statistics included means, standard deviations, and frequencies for each variable, offering insights into the average levels and variability of BDAU and CSR dimensions (Field, 2018). By examining these descriptive statistics, researchers can identify any unusual patterns or potential issues in the data that may require further investigation before proceeding with more advanced analyses (Tabachnick & Fidell, 2019).

Correlation Analysis

Before performing the primary analysis using multivariate multiple regression, it is imperative to undertake a correlation analysis to investigate the correlations between the independent variable, BDAU, and the dependent variables, encompassing the many dimensions of CSR. Correlation analysis offers critical insights into the degree and direction of bivariate correlations between variables, guiding the selection of predictors for the regression model and facilitating result interpretation (Cohen et al., 2014). By comprehending these relationships, researchers can construct more precise and significant models, guaranteeing that the included variables possess pertinent associations with the conclusion of interest.

Moreover, correlation analysis is crucial in assessing multicollinearity, which occurs when independent variables in a regression model are highly correlated. Multicollinearity can distort the regression analysis results, making it challenging to interpret the effect of each independent variable on the dependent variable (Singh et al., 2023; Vatcheva et al., 2016). By identifying highly correlated variables through correlation analysis, researchers can take appropriate measures to address multicollinearity, such as variable selection or transformation, before proceeding with the regression analysis.

Assumptions of Correlation Analysis. To ensure the validity and reliability of the correlation analysis results, it is crucial to assess and address the underlying assumptions of the technique. Field (2018) and Tabachnick and Fidell (2019) delineated these assumptions for correlation analysis: continuous variables, normal distribution, linearity, no significant outliers, and paired observations. First, continuous variables are a prerequisite for correlation analysis, necessitating that the variables under study be measured on an interval or ratio scale (Field, 2018). This condition is vital for accurately representing the variables' degrees and variations.

Second, the variables should follow a normal distribution. The normal distribution of variables is assessed through graphical methods like histograms and Q-Q plots, alongside statistical tests such as the Shapiro-Wilk and Kolmogorov-Smirnov tests (Flatt & Jacobs, 2019; Garson, 2012). Should these assessments reveal deviations from normality, data undergo transformations (i.e., logarithmic, square root, or reciprocal) to correct for non-normal distribution. If transformation does not resolve the issue, non-

parametric correlations (Spearman's rank correlation) are employed (Field, 2018; Temizhan et al., 2022).

Third, the relationship between the variables should be linear. Linearity between the variables is evaluated using scatterplots (Field, 2018). A linear trend should be evident; if not, data transformations (logarithmic or polynomial) are applied to foster linearity. Should these transformations fail, non-parametric correlation measures or curve estimation techniques are considered (Tabachnick & Fidell, 2019).

Fourth, the presence of outliers, which can significantly skew the correlation coefficient, is determined through scatterplots and z-score calculations for each variable. Outliers are defined as having z-scores greater than ± 3.29 (Garson, 2012). Detected outliers are either removed (if attributed to data entry errors or deemed not representative of the population) or have their impact lessened through data transformations or Winsorization (Garson, 2012; Temizhan et al., 2022).

Finally, paired observations are essential; each data point must correspond to a pair across the variables. The correlation coefficient cannot be computed if the number of observations differs between the two data sets (Field, 2018). SPSS easily identifies missing or unpaired data through its descriptive statistics (i.e., case summary). Discrepancies in the number of observations necessitate the use of listwise deletion, pairwise deletion, or imputation methods (e.g., mean imputation, regression imputation, or multiple imputation) to correct for any missing or unpaired data (Cho et al., 2020; Shantal et al., 2023).

Addressing these assumptions during the correlation analysis stage helped ensure the data were suitable for the subsequent regression analysis. The method chosen to address any violations was informed by the nature and severity of the violation and the research context and objectives. These methods were transparently reported to ensure the study's integrity. By rigorously examining and addressing these assumptions, the suitability of the data for both correlation and subsequent regression analysis was secured, enhancing the overall credibility of the findings.

Conducting the Correlation Analysis. A Pearson correlation coefficient (r) was planned to calculate each pair of independent and dependent variables for the correlation analysis. However, since severe assumptions of the correlation were noted, Spearman's correlation was used. The correlation coefficient ranges from -1 to +1, with values closer to -1 indicating a strong negative linear relationship, values closer to +1 suggesting a strong positive linear relationship and values near 0 implying a weak or no linear relationship (Cohen et al., 2014; Field, 2018).

The significance of each correlation coefficient was assessed using a two-tailed test at the appropriate alpha level ($\alpha = .05$). Significant positive correlations between the independent variable (BDAU) and the dependent variables (CSRP dimensions) provide initial support for the study's hypotheses. In contrast, non-significant or negative correlations suggest a need to re-evaluate the proposed relationships or consider potential confounding factors (Tabachnick & Fidell, 2019).

Additionally, correlations with an absolute value greater than .90 were flagged for further investigation, as they may indicate potential multicollinearity issues that could

affect the interpretation of the multivariate multiple regression results (Hair et al., 2019; Vatcheva et al., 2016). If high correlations were observed, variable selection techniques or data transformations were considered to mitigate multicollinearity before proceeding with the regression analysis.

Primary Analysis

The primary hypothesis-testing analysis for this study employed multivariate multiple linear regression, a powerful statistical technique that allows for the simultaneous prediction of multiple dependent variables from multiple independent variables (Hair et al., 2019). This approach is particularly well-suited for the current research, which investigates the complex relationships between BDAU, CSRP, and three dimensions of CSRP (economic, ethical-legal, and philanthropic) in Ghanaian banks.

The nature of the relationships under study informs the choice of multivariate multiple linear regression over multiple linear regression. Whereas multiple linear regression is limited to predicting a single dependent variable from multiple independent variables, multivariate multiple linear regression enables the efficient analysis of the impact of BDAU and CSRP on multiple dimensions of CSRP within a single model (Cohen et al., 2014; Tabachnick & Fidell, 2019). This approach provides a more comprehensive understanding of the relationships and accounts for potential interrelationships among the dependent variables, ensuring a more accurate assessment of the unique contributions of each predictor (Hair et al., 2019).

The research questions and hypotheses guiding the study are as follows:

RQ1: To what extent is there a statistically significant relationship between big

data analytics use and economic performance in Ghanaian banks while controlling for overall corporate social responsibility performance?

$H1_0$: There is no statistically significant relationship between big data analytics use and economic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

$H1_a$: There is a statistically significant relationship between big data analytics use and economic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

RQ2: To what extent is there a statistically significant relationship between big data analytics use and ethical-legal performance in Ghanaian banks while controlling for overall corporate social responsibility performance?

$H2_0$: There is no statistically significant relationship between big data analytics use and ethical-legal performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

$H2_a$: There is a statistically significant relationship between big data analytics use and ethical-legal performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

RQ3: To what extent is there a statistically significant relationship between big data analytics use and philanthropic performance in Ghanaian banks while controlling for overall corporate social responsibility performance?

$H3_0$: There is no statistically significant relationship between big data analytics use and philanthropic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

$H3_a$: There is a statistically significant relationship between big data analytics use and philanthropic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

RQ4: To what extent is there a statistically significant relationship between corporate social responsibility performance and economic performance in Ghanaian banks while controlling for big data analytics use?

$H4_0$: There is no statistically significant relationship between corporate social responsibility performance and economic performance in Ghanaian banks while controlling for big data analytics use.

$H4_a$: There is a statistically significant relationship between corporate social responsibility performance and economic performance in Ghanaian banks while controlling for big data analytics use.

RQ5: To what extent is there a statistically significant relationship between corporate social responsibility performance and ethical-legal performance in Ghanaian banks while controlling for big data analytics use?

$H5_0$: There is no statistically significant relationship between corporate social responsibility performance and ethical-legal performance in Ghanaian banks while controlling for big data analytics use.

$H5_a$: There is a statistically significant relationship between corporate social responsibility performance and ethical-legal performance in Ghanaian banks while controlling for big data analytics use.

RQ6: To what extent is there a statistically significant relationship between corporate social responsibility performance and philanthropic performance in Ghanaian banks while controlling for big data analytics use?

$H6_0$: There is no statistically significant relationship between corporate social responsibility performance and philanthropic performance in Ghanaian banks while controlling for big data analytics use.

$H6_a$: There is a statistically significant relationship between corporate social responsibility performance and philanthropic performance in Ghanaian banks while controlling for big data analytics use.

Model Specification

Two multivariate multiple linear regression models were specified to test the hypothesized relationships. The first model examined the impact of BDAU on economic, ethical-legal, and philanthropic performance while controlling for overall CSRP. The second model explored the influence of overall CSRP on the same three dimensions, controlling for BDAU. Including control variables accounts for their potentially confounding effects on the relationships of interest (Grant et al., 2019; Hünermund & Louw, 2020; Tabachnick & Fidell, 2019). Controlling for CSRP in the first model allows for isolating the unique effects of BDAU on the performance dimensions. Controlling for

BDAU in the second model enables the assessment of the unique effects of overall CSRP on the same outcomes.

The general form of the multivariate multiple linear regression equation is:

$Y_i = \beta_{0i} + \beta_{1i}X_1 + \beta_{2i}X_2 + \dots + \beta_{pi}X_i + \varepsilon_i$ (Alexopoulos, 2010; Grant et al., 2019; Variyath & Brobbey, 2020; Vatcheva et al., 2016). In this equation, Y_i represents the i -th dependent variable, X_1, X_2, \dots, X_i represents the independent variables, β_{0i} is the intercept for the i -th dependent variable, $\beta_{1i}, \beta_{2i}, \dots, \beta_{pi}$ are the regression coefficients for each independent variable on the i -th dependent variable, and ε_i is the error term for the i -th dependent variable.

Model 1. The first model examined the effects of BDAU on economic performance (RQ1/H1), ethical-legal performance (RQ2/H2), and philanthropic performance (RQ3/H3) simultaneously. This approach allows for assessing the impact of BDA on multiple dimensions of CSRP while accounting for potential interrelationships among these dimensions. The equations for Model 1 are:

$$CSR_EP = \beta_{01} + \beta_{11} \times BDAU + \beta_{11C} \times CSRP + \varepsilon_1 \text{ (Economic Performance)}$$

$$CSR_ELP = \beta_{02} + \beta_{12} \times BDAU + \beta_{12C} \times CSRP + \varepsilon_2 \text{ (Ethical-Legal Performance)}$$

$$CSR_PP = \beta_{03} + \beta_{13} \times BDAU + \beta_{13C} \times CSRP + \varepsilon_3 \text{ (Philanthropic Performance)}$$

In this model, the intercepts $\beta_{01}, \beta_{02},$ and β_{03} represent the expected values of the CSR outcomes—economic performance, ethical-legal performance, and philanthropic performance—when both the independent variable (BDAU) and the covariate (overall CSRP) are held at zero. The regression coefficients $\beta_{11}, \beta_{12},$ and β_{13} indicate the influence of BDAU on each of the CSR outcomes, while the coefficients $\beta_{11C}, \beta_{12C},$ and β_{13C} reflect

the effect of CSRP on these outcomes. The error terms ε_1 , ε_2 , and ε_3 capture the residual variance, or the portion of the variation in the dependent variables that are not explained by BDAU or overall CSRP. This allows for an assessment of both the direct effects of the independent variable and the covariate on the CSR outcomes, as well as the unexplained variation.

Model 2. In the second model, CSRP was modeled as a higher-order construct and was tested separately to predict each performance dimension. This analysis addressed the hypothesized relationships between CSRP and economic performance (RQ4/H4), ethical-legal performance (RQ5/H5), and philanthropic performance (RQ6/H6). By examining these relationships individually, the unique contribution of CSRP to each outcome can be determined. The equations for Model 2 are:

$$CSR_EP = \gamma_{01} + \gamma_{11} \times CSR + \gamma_{11B} \times BDAU + \varepsilon_1 \text{ (Economic Performance)}$$

$$CSR_ELP = \gamma_{02} + \gamma_{12} \times CSR + \gamma_{12B} \times BDAU + \varepsilon_2 \text{ (Ethical-Legal Performance)}$$

$$CSR_PP = \gamma_{03} + \gamma_{13} \times CSR + \gamma_{13B} \times BDAU + \varepsilon_3 \text{ (Philanthropic Performance)}$$

In this model, the intercepts γ_{01} , γ_{02} , and γ_{03} represent the expected values of the CSR outcomes—economic performance, ethical-legal performance, and philanthropic performance—when overall CSRP and BDAU are zero. The regression coefficients γ_{11} , γ_{12} , and γ_{13} capture the influence of overall CSRP on the respective CSR outcomes, while γ_{11B} , γ_{12B} , and γ_{13B} represent the effect of BDAU on the outcomes. The error terms ε_1 , ε_2 , and ε_3 account for the unexplained variance in economic, ethical-legal, and philanthropic performance not explained by overall CSRP and BDAU. This allows for evaluating how the main variable (overall CSRP) and the covariate (BDAU) impact the CSR outcomes.

Specifying these two models allows for a comprehensive examination of the hypothesized relationships while accounting for the potential confounding effects of the control variables (Grant et al., 2019; Hünermund & Louw, 2020; Rietveld & Schilling, 2020). This approach aligns with the research questions and hypotheses, enabling the exploration of the extent to which BDAU and CSRP are associated with economic, ethical-legal, and philanthropic performance in the context of Ghanaian banks.

Assumption Testing for Regression Analysis

Before fitting the regression models, a comprehensive assessment of assumptions was performed to ascertain the validity and trustworthiness of the results (Flatt & Jacobs, 2019; Garson, 2012). It is imperative to validate the assumptions of the analysis before evaluating a research question (Field, 2018). In multiple regression, six conditions must be satisfied for dependable conclusions from data analysis (Laerd Statistics, n.d.).

First, independence of observations: This assumption requires that the errors (residuals) of the observations are uncorrelated. Violation of this assumption can lead to biased standard errors and significance tests. The Durbin-Watson statistic was used to test for first-order autocorrelation, with values between 1.5 and 2.5 indicating no substantial autocorrelation (Field, 2018; Garson, 2012). If this assumption is violated, remedial measures such as data transformation or generalized least squares regression may be necessary (Tabachnick & Fidell, 2019).

Secondly, checking linearity: This assumption necessitates linearly connecting the dependent and independent variables. Transgressing this assumption may result in biased and inefficient estimations of the regression coefficients. Scatterplots of studentized

residuals versus projected values and partial regression plots were employed to evaluate the linearity of relationships between the dependent and independent variables (Laerd Statistics, n.d.). In non-linearity, variable transformations such as logarithmic or applying generalized additive models may be suitable (Hair et al., 2019).

Third, assessing homoscedasticity: This assumption necessitates that the variance of the residuals remains uniform across all levels of the independent variables. Transgressing this assumption (heteroscedasticity) may result in distorted standard errors and significance tests. Homoscedasticity was assessed by Breusch-Pagan's test and visual examination of residual plots to confirm uniform variances of residuals throughout the predictor levels (Garson, 2012; Laerd Statistics, n.d.). Upon detecting heteroscedasticity, it may be essential to use corrective techniques such as weighted least squares regression or resilient standard errors (Tabachnick & Fidell, 2019).

Fourth, assessing multicollinearity: This assumption necessitates that the independent variables exhibit minimal correlation. Transgressing this assumption (multicollinearity) may result in unstable and challenging-to-interpret regression coefficients. Variance inflation factors (VIFs) were employed to identify multicollinearity, with values exceeding 5 suggesting possible complications (Garson, 2012; Vatcheva et al., 2016). In the event of observed multicollinearity, acceptable corrective procedures include variable deletion, variable combination, or ridge regression (Singh et al., 2023; Tabachnick & Fidell, 2019).

Fifth, assessing the normality of residuals: This assumption necessitates that the residuals follow a normal distribution. Transgression of this assumption may result in

skewed significance tests and confidence intervals. The normality of residuals was evaluated by histograms, P-P plots, and Normal Q-Q plots of studentized residuals (Field, 2018; Laerd Statistics, n.d.). Should non-normality be identified, it may be essential to implement variable transformations (e.g., logarithmic or square root) or to employ robust regression techniques (e.g., bootstrapping or permutation tests) (Hair et al., 2019).

Sixth, the examination for outliers and influential points: This assumption necessitates the absence of observations that exert an undue impact on the regression outcomes. Contravention of this assumption may result in biased and unstable regression coefficients. Studentized residuals, leverage values, and Cook's distance were analyzed to detect probable outliers and influential points that could distort the models (Laerd Statistics, n.d.). Upon detection of outliers or influential points, they must be meticulously scrutinized and perhaps eliminated or addressed by robust regression techniques (e.g., M-estimators or least trimmed squares) (Tabachnick & Fidell, 2019).

Model Fitting and Hypothesis Testing

Two multivariate multiple linear regression models were constructed utilizing SPSS's General Linear Model function to examine the correlations among BDAU, CSR, and various performance outcomes in Ghanaian banks. The initial model analyzed the influence of BDAU on economic, ethical-legal, and philanthropic performance while accounting for CSR. The second model evaluated the impact of CSR on identical performance outcomes while controlling for BDAU. Incorporating control variables mitigates their possible confounding influence on the relationships of interest.

Wilks' Lambda was the primary multivariate test to evaluate the models' overall significance. Although other tests like Pillai's Trace and Hotelling's Trace offer alternative assessments, Wilks' Lambda is widely recognized for its robustness and clarity in evaluating the independent variables' collective impact. The decision to focus on Wilks' Lambda avoids redundancy, as the other tests typically lead to similar conclusions (Hair et al., 2019).

The F-test assessed the overall significance of each regression model by contrasting the explained variance of the dependent variables with the independent variables against the unexplained variance. An important F-test demonstrates that the model accounts for a substantial percentage of the variance in the dependent variables, affirming the model's efficacy (Field, 2018).

R-squared values were reported for each model to quantify the proportion of variance in the dependent variables explained by the independent variables. Higher R-squared values suggest a stronger explanatory power of the model, highlighting the practical significance of the relationships under investigation (Cohen, 1988).

Univariate analyses of variance (ANOVAs) were used to evaluate the significance of individual dependent variables within each model, offering comprehensive insights into the unique impacts of BDAU and CSRP on each performance outcome (Field, 2018). Unstandardized beta coefficients were presented to elucidate the direction and size of these effects, providing actionable insights for stakeholders.

Statistical significance was determined using an alpha level of .05, aligning with standard practices in empirical research (Pallant, 2020; Tabachnick & Fidell, 2019).

However, to facilitate a nuanced interpretation of the results, exact p-values and effect sizes (i.e., partial eta squared) were also reported, adhering to recommendations for transparent and informative statistical reporting (Laerd Statistics, n.d.). This approach enabled the assessment of statistical significance and practical relevance, providing a comprehensive understanding of the relationships between BDAU, CSRP, and various performance outcomes in Ghanaian banks.

Post Hoc Analysis

Following the initial multivariate multiple regression analysis, post-hoc studies may further investigate the intricate links among BDAU, overall CSRP, and the three dimensions of CSRP (economic, ethical-legal, and philanthropic) within Ghanaian banks. Considered essential and suitable, these studies examined interaction terms beyond the core hypothesis testing, offering a more refined comprehension of the elements affecting CSRP results.

The primary analysis results suggested that interaction terms were incorporated into the multivariate multiple regression models. Specifically, the post-hoc analysis explored whether the relationship between BDAU and each CSRP dimension (economic, ethical-legal, and philanthropic) varies depending on the level of overall CSRP. This analysis helped determine if the impact of BDA on CSRP outcomes is contingent upon the bank's overall commitment to CSR.

Interaction terms were generated by multiplying the standardized scores of BDAU and overall CSRP. The interaction variables were then incorporated into the regression models alongside the main effects of BDAU and overall CSRP. The F-test evaluated the

importance of the interaction terms, and alterations in R-squared values were analyzed to ascertain whether the addition of the interaction terms substantially enhances the model's explanatory capacity.

It is essential to emphasize that these post-hoc analyses were conducted as exploratory and not part of the preregistered analysis. These analyses' findings were interpreted cautiously and mainly used for hypothesis generation and future research directions rather than as confirmatory evidence (Smith et al., 2020). The post-hoc analysis section aims to supplement the study's primary objectives by fully extracting insights from the collected data in a theoretically grounded manner while acknowledging the exploratory nature of these tests. Any significant findings from the post-hoc analyses were reported as exploratory and subject to future confirmatory research.

The decision to perform a post-hoc analysis was influenced by the outcomes of the initial analysis and based on pertinent theoretical factors rather than being exclusively data-driven (Smith et al., 2020). This methodology guaranteed that the post-hoc analyses conducted were significant and enhanced understanding of the discipline. However, the constraints of these exploratory analyses were explicitly articulated, and the results were interpreted within the study's sample size, design, and analytical assumptions.

Threats to Validity

External Validity

Nonprobability sampling strategies jeopardize external validity, as findings may not generalize to the broader population of interest (Etikan et al., 2016; Leedy et al., 2019). Due to time and access limitations that preclude random sampling of all banks in

Ghana, the selected methodology emphasizes optimizing participation among readily available individuals and institutions. Nonetheless, the failure to exhibit representative sampling persists as a limitation. Employing structured protocols grounded in survey design scholarship is the most effective approach to enhance response rates and strengthen generalizability claims (Brosnan et al., 2019; Fan & Yan, 2010). Meticulous contextualization of findings by recognizing limitations and refraining from overextending conclusions enhances integrity in light of inherent constraints.

Internal Validity

Leveraging cross-sectional design aids survey logistics yet restricts internal validity, as data about predictor and outcome variables are gathered simultaneously without experimental interventions or temporal precedents (Curtis et al., 2016; Leedy et al., 2019; Stockemer, 2019). Consequently, assertions of causal determinations between BDA investments and CSRP must be avoided. Instead, emphasis resides on elucidating predictive relationships and explanatory contribution. Violations of assumptions like omitted variable bias, measurement errors, and participant hypothesis guessing may also undermine validity (Leedy et al., 2019; Stockemer, 2019). Using validated instruments helps mitigate this. Meticulous statistical analysis and transparency regarding what conclusions data substantiates or fails to support provide the strongest means of bolstering credibility given non-experimental methods (Leedy et al., 2019).

Construct Validity

Despite selecting survey measures with psychometric backing from prior research, discrepancies between conceptual definitions and operational proxies may

persist, threatening construct validity (Hughes, 2018). For instance, self-reported assessments of philanthropic activities may not fully capture objective performance. Comparing findings against extant scholarship provides ways of assessing convergence or divergence (Heggestad et al., 2019). Supplementing perceptual estimates with archival data on CSR inputs and outputs could also enhance arguments when feasible. Carefully detailing limitations and avoiding overstatements remains vital for upholding integrity, as data and interpretations incorporate subjective elements (Heggestad et al., 2019; Hughes, 2018).

Ethical Procedures

Formal authorization to utilize survey instruments was obtained, as evidenced in Appendices H and I, which include hyperlinks to the pertinent copyright clearances. The approval of the dissertation committee offers independent ethical control, guaranteeing adherence to research norms. Furthermore, formal consent to interact with member banks was acquired from GAB, accompanied by a signed authorization letter (see Appendix F). The permission form contains contact details for complimentary mental health providers and hotlines for participants who may encounter acute psychological discomfort due to their involvement in the study.

Confidentiality, withdrawal, risks, and rewards were explicitly delineated when engaging potential participants in compliance with ethical consent standards. The voluntary aspect of participation was highlighted to prevent coercion, and transparency regarding data management, access, and anonymity was guaranteed to provide participants with complete control over their involvement. The permission form explicitly

said that refusal or withdrawal from the study would not adversely affect the participant's connection with the researcher or access to any services offered by the organization.

Questionnaires were conducted via Google Forms, a secure online survey platform adhering to contemporary cybersecurity best practices, encompassing encryption and restricted access to safeguarded servers. Google Forms complies with rigorous privacy and security requirements, safeguarding the confidentiality and safety of participant data. The consent form utilized terminology from Walden's template to articulate the measures taken to ensure privacy, including anonymous data collection, secure data storage, limited access to de-identified data, and a guarantee that the data would not be employed for any reasons beyond this research study. All requisite paper materials were managed meticulously, and identifiers were eliminated to preserve confidentiality. Records were electronically stored on secure systems with multifactor authentication and compliant with research integrity standards for at least 5 years following publication. Upon completing the specified duration of active utilization, all identifiable data are irrevocably eradicated to meet ethical responsibilities.

Walden University's Institutional Review Board approved (IRB approval number: 06-14-24-1155952) to confirm that all protocols adequately minimize participant risks. This method highlighted participants' rights, dignity, and privacy, establishing a benchmark for evaluating all plans and procedures. Arrangements were established for ongoing modifications as required by ethical considerations. The research sought to achieve prospective advantages through careful planning and adherence to ethical

standards while mitigating unavoidable risks and preserving integrity and credibility throughout the study.

Various efforts were enacted to mitigate the recognized dangers. Psychological hazards were mitigated by collecting anonymous data, implementing transparent, informed consent protocols, and including mental health resource referrals in the consent documentation. Relationship risks were mitigated by enlisting individuals from several banks and underscoring the voluntary involvement. Professional risks were mitigated through safe data management protocols, anonymizing the identities of persons and organizations in reports, and ensuring participants the confidentiality of their responses.

Summary

This quantitative, cross-sectional correlational study investigated potential relationships between BDAU and CSRP in Ghanaian banks. The research employed validated instruments, specifically Yunis et al.'s (2018) scale for evaluating BDAU and Salmones et al.'s (2005) multidimensional scale for measuring CSRP factors (economic, ethical-legal, and philanthropic). The independent variable is the degree of BDAU, whereas the dependent variables denote three dimensions of CSRP.

The target population encompasses executives, managers, and staff engaged with CSR and analytics initiatives across 147 rural/community banks and 25 commercial/regional banks in Ghana. Nonprobability purposive sampling identified cases rich in information that met the eligibility requirements. The power analysis reveals a requirement for a minimum of 68 respondents, with a target of 100 to enhance the study's robustness. Participants were recruited using contact information, referrals, and key

informants. Encrypted online surveys gathered data, and data-cleaning protocols were implemented to address missing values, detect and eliminate outliers, and verify data normality. This procedure entailed utilizing SPSS's missing value analysis capabilities, computing z-scores and Mahalanobis distance, and performing the Shapiro-Wilk test.

Preliminary analysis included generating descriptive statistics for all variables and conducting a correlation analysis to examine the relationships between BDAU and CSRP dimensions. Spearman's correlation coefficients were calculated, and the significance of each coefficient was assessed using a two-tailed test. Assumption testing for regression analysis was performed to verify the validity and reliability of the findings. This evaluation encompassed the examination of observation independence, linearity, homoscedasticity, multicollinearity, residual normality, and the identification of outliers or influential points. Suitable examinations and visual assessments were utilized to validate these assumptions. Unstandardized beta coefficients and effect sizes assessed the importance and degree of the correlations.

Two regression models were deployed: the first assessed BDAU's association with CSRP variables across the initial three research questions, while the second addressed the remaining three questions. Post hoc analysis explored potential interaction terms not part of the primary hypotheses testing. The interaction terms were created by multiplying the standardized scores of BDAU and overall CSRP, and their significance was assessed using the F-test.

Ethical procedures included acquiring informed consent from participants, safeguarding data privacy and security through encrypted online surveys and secure data

storage, and obtaining approval from IRB to confirm that all protocols adequately minimize participant risks. Potential threats to validity were recognized, and comprehensive ethical protocols were established to mitigate them.

By elucidating the connections between technological investments and their diverse implications, the findings help inform the adoption of analytics that enhance financial, social, and environmental performance. Nonetheless, non-experimental approaches constrain internal validity, requiring meticulous contextualization. The study's results are anticipated to impact theory, practice, and social change substantially. This research seeks to elucidate the connections between BDAU and CSRP, thereby enhancing the current literature, facilitating the application of analytics to support diverse performance outcomes, and advancing responsible digitization across many industries.

As described in the subsequent chapter, meticulous data gathering and analysis procedures aim to yield valuable insights while upholding rigorous standards. Transitioning from design to execution, Chapter 4 will present the data analysis results, test the specified hypotheses, and discuss the findings in relation to the study's objectives.

Chapter 4: Results

This chapter presents the results of a non-experimental, correlational study using multivariate multiple linear regression. The study examines the associations between BDAU, CSRP, and three specific dimensions of CSR—economic, ethical-legal, and philanthropic—in Ghanaian banks. The analysis investigated these relationships while controlling for relevant factors, providing a nuanced understanding of how these variables are interconnected.

Six research questions and associated hypotheses guide the study:

RQ1: To what extent is there a statistically significant relationship between big data analytics use and economic performance in Ghanaian banks while controlling for overall corporate social responsibility performance?

$H1_0$: There is no statistically significant relationship between big data analytics use and economic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

$H1_a$: There is a statistically significant relationship between big data analytics use and economic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

RQ2: To what extent is there a statistically significant relationship between big data analytics use and ethical-legal performance in Ghanaian banks while controlling for overall corporate social responsibility performance?

$H2_0$: There is no statistically significant relationship between big data analytics use and ethical-legal performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

$H2_a$: There is a statistically significant relationship between big data analytics use and ethical-legal performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

RQ3: To what extent is there a statistically significant relationship between big data analytics use and philanthropic performance in Ghanaian banks while controlling for overall corporate social responsibility performance?

$H3_0$: There is no statistically significant relationship between big data analytics use and philanthropic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

$H3_a$: There is a statistically significant relationship between big data analytics use and philanthropic performance in Ghanaian banks while controlling for overall corporate social responsibility performance.

RQ4: To what extent is there a statistically significant relationship between corporate social responsibility performance and economic performance in Ghanaian banks while controlling for big data analytics use?

$H4_0$: There is no statistically significant relationship between corporate social responsibility performance and economic performance in Ghanaian banks while controlling for big data analytics use.

H4_a: There is a statistically significant relationship between corporate social responsibility performance and economic performance in Ghanaian banks while controlling for big data analytics use.

RQ5: To what extent is there a statistically significant relationship between corporate social responsibility performance and ethical-legal performance in Ghanaian banks while controlling for big data analytics use?

H5₀: There is no statistically significant relationship between corporate social responsibility performance and ethical-legal performance in Ghanaian banks while controlling for big data analytics use.

H5_a: There is a statistically significant relationship between corporate social responsibility performance and ethical-legal performance in Ghanaian banks while controlling for big data analytics use.

RQ6: To what extent is there a statistically significant relationship between corporate social responsibility performance and philanthropic performance in Ghanaian banks while controlling for big data analytics use?

H6₀: There is no statistically significant relationship between corporate social responsibility performance and philanthropic performance in Ghanaian banks while controlling for big data analytics use.

H6_a: There is a statistically significant relationship between corporate social responsibility performance and philanthropic performance in Ghanaian banks while controlling for big data analytics use.

The research questions (RQs) and hypotheses were tested using two multivariate multiple linear regression models. The first three RQs are explored in Model 1, which focuses on the relationships between BDAU and CSR dimensions, controlling overall CSRP. The remaining three RQs are tested in Model 2, which examines the relationships between overall CSRP and CSR dimensions, controlling for BDAU.

The chapter is structured as follows: First, data preparation and cleaning procedures are described, followed by descriptive statistics to provide a clear overview of the dataset. Next, the correlation analysis is presented, where assumptions of Pearson's correlation were tested, leading to the adoption of Spearman's correlation based on the findings. The assumption checks for the primary analysis are then discussed, focusing on the multivariate linear regression assumptions. The hypothesis testing section presents the primary analysis results for both models. Finally, post hoc testing results are included to address additional insights, and the chapter concludes with a summary of the findings.

Data Collection

The data were collected between June 15 and July 31, 2024. A total of 113 individuals initially responded to the survey. All respondents met the study's eligibility criteria; however, four did not complete the survey, leaving 109 participants with complete data. The data analysis plan included provisions for handling missing values, but no missing data were present. As a result, the outlined procedures were unnecessary, and all cases were retained, preserving the integrity of the final sample.

Before analysis, I assigned each response a unique case number by converting timestamps into identifiers, facilitating ease of reference. Additionally, I calculated

composite mean scores for each variable dimension—BDAU, CSR_EP, CSR_ELP, CSR_PP, and CSRP. These scores were derived from the mean of the responses to the items on a 7-point Likert scale corresponding to each dimension. After computing these composite scores, a check for outliers was performed by calculating standardized values (z-scores).

Outliers were identified using both z-scores and Mahalanobis distance to detect multivariate outliers. Six cases were flagged with standardized values greater than $|3.29|$, signaling potential outliers. Mahalanobis distance further confirmed these as multivariate outliers. Each of these cases was carefully assessed for validity.

Case number 20240628110645 displayed low scores across BDAU, CSR_EP, CSR_ELP, and CSR_PP, suggesting that the respondent's decision-making may not have been influenced by CSR considerations, potentially indicating a lack of autonomy or ethical leadership. Similarly, case numbers 20240628113408 and 20240628112749 reported uniform minimum scores (1s across all variables), suggesting disengagement or random responses. Case numbers 20240628113818 and 20240628113631, despite holding senior roles, reported uniform minimum scores, which is highly improbable given their positions. Finally, case number 20240712235219 showed inconsistencies between individual BDAU items and the overall BDAU score, implying misunderstanding or careless response.

Given these distinct patterns of anomalous or spurious responses, all six cases were flagged and removed to prevent skewing the results. Removal was deemed necessary due to the clear evidence of invalid data, ensuring that the final analysis

accurately reflects trends among engaged and valid respondents. After excluding these outliers, 103 valid responses remained for analysis.

Sample Characteristics and Descriptive Statistics

Data were gathered across various demographic and organizational variables, including age, bank size, bank type, decision role (for BDA and CSR), education level, and gender. Descriptive statistics were generated to comprehensively understand the sample characteristics and the variables under study. Table 1 presents the frequencies and percentages for these variables.

Most respondents fell within the 25–34 years ($n = 42$, 40.8%) and 35–44 years ($n = 35$, 34.0%) age groups, indicating a relatively young workforce. A smaller proportion of respondents were 55–64 ($n = 5$, 4.9%), and only 1% were under 25. This distribution suggests that most participants are in the early to mid-stages of their professional careers, which may influence their perspectives on BDA and CSR decision-making.

Regarding affiliated bank size, nearly half of the respondents ($n = 49$, 47.6%) worked in banks with more than 1000 employees, while only 2.9% were from banks with fewer than 51 employees. This distribution reflects the predominance of larger financial institutions in the study, where BDA is likely to play a more critical role. Furthermore, 84.5% of respondents were employed by commercial banks, with a smaller representation from rural ($n = 8$, 7.8%), community ($n = 4$, 3.9%), and regional ($n = 4$, 3.9%) banks.

Regarding decision-making roles, 46.6% of respondents reported a significant role in BDA decision-making, and 7.8% indicated a primary role. By contrast, 8.7% of participants reported having little involvement in BDA decisions. In the context of CSR

decision-making, most respondents held a significant role ($n = 40$, 38.8%) or some role ($n = 43$, 41.7%), while only 6.8% held a primary role. These findings suggest that most respondents actively engage in BDA and CSR decision-making processes within their organizations, likely shaping the CSRP outcomes analyzed in this study.

The educational background of the respondents further reflects the high level of expertise within the sample. More than half of the respondents held a bachelor's degree ($n = 53$, 51.5%), and a substantial portion ($n = 47$, 45.6%) held a master's degree. Only 1.9% had achieved a doctorate or equivalent qualification, while 1.0% reported holding other professional qualifications. The gender distribution was skewed toward males ($n = 75$, 72.8%), with females comprising 27.2% of the sample. The educational qualifications and decision-making responsibilities suggest the respondents are well-equipped to provide informed insights into integrating BDA and CSR within their organizations.

Table 1*Sample Characteristics*

Variable	<i>n</i>	%
Age group		
Under 25 years	1	1.0
25-34 years	42	40.8
35-44 years	35	34.0
45-54 years	20	19.4
55-64 years	5	4.9
Bank size		
Less than 51 employees	3	2.9
51 - 200 employees	13	12.6
201 - 500 employees	12	11.7
501 - 1000 employees	26	25.2
More than 1000 employees	49	47.6
Bank type		
Community	4	3.9
Rural	8	7.8
Regional	4	3.9
Commercial	87	84.5
BDA decision role		
Little	9	8.7
Some	38	36.9
Significant	48	46.6
Primary	8	7.8
CSR decision role		
Little	13	12.6
Some	43	41.7
Significant	40	38.8
Primary	7	6.8
Education level		
Bachelor's Degree	53	51.5
Master's Degree	47	45.6
Doctorate or Equivalent	2	1.9
Other: Professional	1	1.0
Gender		
Female	28	27.2
Male	75	72.8

Note. *N* = 103, BDA = big data analytics, CSR = corporate social responsibility.

Descriptive statistics for the main study variables, including BDAU and the CSR dimensions, were calculated. Table 2 displays the key constructs' mean scores, standard deviations, skewness, and kurtosis. BDAU showed a mean of 5.66 ($SD = 1.11$), indicating the respondents substantially engaged with big data tools. The relatively low variability ($SD = 1.11$) suggests a fairly consistent usage across the sample. CSR ethical-legal performance (CSR_ELP) had the highest mean score ($M = 6.34$, $SD = 0.92$), signaling an organization's strong commitment to legal compliance and ethical behavior. However, the negative skewness (-3.02) for CSR_ELP suggests that most participants rated their organizations quite high on this dimension, with only a few indicating lower performance. On the other hand, CSR philanthropic performance (CSR_PP; $M = 5.87$, $SD = 1.04$) displayed more variability, which could reflect differences in how organizations approach community involvement or charitable activities.

Table 2

Descriptive Statistics for Key Constructs

Variable	<i>M</i>	<i>SD</i>	Min	Max	Skewness	Kurtosis
BDAU	5.66	1.11	1.00	7.00	-1.68	3.78
CSR_EP	6.14	0.79	3.00	7.00	-1.26	2.41
CSR_ELP	6.34	0.92	1.25	7.00	-3.02	12.73
CSR_PP	5.87	1.04	1.00	7.00	-2.08	6.69
CSRP	6.12	0.74	1.75	7.00	-2.38	10.66

Note. Min = minimum, Max = maximum.

The reliability of the instruments used in the study was assessed using Cronbach's alpha to ensure internal consistency. The ICT use instrument, adapted from Yunis et al. (2018), demonstrated a strong reliability score for BDAU with a Cronbach's alpha of 0.86. The CSR instrument, adapted from Salmones et al. (2005), also showed satisfactory

internal consistency across its three dimensions. Specifically, CSR_EP had an alpha of 0.72, CSR_ELP demonstrated the highest reliability with an alpha of 0.91, and CSR_PP had an alpha of 0.87. The overall CSRP, which combines all CSR dimensions, exhibited strong internal consistency with a Cronbach's alpha of 0.89. Table 3 summarizes the number of items and Cronbach's alpha values for each construct, demonstrating the robustness of the measurement scales.

Table 3

Reliability for Key Constructs

Variable	Number of items	Cronbach's alpha
BDAU	4	0.86
CSR_EP	3	0.72
CSR_ELP	4	0.91
CSR_PP	4	0.87
CSRP	11	0.89

A priori power analysis, conducted using G*Power, indicated that for a multiple regression model with two predictors, a medium effect size ($f^2 = 0.15$), an alpha of .05, and a power of 80%, a minimum of 68 participants was required (see Appendix A). With 103 valid responses collected, a post hoc power analysis in G*Power confirmed that the achieved power was 94.39% (see Appendix L), demonstrating the adequacy of the sample size for detecting medium-sized effects in the analyses.

Bivariate Correlation Analysis

The correlation analysis was a preliminary step in understanding the relationships between BDAU, CSR_EP, CSR_ELP, CSR_PP, and CSRP. These relationships were explored to inform the selection of variables for the primary analysis, employing

multivariate multiple linear regression. The correlation analysis also provided insights into multicollinearity and the strength and direction of the bivariate relationships between variables. The findings from this analysis were foundational in assessing the hypotheses of this study and ensuring that the variables exhibited meaningful associations with the CSR outcomes of interest.

Before conducting the correlation analysis, it was essential to check that the key assumptions of Pearson's correlation were met. First, it was confirmed that all of the variables per study design were computed as a continuous scale, meeting the requirement for correlation analysis. The assumption of paired observations was also satisfied, as all variables contained the same number of observations ($N = 103$) with no missing or unpaired data points (see Appendix M). This ensured that each observation was appropriately paired across all variables, making the data suitable for correlation analysis.

The assumption of normal distribution was evaluated using both the Kolmogorov-Smirnov and Shapiro-Wilk tests, both of which revealed statistically significant deviations from normality for all variables ($p < .001$; see Table 4). Given the sample size, even small deviations from normality can result in significant test results. Logarithmic and square root transformations were attempted to improve the distribution but yielded no significant improvement. However, visual inspection of Q-Q plots showed that while there were some deviations—particularly in the tails—the overall distribution closely followed the expected normal pattern for most variables (see Appendix N). Based on these findings, the data were deemed sufficiently normal for correlation analysis, though caution was warranted for variables with larger deviations.

Table 4*Tests of Normality*

Variable	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BDAU	0.185	103	0.000	0.856	103	0.000
CSR_EP	0.178	103	0.000	0.877	103	0.000
CSR_ELP	0.235	103	0.000	0.684	103	0.000
CSR_PP	0.166	103	0.000	0.822	103	0.000
CSRP	0.137	103	0.000	0.826	103	0.000

Regarding linearity, scatterplots showed that the assumption of linearity was weakly met. While there was a discernible upward trend between both BDAU and CSRP with the dependent variables (CSR_EP, CSR_ELP, and CSR_PP), these relationships were not strongly linear (see Appendix Q). The strongest linear trend was observed between BDAU and CSR_PP, while CSR_EP and CSR_ELP showed weaker or non-linear patterns. Nevertheless, these relationships were considered sufficient to proceed with the correlation analysis. However, non-parametric methods such as Spearman's correlation were chosen due to the observed deviations from normality and linearity.

Finally, the assumption of the absence of significant outliers was partially satisfied. Mild to moderate outliers were detected, particularly in the boxplot's lower range of CSR_EP, CSR_ELP, and CSR_PP (see Appendix P). These outliers, while noticeable, did not substantially distort the overall relationships as observed in the scatterplots (see Appendix Q). Although the outliers' influence appeared limited, Spearman's rank correlation was selected due to its robustness to outliers, ensuring that any potential impacts on the analysis were mitigated effectively.

Spearman's Correlation Result

Spearman's rank correlation results revealed several key relationships between BDAU and the CSRP dimensions. Table 5 shows a summary of the correlations between the variables of interest. The strongest correlation between BDAU and CSR_PP ($r = .580$) indicates a moderate to strong positive association. This suggests that greater use of BDA is linked to higher levels of philanthropic engagement within the surveyed banks. Additionally, BDAU exhibited a positive correlation with CSRP (i.e., overall performance; $r = .571$), suggesting that banks utilizing BDA tend to perform better overall in CSR initiatives, encompassing economic, ethical-legal, and philanthropic dimensions.

The relationship between BDAU and CSR_EP ($r = .387$) was moderate, indicating that although there is a positive relationship between the two, it is not as strong as the relationship with CSR_PP. BDAU had the weakest, statistically significant, correlation with CSR_ELP ($r = .355$). This implies that while BDA plays a role in ethical and legal aspects of CSR, its influence in this domain is less pronounced.

The interrelationships between the CSR dimensions themselves were also notable. CSR_EP showed strong correlations with CSRP ($r = .728$) and CSR_PP ($r = .420$), suggesting that economic performance is highly integrated with overall CSR outcomes. CSR_ELP was similarly well-correlated with CSRP ($r = .781$) and CSR_PP ($r = .566$), indicating a strong alignment between these CSR dimensions.

Table 5*Spearman's Correlations Coefficients for Key Variables*

Variable	BDAU	CSR_EP	CSR_ELP	CSR_PP	CSRP
BDAU	-	.387**	.355**	.580**	.571**
CSR_EP	.387**	-	.393**	.420**	.728**
CSR_ELP	.355**	.393**	-	.566**	.781**
CSR_PP	.580**	.420**	.566**	-	.830**
CSRP	.571**	.728**	.781**	.830**	-

** = Correlation is significant at the 0.01 level (2-tailed).

These findings lay the groundwork for the subsequent multivariate multiple linear regression analysis, further investigating the predictive relationships between BDAU and CSRP dimensions. This analysis will help clarify the unique contributions of BDAU and CSRP in predicting CSR outcomes across economic, ethical-legal, and philanthropic dimensions.

Assumption Checks for Regression Analysis

The validity of any multivariate multiple linear regression analysis relies heavily on ensuring that the fundamental assumptions of regression analysis are met. To ensure the robustness of the findings, key assumptions were thoroughly assessed, including independence of observations, multicollinearity, linearity, normality of residuals, the presence of outliers and influential points, and homoscedasticity. This section outlines the diagnostic checks performed and the corrective measures applied when necessary. Although most assumptions were met, detecting heteroscedasticity and influential observations necessitated further action; consequently, bootstrapping techniques were employed to ensure robust parameter estimates and enhance the validity of the regression

models. The subsequent analyses reflect these adjustments, allowing for a more accurate interpretation of results.

Independence of Observations

The assumption of independence of observations was confirmed. The Durbin-Watson statistic, which tests for autocorrelation in residuals, yielded values close to 2. As detailed in Table 6, the Durbin-Watson statistics for the regression models, which include independent variables (BDAU and CSRP) and dependent variables (CSR_EP, CSR_ELP, CSR_PP), fell within the acceptable range of 1.5 to 2.5, indicating no significant autocorrelation in the residuals. A value near 2 confirms the absence of autocorrelation, satisfying the independence assumption. No violations were detected, and no further corrective action was necessary.

Table 6

Durbin-Watson Statistics for Regression Models

Dependent variable	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	Durbin-Watson statistic
CSR_EP	.718	0.516	0.506	2.390
CSR_ELP	.816	0.665	0.658	2.094
CSR_PP	.834	0.695	0.689	2.093

Note. Predictors = BDAU, CSRP.

Multicollinearity

The assumption of multicollinearity was also satisfied. I used VIF values and Tolerance statistics to assess potential multicollinearity between the independent variables across the three dependent. Table 7 presents the detailed collinearity statistics, including VIF and Tolerance values. The VIF values for BDAU and CSRP were 1.182, well below the commonly accepted threshold of 10 (or 5, as suggested by some authors),

indicating no significant concerns regarding multicollinearity. Furthermore, the Tolerance values were 0.846, comfortably above the 0.1 threshold, further supporting the absence of multicollinearity. These results confirm that the independent variables did not exhibit strong correlations, preserving the stability of the regression coefficients and ensuring valid interpretations of the analysis.

Table 7

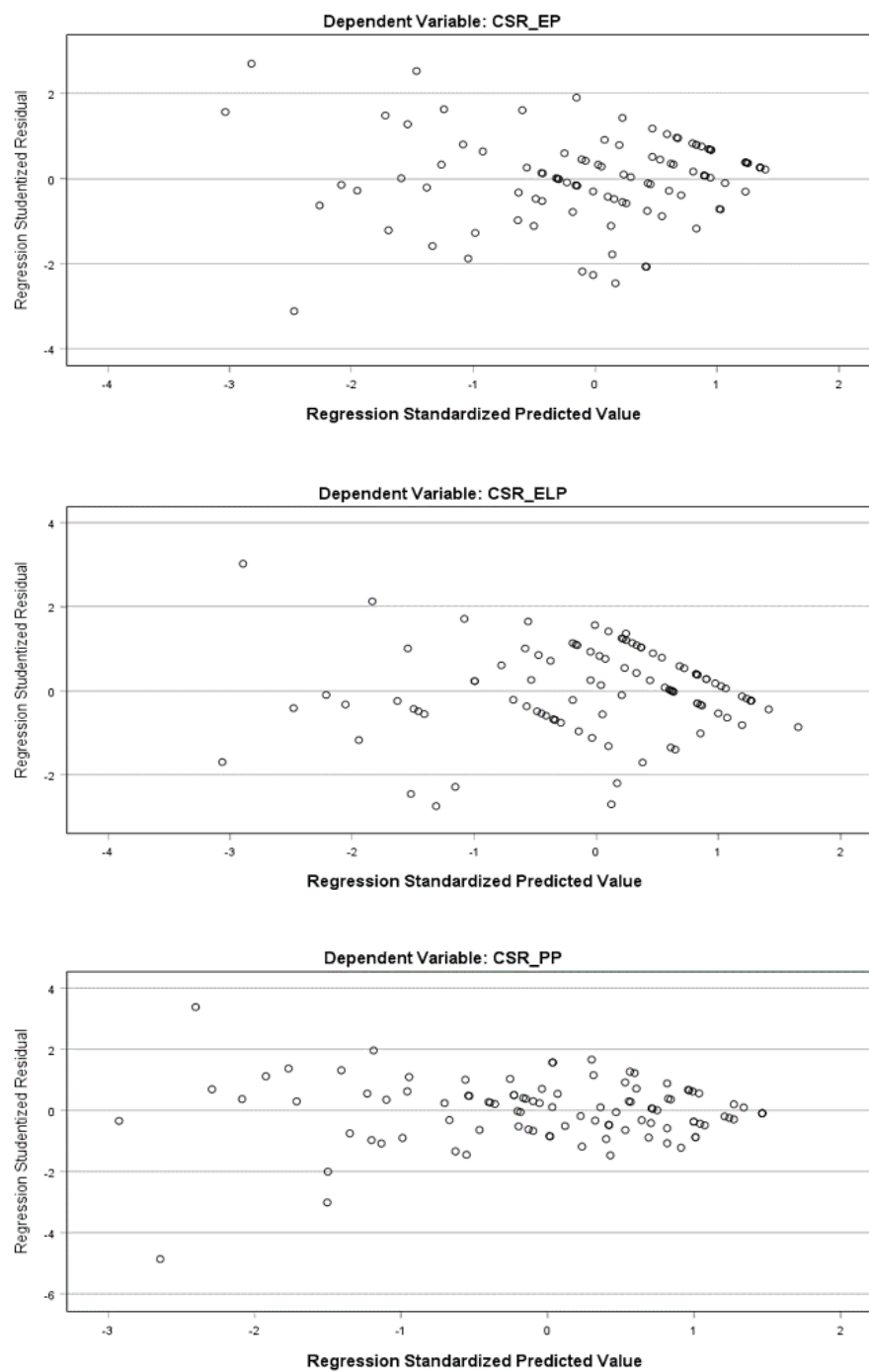
Collinearity Statistics

Dependent variable	Collinearity statistics	
	Tolerance	VIF
CSR_EP	0.846	1.182
CSR_ELP	0.846	1.182
CSR_PP	0.846	1.182

Note. Predictors = BDAU, CSRP.

Linearity

The assumption of linearity was largely met. Inspecting the scatterplots of standardized residuals versus predicted values indicates that the residuals do not follow a pronounced curve, supporting the overall validity of the linearity assumption for all models (see Figure 3). However, minor deviations were observed, particularly for CSR_EP, where slight clustering warrants further investigation. Despite this, the scatterplots for CSR_ELP and CSR_PP displayed sufficient scatter, indicating no substantial curvature. Additionally, partial regression plots confirmed a generally linear relationship between the independent and dependent variables, with no severe deviations from linearity (see Appendix R). Given the absence of significant patterns, no further transformations or adjustments are deemed necessary at this stage.

Figure 3*Regression Standardized**Note.* Source: SPSS.

Normality of Residuals

The assumption of normality of residuals is approximately met. Normal P-P plots and histograms for the dependent variables reveal that the residuals follow a distribution close to normal (see Figure 4, Figure 5). In the P-P plots, most points lie along the diagonal line, with only minor deviations at the extremes. The histograms display a bell-shaped distribution, with slight skewness and deviations observed at the tails for CSR_EP and CSR_ELP and minor peaks at the extremes for CSR_PP. However, these deviations are minimal and not substantial enough to indicate a violation of normality. Therefore, the normality assumption is reasonably satisfied.

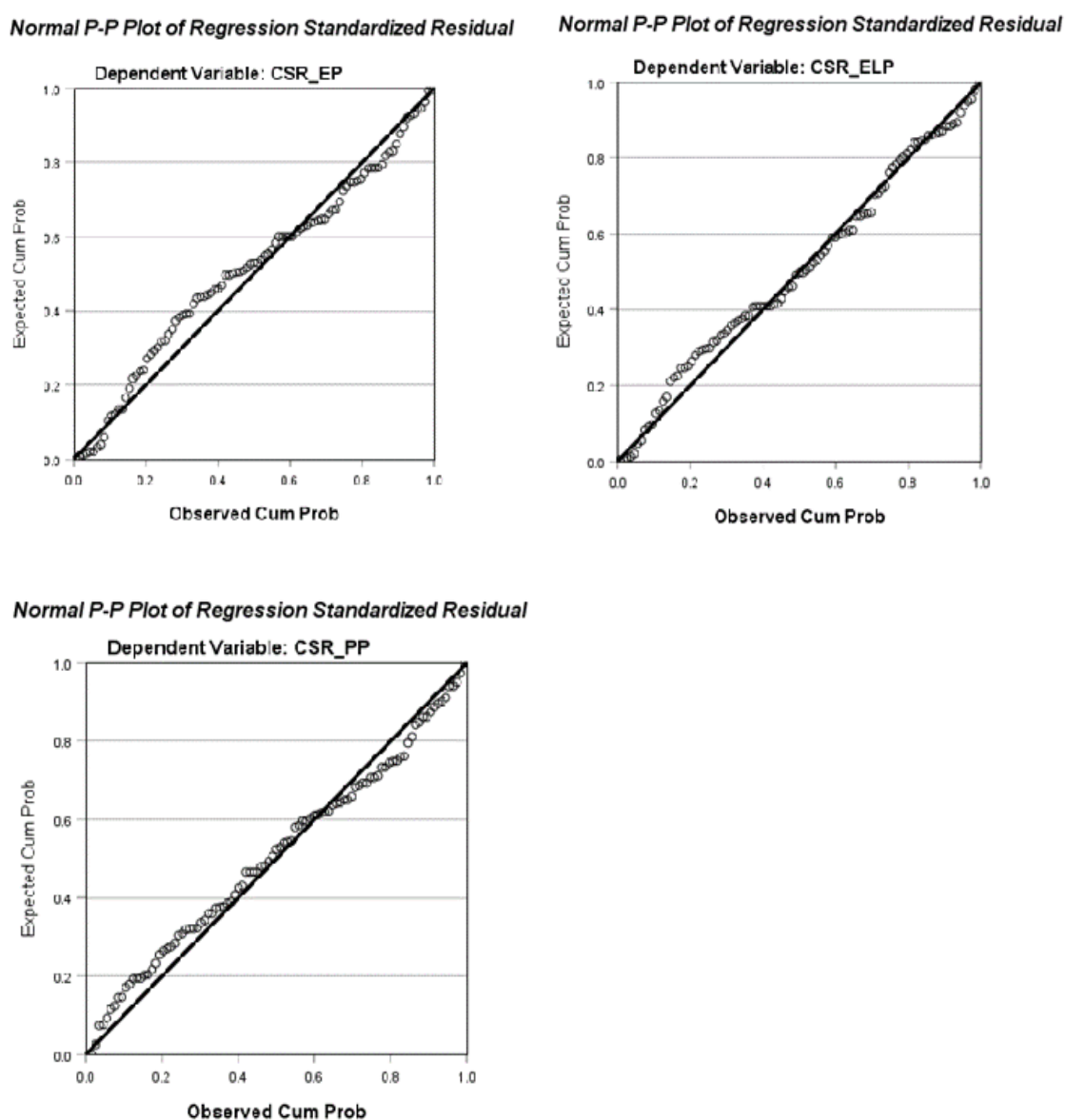
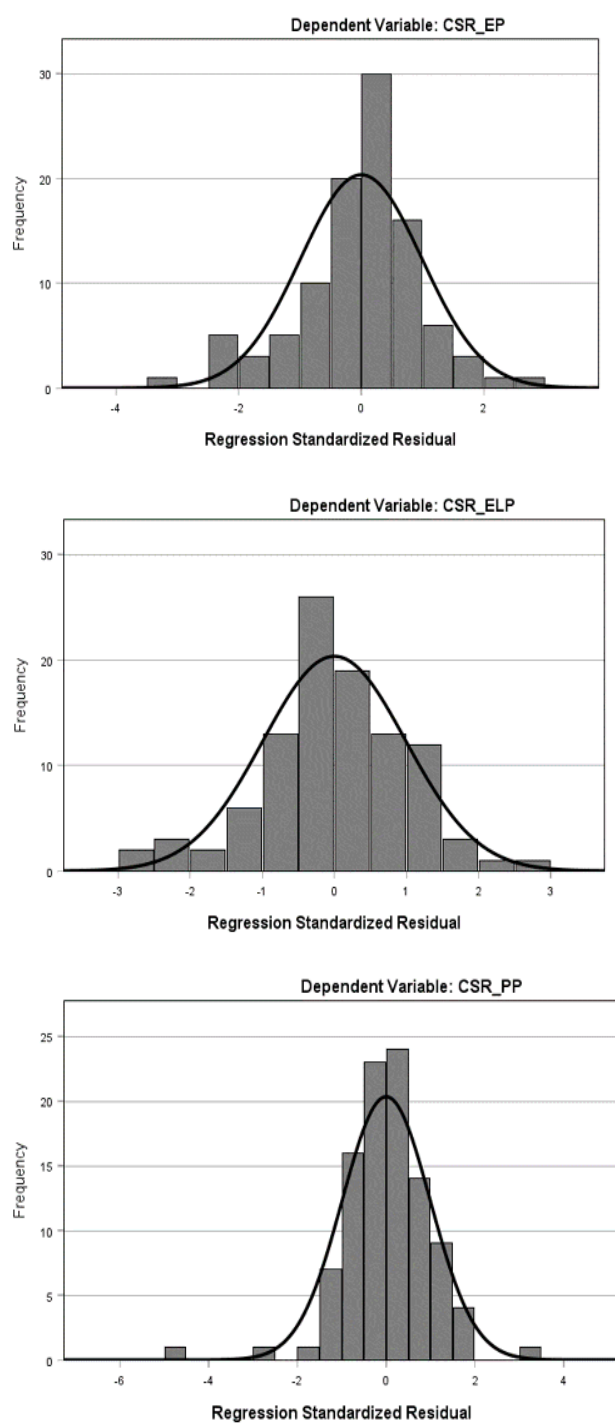
Figure 4*Regression Standardized Residual Normal P-P Plots**Note.* Source: SPSS.

Figure 5*Regression Standardized Residual Histograms*

Note. Source: SPSS.

Outliers and Influential Points

The assumption regarding outliers and influential points was partially met. Several cases were flagged as potential outliers based on studentized deleted residuals (SDRs). Notably, case 20240628115654 exhibited an SDR of -3.3573 for CSR_EP, and case 20240628110920 had an SDR of -8.7821 for CSR_ELP, both exceeding the ± 3 threshold typically used to identify outliers (see Table 8). Other cases, such as 20240628104703 for CSR_PP with an SDR of -5.4640, also showed elevated SDRs (greater than ± 2), though these did not meet the strict outlier threshold but were flagged for further scrutiny.

Table 8

Cases With High Studentized Deleted Residuals

Case number	SDR_1 (CSR_EP)	SDR_2 (CSR_ELP)	SDR_3 (CSR_PP)
20240628104703	2.3267	2.8095	-5.4640
20240628115654	-3.3573	0.2615	3.0222
20240628115559	1.2768	1.8507	-3.1099
20240628110920	3.2145	-8.7821	3.3816

Cook's distance values for all cases were below 1, suggesting that no single case had an undue influence on the regression models. However, two cases had leverage values that exceeded the accepted threshold, indicating potential influence on the model results. For example, case 20240623074257 displayed a leverage value of 0.3380 across all dependent variables (see Table 9). While this value suggests some degree of influence, it was not deemed large enough to invalidate the model's findings, nonetheless warranting attention.

Table 9*Cases With High Leverage Values*

Case number	LEV_1 (CSR_EP)	LEV_2 (CSR_ELP)	LEV_3 (CSR_PP)
20240623074257	0.3380	0.3380	0.3380
20240628102016	0.0587	0.0587	0.0587
20240628113257	0.0982	0.0982	0.0982
20240616163543	0.2120	0.2120	0.2120
20240626084324	0.1881	0.1881	0.1881
20240715035457	0.0875	0.0875	0.0875

Homoscedasticity

The assumption of homoscedasticity is not fully met. A visual inspection of scatterplots for standardized residuals versus predicted values indicated some deviation, particularly slight funneling for CSR_EP and CSR_ELP, suggesting potential heteroscedasticity (see Appendix S). Formal testing using the Breusch-Pagan test confirmed heteroscedasticity across both models. Table 10 summarizes the results obtained from the Python analysis, while the Python code used for the Breusch-Pagan test is provided in Appendix U.

In both Model 1, where BDAU is the independent variable and CSRP is the covariate, and Model 2, where CSRP is the independent variable and BDAU is the covariate, the Breusch-Pagan test revealed statistically significant evidence of heteroscedasticity. For CSR_EP, the p-value was 0.0071, indicating a violation of homoscedasticity. Similarly, for CSR_ELP, the p-value was 0.0445; for CSR_PP, the p-value was 0.0010. These results suggest that the variance of residuals is not constant across the levels of the predictors in both models, thus violating the assumption of homoscedasticity.

Table 10*Breusch-Pagan Test for Heteroscedasticity in Multivariate Models*

Dependent variable	Lagrange multiplier statistic	p-value	Assumption met
CSR_EP	9.8995	0.0071	No
CSR_ELP	6.2237	0.0445	No
CSR_PP	13.8000	0.0010	No

Note. In Model 1, independent variable = BDAU and Covariate = CSRP; in Model 2,

independent variable = CSRP and covariate = BDAU.

Handling Heteroscedasticity and Outliers

The assumption testing provided key diagnostic checks for this study's multivariate multiple linear regression models. While most assumptions were satisfied, attention was required for heteroscedasticity across both models and for identified outliers and influential points.

Since SPSS, the main tool used in the study, does not provide a straightforward way to conduct the Breusch-Pagan test, Python 3 code was employed on Google Colaboratory. The results of the Breusch-Pagan test indicated significant heteroscedasticity in both models, with p-values below 0.05 for all dependent variables, including CSR_EP, CSR_ELP, and CSR_PP. This confirmed the need for corrective measures to address the violation of the homoscedasticity assumption.

During the analysis, several cases were flagged as potential outliers and influential points based on studentized residuals and leverage values. Further investigation determined that these cases represented valid data points and were not resulting from data entry errors or anomalies. Therefore, they were retained in the analysis, as their removal could have led to the loss of valuable information that

accurately reflects the population being studied. Nonetheless, measures were needed to address the concerns these outliers brought.

Due to SPSS limitations in calculating robust standard errors, bootstrapping was employed as the most viable option to address heteroscedasticity and ensure stable parameter estimates. Bootstrapping was performed using 1,000 resamples, with a bias-corrected and accelerated (BCa) confidence interval set at 95%. A simple random sampling method was used, and no seed was specified for the Mersenne Twister random number generator to maintain randomness. This approach allowed for robust estimation of parameters, effectively addressing concerns related to heteroscedasticity, outliers, and influential points. As a result, the models produced valid and reliable findings, ensuring the robustness of the analysis.

Hypothesis Testing

The hypothesis testing examined the relationships between BDAU, CSRP, and three key CSR outcome dimensions: economic performance, ethical-legal performance, and philanthropic performance. Multivariate multiple linear regression assessed these relationships while controlling key covariates. The first model examined the effect of BDAU on CSR outcomes, while the second model evaluated the impact of CSRP. To enhance the reliability of parameter estimates, bootstrapping was conducted using 1,000 subsamples with bias-corrected 95% confidence intervals. Hypotheses were tested at a significance level of 0.05, with results presented for each research question.

Model 1: Big Data Analytics Use and CSR Outcomes

The multivariate results of Model 1 examined the relationship between BDAU and three dimensions of CSR outcomes—CSR_EP, CSR_ELP, and CSR_PP—while controlling for CSRP. The results indicated that the independent variables and covariates collectively predicted the variance in CSR outcomes. Table 11 summarizes the results of the statistical tests.

BDAU had a statistically significant effect on the combined CSR outcomes, specifically, $\Lambda = .348$, $F(34, 166) = 3.397$, $p < .001$, indicating that BDAU significantly influences the CSR dimensions. The associated partial eta squared value of $\eta^2 = .410$ suggests that BDAU accounts for 41.0% of the variance in CSR outcomes, a notable proportion indicating a meaningful effect of BDAU on CSRP.

Additionally, the covariate CSRP also exhibited a significant multivariate effect on the CSR outcomes, with $\Lambda = .145$, $F(2, 83) = 244.788$, $p < .001$, demonstrating that CSRP explains a substantial amount of the variance in CSR outcomes ($\eta^2 = .855$). This large effect size suggests that CSRP is a key driver of the various CSR dimensions.

Table 11

Model 1 Wilks' Lambda Multivariate Test Results

Factor	Λ	F	Hypothesis df	Error df	p	η^2
Intercept	0.930	3.104	2.000	83.000	0.050	0.070
BDAU	0.348	3.397	34.000	166.000	0.000	0.410
CSRP	0.145	244.788	2.000	83.000	0.000	0.855

H1: Relationship Between BDAU and CSR_EP Controlling for CSRP

For *H1*, the relationship between BDAU and economic performance controlling for CSRP was tested. The results indicated that BDAU does not have a statistically significant effect on CSR_EP, with $F(17, 84) = 1.476$, $p = .124$, and partial $\eta^2 = .230$ (see Table 12). This partial eta squared suggests that BDAU explains 23.0% of the variance in economic performance. The observed power for this effect is 0.843, indicating that the test had 84.3% power to detect a significant effect if one existed. However, since the p -value is not statistically significant, this explanatory power is not considered robust. Therefore, the null hypothesis, $H1_0$, was not rejected, indicating no evidence of a significant relationship between BDAU and economic performance in Ghanaian banks while controlling overall CSRP.

H2: Relationship Between BDAU and CSR_ELP Controlling for CSRP

For *H2*, the relationship between BDAU and ethical-legal performance controlling for CSRP was examined. The results showed a statistically significant effect. BDAU significantly influences CSR_ELP, with $F(17, 84) = 7.008$, $p < .001$, and partial $\eta^2 = .586$ (see Table 12). This partial eta squared indicates that BDAU explains 58.6% of the variance in ethical-legal performance, with an observed power of 1.000, indicating that the test had full power to detect an effect. Hence, the null hypothesis, $H2_0$, was rejected, confirming that BDAU was significantly related to ethical-legal performance in Ghanaian banks while controlling overall CSRP.

H3: Relationship Between BDAU and CSR_PP Controlling for CSRP

For H3, the relationship between BDAU and philanthropic performance controlling for CSRP was tested. The analysis produced $F(17, 84) = 1.907$, $p = .028$, and partial $\eta^2 = .278$ (see Table 12). This result suggests that BDAU explains 27.8% of the variance in philanthropic performance. The observed power for this effect is 0.933, indicating that the test had 93.3% power to detect a significant effect. Therefore, the null hypothesis, $H3_0$, was rejected, demonstrating that BDAU has a significant relationship with philanthropic performance in Ghanaian banks while controlling overall CSRP.

Table 12

Model 1 Tests of Between-Subjects Effects on CSR Outcomes

Source	DV	<i>df</i>	<i>F</i>	<i>p</i>	η^2	Observed power
Intercept	CSR_EP	1	3.479	0.066	0.040	0.454
	CSR_ELP	1	0.746	0.390	0.009	0.137
	CSR_PP	1	6.281	0.014	0.070	0.698
BDAU	CSR_EP	17	1.476	0.124	0.230	0.843
	CSR_ELP	17	7.008	0.000	0.586	1.000
	CSR_PP	17	1.907	0.028	0.278	0.938
CSRP	CSR_EP	1	89.625	0.000	0.516	1.000
	CSR_ELP	1	231.107	0.000	0.733	1.000
	CSR_PP	1	170.454	0.000	0.670	1.000

Note. Error *df* for each DV = 84, DV = Dependent variable, *df* = Degrees of freedom, *F* =

F-statistic, η^2 = Partial eta squared.

Covariate Impact for Model 1

The covariate, CSRP, exhibited a strong and statistically significant impact on all CSR outcomes in Model 1. The univariate results confirmed the substantial influence of CSRP across all three dimensions: CSR_EP, CSR_ELP, and CSR_PP.

For CSR_EP, CSRP had a highly significant effect, with $F(1, 84) = 89.625$, $p < .001$, and partial $\eta^2 = .516$ (see Table 12), indicating that CSRP explained 51.6% of the variance in economic performance. This reflects the critical role of CSRP in influencing economic outcomes.

Similarly, for CSR_ELP, CSRP demonstrated an even more substantial effect, with $F(1, 84) = 231.107$, $p < .001$, and partial $\eta^2 = .733$ (see Table 12). This means that CSRP accounted for 73.3% of the variance in ethical-legal performance, showing that CSRP is the model's dominant predictor for ethical-legal outcomes.

Lastly, for CSR_PP, CSRP also had a significant and notable effect, with $F(1, 84) = 170.454$, $p < .001$, and partial $\eta^2 = .670$ (see Table 12), explaining 67.0% of the variance in philanthropic performance. This underscores the broad and influential role of CSRP in shaping corporate philanthropic activities.

Model 2: CSRP and CSR Outcomes

The multivariate results for Model 2, which examined the relationship between CSRP and the CSR outcomes—CSR_EP, CSR_ELP, and CSR_PP—while controlling for BDAU, indicated that CSRP significantly impacts CSR outcomes. Like Model 1, the findings highlight the model's utility in explaining the variance in CSRP, demonstrating that both the independent variable and covariate significantly contribute to understanding the different dimensions of CSR outcomes. Table 13 summarizes the results of the multivariate tests.

CSRP demonstrated a statistically significant effect on the combined CSR outcomes, specifically, $\Lambda = .005$, $F(106, 94) = 11.567$, $p < .001$, indicating that CSRP

significantly influences the CSR dimensions. The associated partial eta squared value of $\eta^2 = .929$ suggests that CSRP accounts for 92.9% of the variance in CSR outcomes, a large proportion indicating a dominant role of overall CSRP in shaping CSR outcomes.

Additionally, BDAU, the covariate in this model, also showed a statistically significant multivariate effect on CSR outcomes, with $\Lambda = .679$, $F(2, 47) = 11.093$, $p < .001$, demonstrating that BDAU explains a substantial portion of the variance in CSR outcomes ($\eta^2 = .321$). This notable effect size suggests that BDAU remains an important factor influencing CSR outcomes.

Table 13

Model 2 Wilks' Lambda Multivariate Test Results

Factor	Λ	F	Hypothesis df	Error df	p	η^2
Intercept	0.014	1672.995	2.000	47.000	0.000	0.986
CSRP	0.005	11.567	106.000	94.000	0.000	0.929
BDAU	0.679	11.093	2.000	47.000	0.000	0.321

H4: Relationship Between CSRP and CSR_EP Controlling for BDAU

For H4, the relationship between CSRP and economic performance controlling for BDAU was tested. The results indicate that CSRP has a statistically significant effect on CSR_EP, with $F(53, 48) = 5.476$, $p < .001$, and partial $\eta^2 = .858$ (see Table 14). This partial eta squared suggests that CSRP explains 85.8% of the variance in economic performance. The observed power for this effect is 1.000, indicating that the test had full power to detect a significant effect. Therefore, the null hypothesis, H_{40} , was rejected, confirming that overall CSRP has a significant relationship with economic performance in Ghanaian banks while controlling for BDAU.

H5: Relationship Between CSRP and CSR_ELP Controlling for BDAU

In testing H5, the relationship between CSRP and ethical-legal performance controlling for BDAU was examined. The analysis demonstrated that CSRP significantly influences CSR_ELP, with $F(53, 48) = 20.567$, $p < .001$, and partial $\eta^2 = .958$ (see Table 14). This result indicates that CSRP explains 95.8% of the variance in ethical-legal performance, with an observed power of 1.000, suggesting the test had full power to detect an effect. Thus, the null hypothesis, $H5_0$, was rejected, confirming that CSRP is significantly related to ethical-legal performance in Ghanaian banks while controlling for BDAU.

H6: Relationship Between CSRP and CSR_PP Controlling for BDAU

For H6, the analysis tests the relationship between CSRP and CSR_PP. The results show that CSRP has a statistically significant effect on CSR_PP, with $F(53, 48) = 11.823$, $p < .001$, and partial $\eta^2 = .929$ (see Table 14). This suggests that CSRP explains 92.9% of the variance in philanthropic performance. The observed power for this effect is 1.000, indicating that the test had full power to detect a significant effect. Hence, the null hypothesis, $H6_0$, was rejected, demonstrating that CSRP has a significant relationship with philanthropic performance in Ghanaian banks while controlling for BDAU.

Table 14*Model 2 Tests of Between-Subjects Effects on CSR Outcomes*

Source	DV	<i>df</i>	<i>F</i>	<i>p</i>	η^2	Observed power
CSRP	CSR_EP	53	5.476	0.000	0.858	1.000
	CSR_ELP	53	20.567	0.000	0.958	1.000
	CSR_PP	53	11.823	0.000	0.929	1.000
BDAU	CSR_EP	1	3.019	0.089	0.059	0.399
	CSR_ELP	1	8.338	0.006	0.148	0.808
	CSR_PP	1	16.666	0.000	0.258	0.979

Note. Error *df* for each DV = 48, DV = Dependent variable, *df* = Degrees of freedom, *F* =

F-statistic, η^2 = Partial eta squared.

Covariate Impact for Model 2

The covariate, BDAU, demonstrated a statistically significant impact on all CSR outcomes in Model 2, though to a lesser extent than CSRP. The univariate results confirmed the influence of BDAU across the three dimensions: CSR_EP, CSR_ELP, and CSR_PP.

For CSR_EP, BDAU showed a marginal effect, with $F(1, 48) = 3.019$, $p = .089$, and partial $\eta^2 = .059$ (see Table 14), explaining 5.9% of the variance in economic performance. Although this effect approaches statistical significance, it suggests a relatively modest role for BDAU in economic outcomes when controlling for CSRP.

In contrast, BDAU had a stronger and more significant impact on CSR_ELP, with $F(1, 48) = 8.338$, $p = .006$, and partial $\eta^2 = .148$ (see Table 14). BDAU explained 14.8% of the variance in ethical-legal performance, indicating that BDA substantially influences ethical-legal outcomes.

Lastly, for CSR_PP, BDAU had a significant effect, with $F(1, 48) = 16.666$, $p < .001$, and partial $\eta^2 = .258$ (see Table 14), explaining 25.8% of the variance in philanthropic performance. This highlights BDA's important role in shaping corporate philanthropic initiatives, potentially by optimizing resource allocation and decision-making processes.

Post-Hoc Analysis: Interaction Between BDAU and CSRP

A post-hoc analysis explored the interaction between BDAU and CSRP and their combined influence on three key CSR outcomes: CSR_EP, CSR_ELP, and CSR_PP. The goal was to determine whether this interaction provided additional explanatory power beyond the individual effects of BDAU and CSRP. This analysis extends the primary model by focusing on how these variables interact to predict CSR outcomes.

The post-hoc model, outlined in Appendix V, revealed significant effects. Multivariate tests showed that the interaction between BDAU and CSRP had a statistically significant multivariate impact, with $\Lambda = .438$, $F(24, 142) = 3.020$, $p < .001$, and partial $\eta^2 = .338$. This indicates that the interaction explained 33.8% of the variance across CSR outcomes.

The results, detailed in Appendix W, further clarified the interaction's effects on individual CSR dimensions. For CSR_EP, the interaction between BDAU and CSRP was not significant, $F(12, 72) = 1.312$, $p = .231$, $\eta^2 = .179$, explaining 17.9% of the variance. However, the interaction had a significant effect on CSR_ELP, $F(12, 72) = 2.360$, $p = .013$, $\eta^2 = .282$, explaining 28.2% of the variance. The most substantial interaction effect

was observed for CSR_PP, $F(12, 72) = 5.004, p < .001, \eta^2 = .455$, accounting for 45.5% of the variance.

These findings suggest that while the interaction between BDAU and CSR_P does not significantly affect CSR_EP, it shapes both CSR_ELP and CSR_PP meaningfully. The significant interaction effects indicate that the combined influence of BDAU and CSR_P deepens our understanding of how organizations can enhance their ethical-legal and philanthropic performance.

Acknowledging the covariate CSR_P's pivotal role, which consistently emerged as a dominant predictor across all CSR dimensions, is crucial. In the primary and post-hoc analyses, CSR_P demonstrated substantial and statistically significant effects, particularly for CSR_EP and CSR_ELP, which explained 51.6% and 73.3% of the variance, respectively. Even when exploring the interaction between BDAU and CSR_P, the influence of CSR_P remained pronounced, reinforcing its critical role in shaping CSR outcomes. Any future investigation into BDAU's effects should account for CSR_P's substantial and consistent impact.

While these post-hoc findings provide valuable insights, they should be interpreted cautiously. Given that the analyses were exploratory and not part of the pre-registered hypotheses, the results are best considered hypothesis-generating. Further research is warranted to confirm these findings in other contexts. A longitudinal study of BDAU and CSR_P would clarify whether sustained BDAU efforts lead to long-term improvements in CSR outcomes. Additionally, a moderation and mediation study could explore whether factors such as organizational culture mediate or moderate the

relationship between BDAU and CSRP. Finally, a replication study with a larger sample size would offer greater statistical power and ensure that these interaction effects hold across a broader population.

Summary

The results chapter provided a comprehensive analysis of the relationships between BDAU, CSRP, and three key CSR outcome dimensions: economic performance, ethical-legal performance, and philanthropic performance. The study employed two multivariate multiple linear regression models to evaluate these relationships while controlling key covariates. To ensure the robustness of parameter estimates, bootstrapping was applied using 1,000 resamples with bias-corrected 95% confidence intervals. Hypotheses were tested at a significance level of 0.05.

In Model 1, the analysis examined the effect of BDAU on CSR outcomes while controlling for CSRP. The results showed that BDAU had a significant multivariate effect on CSR outcomes, particularly on ethical-legal and philanthropic performance, but no significant impact on economic performance. Therefore, while support was confirmed for H2_a and H3_a, no evidence was found to support H1_a. The covariate, CSRP, demonstrated a strong influence across all CSR outcomes, explaining a substantial proportion of the variance, with ethical-legal performance being the most affected. These findings highlight the critical role of CSRP in shaping CSR outcomes, whereas BDAU played a notable but limited role.

Model 2 focused on the effect of CSRP on CSR outcomes while controlling BDAU. CSRP had a highly significant effect across all three CSR dimensions, with the

greatest influence observed on ethical-legal and philanthropic outcomes. In contrast to Model 1, support was confirmed for H4_a, H5_a, and H6_a. BDAU, as a covariate in this model, also showed significant effects on CSR_ELP and CSR_PP, though its influence on economic performance remained insignificant.

Finally, a post-hoc analysis explored the interaction between BDAU and CSRP. The results demonstrated a significant interaction effect on ethical-legal and philanthropic outcomes, indicating that strong CSRP and data-driven practices enhance these CSR dimensions. However, the interaction between BDAU and CSRP was insignificant regarding economic performance. Overall, the interaction between BDAU and CSRP played an important role in shaping ethical-legal and philanthropic performance, emphasizing the value of integrating data analytics with robust CSR practices.

Chapter 5 transforms these empirical findings into strategic insights for practice. While Chapter 4 has revealed the statistical relationships between BDAU and CSR in Ghanaian banks, the following chapter interprets these findings within broader theoretical frameworks and practical contexts. This discussion synthesizes the quantitative results with implications for policy and practice, charting a course for financial institutions seeking to leverage data analytics for enhanced social impact in an increasingly digital African banking sector.

Chapter 5: Discussion, Conclusions, and Recommendations

This non-experimental quantitative correlational study aimed to examine the relationship between BDAU and CSRP across three key performance dimensions—economic, ethical-legal, and philanthropic—within the banking sector in Ghana. Employing a cross-sectional survey approach, this study utilized validated instruments and multivariate multiple regression techniques to quantify these relationships at a single point (Leedy et al., 2019; Pituch & Stevens, 2018). By addressing this intersection between BDAU and CSR, this research aimed to fill a significant gap in understanding how big data technologies might improve CSR outcomes in an era where banks are increasingly expected to reconcile financial imperatives with broader stakeholder expectations for ethical and socially responsible conduct (Choi & Park, 2022; Kusi-Sarpong et al., 2021).

The findings from this study were particularly salient given the growing reliance on BDA in business operations. While previous studies have explored CSR and financial performance relationships, limited research has delved into how the deployment of BDA influences various CSR dimensions, particularly in the Ghanaian banking context (Afful et al., 2018; Otchere et al., 2021). This study addressed this lacuna by analyzing how BDAU impacts economic, ethical-legal, and philanthropic performance (Calic & Ghasemaghaei, 2021; Choi & Park, 2022). Furthermore, by controlling CSRP, the study provided insights into the nuanced role BDAU plays alongside established CSR practices in shaping organizational performance.

The aim of this research was twofold: first, to determine whether BDAU significantly predicts CSRP outcomes, and second, to explore how CSRP as a covariate affects the relationship between BDAU and CSR dimensions. The study hypothesized that BDA would significantly predict CSR economic, ethical-legal, and philanthropic performance when controlling CSRP. Similarly, it was hypothesized that CSRP would significantly influence these CSR dimensions while controlling BDAU.

In this chapter, I interpret the study's findings in light of these aims, juxtaposing them with existing literature to assess the extent to which they confirmed, challenged, or extended prior knowledge. Additionally, I present a comprehensive discussion of the study's limitations, including concerns related to the generalizability, validity, and reliability of the findings. This is followed by a series of recommendations for future research and practice, particularly concerning leveraging BDA to bolster CSR initiatives in the banking industry. Finally, I discuss the broader implications for positive social change, specifically how data-driven strategies could support banks in aligning their operations with sustainable development goals and stakeholder expectations (Choi & Park, 2022; Van Der Merwe & Achkar, 2022).

By providing evidence-based insights into the relationship between BDAU and CSR, this study contributed to the growing discourse on how data-centric strategies can enhance financial and social outcomes in banking. It highlighted BDA and CSRP's critical role in navigating the complex balance between profitability and societal responsibility. These findings offered valuable guidance for banks seeking to optimize

their performance while maintaining a commitment to ethical practices, regulatory compliance, and philanthropic contributions.

Interpretation of Findings

The findings of this study provide critical insights into the relationship between BDAU and CSRP across economic, ethical-legal, and philanthropic dimensions in Ghanaian banks. This non-experimental, quantitative, correlational study aimed to investigate how BDAU contributes to different facets of CSRP, controlling for CSRP. The results presented in Chapter 4 showed varying levels of significance across the CSR dimensions, with BDAU playing a critical role in shaping ethical-legal and philanthropic outcomes. However, it showed no significant influence on economic performance. The following sections interpret these findings in light of the literature.

Economic Performance

RQ1 sought to determine whether BDAU significantly impacts CSR_EP when controlling CSRP. The results showed that BDAU did not significantly predict CSR_EP ($p = .124$), leading to the failure to reject the null hypothesis ($H1_0$). This outcome contrasts with existing literature that highlights the potential of big data for enhancing organizational innovation and economic outcomes (Calic & Ghasemaghaei, 2021; Li et al., 2022). In theory, BDA should optimize cost efficiencies and increase profitability by facilitating smarter decision-making. However, in the context of Ghanaian banks, this potential appears to remain underutilized.

Several reasons might explain this outcome. As He et al. (2022) and Gaayire et al. (2023) noted, using big data in financial sectors often depends on an institution's

technological infrastructure, data governance, and human capital. The results of this study suggest that Ghanaian banks may lack the advanced data infrastructures or managerial expertise necessary to capitalize fully on BDA for economic performance. This aligns with the findings of Shabbir and Gardezi (2020), who emphasized gaps in deploying advanced analytics capabilities, where BDAU is often restricted to basic querying and reporting rather than sophisticated predictive modeling or real-time decision-making. Moreover, limited access to skilled data analysts could further inhibit banks' ability to leverage big data effectively for economic gains (Nasrollahi et al., 2021).

Similarly, Akhtar et al. (2019) highlighted the crucial role of big data-savvy teams and multidisciplinary skills in transforming traditional business operations into data-driven insights that enhance business performance. Their findings suggest that without the necessary skills and cross-functional teams to interpret and act on big data, organizations may not realize the potential benefits of BDA. This further supports the notion that Ghanaian banks may lack the skilled personnel necessary to leverage BDA fully for economic performance.

However, it is worth noting that CSRP as a covariate demonstrated a significant positive relationship with economic performance, explaining 51.6% of the variance in CSR_EP, $F(1, 84) = 89.625, p < .001, \eta^2 = .516$. This suggests that CSR practices, such as responsible business operations and sustainable resource management, continue to drive economic performance without significant BDAU contributions. This finding corroborates research by Rehman et al. (2020), who reported that the economic dimension of CSR has a significant positive association with financial performance in

Islamic banks. Whereas Gaayire et al. (2023) emphasized the role of BDA in improving operational efficiency in Ghana's banking sector, this study shows that banks' CSR strategies, independent of advanced data analytics, remain crucial to achieving financial success.

Ethical-Legal Performance

RQ2 examined the relationship between BDAU and CSR_ELP while controlling for CSRP. The results revealed a significant and positive relationship between BDAU and CSR_ELP ($p < .001$), with BDAU explaining 58.6% of the variance (partial $\eta^2 = .586$). This finding supports rejecting the null hypothesis ($H2_0$) and highlights BDA's critical role in enhancing ethical-legal compliance within Ghanaian banks.

This result aligns with existing literature demonstrating that data-driven approaches effectively ensure regulatory compliance, improve transparency, and promote ethical behavior. Dubey et al. (2019) conceptualized big data and predictive analytics as an organizational capability that significantly predicts social and environmental performance, including ethical and legal obligations. Their study suggests that big data and predictive analytics enhances an organization's ability to address social responsibilities effectively, supporting the finding that BDAU positively influences CSR_ELP by providing the tools necessary for real-time compliance monitoring and ethical governance.

Similarly, He et al. (2022) argued that BDA enables organizations to monitor compliance with legal requirements in real time, identify violations, and mitigate risks before they escalate. In sectors like banking, where regulatory scrutiny is high, using

advanced analytics to ensure adherence to ethical and legal standards can significantly reduce the likelihood of financial penalties and reputational damage. Moreover, predictive analytics can anticipate legal challenges or unethical behaviors, enabling proactive interventions that bolster ethical governance (Calic & Ghasemaghaei, 2021).

However, while BDAU enhances ethical-legal performance, there are concerns regarding its limitations. Breidbach et al. (2019) cautioned that using BDA, particularly in areas involving customer data, could introduce ethical dilemmas related to privacy and transparency. Without stringent data governance frameworks, tools intended to promote ethical behavior could be misused, leading to privacy violations or discriminatory practices. This underscores the need for robust data governance and clear ethical guidelines when deploying BDA in CSR contexts (Van Der Merwe & Achkar, 2022). Despite these concerns, the positive impact of BDAU on CSR_ELP in this study suggests that, when appropriately managed, big data can be a powerful tool for promoting legal and ethical compliance in the banking sector.

Philanthropic Performance

RQ3 assessed the relationship between BDAU and philanthropic performance while controlling CSRP. The findings indicated a significant positive relationship between BDAU and CSR_PP ($p = .028$), with BDAU explaining 27.8% of the variance in philanthropic performance (partial $\eta^2 = .278$). This result leads to rejecting the null hypothesis ($H3_0$), suggesting that BDAU enhances philanthropic initiatives in Ghanaian banks.

The positive relationship between BDAU and CSR_PP was consistent with research emphasizing the role of data-driven strategies in identifying and prioritizing high-impact philanthropic activities (Calic & Ghasemaghaei, 2021). By leveraging BDA, organizations could assess societal needs more accurately and allocate resources to philanthropic efforts that generate the greatest social impact (Choi & Park, 2022; Dubey et al., 2019). For instance, banks could use big data to identify underserved communities or pressing social issues, ensuring their philanthropic efforts were timely and effective. This data-driven approach also allowed for greater accountability and transparency, as banks could track the outcomes of their charitable initiatives and adjust strategies as needed.

Nonetheless, some scholars raised concerns about the limitations of data-driven philanthropy. For instance, Da Bormida (2021) argued that although BDA could enhance the efficiency of philanthropic efforts, it might also lead to a narrowing focus on initiatives that produced easily measurable results, potentially neglecting more complex social issues that require long-term commitment. Additionally, Deigh and Farquhar (2021) observed that many philanthropic efforts by banks were driven by marketing considerations rather than genuine social impact, which could undermine the authenticity of data-driven philanthropy. Van Der Merwe and Achkar (2022) further emphasized the importance of data responsibility and ethical considerations in deploying BDA within CSR contexts. Despite these potential drawbacks, the results of this study suggested that when used judiciously, BDA could enhance the strategic alignment and effectiveness of philanthropic efforts in Ghanaian banks.

The Role of CSRP

RQ4–RQ6 explored the impact of CSRP on CSR_EP, CSR_ELP, and CSR_PP while controlling for BDAU. The results revealed that CSRP had a strong and statistically significant influence across all three CSR dimensions, particularly on CSR_ELP, where it explained 73.3% of the variance (partial $\eta^2 = .733$). These findings reinforced the centrality of CSRP in shaping economic, ethical, and philanthropic outcomes, consistent with the literature on stakeholder theory (Dmytriiev et al., 2021; Freeman, 1984; Freeman et al., 2021).

The significant influence of CSRP across all dimensions supported the argument that CSR practices addressing the needs of diverse stakeholders were essential for organizational success, particularly in highly regulated industries like banking (Agyapong et al., 2023; Donaldson & Preston, 1995; Rehman et al., 2020). By engaging in responsible business practices and demonstrating a commitment to ethical governance, banks could build trust with stakeholders, enhancing their overall performance (Dekoulou et al., 2023; Freeman et al., 2021). This finding was particularly relevant in the Ghanaian context, where stakeholders increasingly demanded greater transparency, accountability, and social responsibility from financial institutions (Amoako et al., 2021; Nyarku & Hinson, 2018). Studies on Ghanaian banks indicated that CSR initiatives positively impacted financial performance and stakeholder relationships (Anim et al., 2021; Asiedu et al., 2020), underscoring the practical significance of CSRP in the region.

Interaction Between BDAU and CSRP

An interaction effect between BDAU and CSRP was observed in the post-hoc analysis, revealing a significant impact on both ethical-legal and philanthropic performance, $\Lambda = .438$, $F(24, 142) = 3.020$, $p < .001$. This suggested combining BDAU with robust CSR practices amplified positive outcomes in these areas. This interaction aligned with the findings of Choi and Park (2022), who argued that when integrated with strong CSR frameworks, BDA could lead to more effective decision-making and improved social outcomes. Through the lens of RBV, this interaction suggests that banks effectively combining their BDAU capabilities with CSR practices create a unique, valuable, and difficult-to-imitate resource bundle that enhances their competitive advantage in ethical-legal and philanthropic dimensions. In the Ghanaian banking sector, Gaayire et al. (2023) also highlighted the potential benefits of such integration.

However, there was debate in the literature regarding the extent to which BDAU could enhance CSR outcomes without undermining the social and ethical values at the core of CSR (Breidbach et al., 2019). Some scholars warned that an over-reliance on data analytics could reduce CSR initiatives to quantifiable metrics, neglecting the broader, qualitative aspects of social responsibility that were harder to measure but equally important (Da Bormida, 2021). Van Der Merwe and Achkar (2022) emphasized the need for data responsibility and ethical guidelines in integrating BDAU with CSR practices. Nevertheless, the results of this study suggested that, at least in the Ghanaian banking sector, integrating BDAU with CSR practices could enhance both ethical-legal and philanthropic outcomes while maintaining core CSR values.

Limitations of the Study

Several limitations arose in this study that might affect its generalizability, validity, and reliability. Given this quantitative study's non-experimental, cross-sectional design, causal inferences could not be made between BDAU and CSRP. While the study used multivariate regression models to identify predictive relationships, it lacked the temporal sequencing or controlled interventions necessary to establish causality (Leedy et al., 2019; Wang & Cheng, 2020). The inability to track changes in variables over time further limited the study's capacity to draw definitive conclusions about the directionality of relationships.

One core limitation was the reliance on traditional BDA tools, which, while valuable, might not fully reflect the evolving capabilities of advanced technologies such as artificial intelligence (AI), ML, generative AI, and natural language models (NLMs). The study did not integrate these newer technologies, which could have provided more nuanced insights into CSRP. For instance, AI-driven predictive models and NLMs have the potential to analyze complex unstructured data and predict stakeholder behavior or sentiment in ways that traditional big data tools cannot. The absence of these advanced analytical techniques limited the study's ability to fully capture CSR's multidimensional and dynamic nature (Choi & Park, 2022; Da Bormida, 2021). Future research incorporating these technologies could offer deeper insights into optimizing CSR outcomes, particularly in ethical, legal, and philanthropic performance.

The reliance on self-reported employee data for both BDAU and CSRP introduced potential biases, which might have affected the trustworthiness of the

findings. As employees provided subjective assessments of their organization's use of big data and CSR activities, their responses might have been influenced by individual perceptions, organizational culture, or social desirability biases (Podsakoff et al., 2012). This limitation was further compounded by the study's sample composition, which was skewed toward younger male respondents, with 72.8% of the sample identifying as male and the majority of participants falling within the 25–34 age range (40.8%) and 35–44 age range (34.0%). The educational qualifications of the sample, where over 97% of respondents held either a bachelor's or master's degree, suggested a highly educated workforce. While this supported the reliability of their insights, it might also limit the generalizability of the findings to broader populations, particularly in more diverse or less educated banking sectors (Etikan et al., 2016).

Moreover, the focus on three specific dimensions of CSR—economic, ethical-legal, and philanthropic—excluded other critical aspects, such as environmental sustainability and governance, which are integral to a more comprehensive understanding of CSRP (Sarpong et al., 2023). This limitation is highlighted by Dubey et al. (2019), who found that big data and predictive analytics are strong predictors of social and environmental performance. Their research emphasizes the importance of including environmental sustainability as a key dimension when assessing the impact of BDAU on CSR. By excluding environmental factors, the current study may have overlooked significant areas where BDAU could contribute to CSR outcomes, particularly environmental sustainability. Although these dimensions were selected based on their relevance to the study's objectives and the CSR model applied, the exclusion of broader

CSR components limited the scope of the findings. Future studies could benefit from a more holistic approach with additional CSR dimensions to capture a fuller spectrum of corporate social performance (Taran & Mirkin, 2020).

Another limitation related to the generalizability of the findings beyond the Ghanaian banking context. While the study drew data from a diverse set of commercial, rural, and regional banks, most respondents worked in large institutions with more than 1,000 employees (47.6%). These larger banks are likely to have more resources, advanced technological infrastructure, and greater capacity to integrate BDA into their CSR activities compared to smaller institutions, which may limit the generalizability of the findings to smaller or less technologically advanced banks. Additionally, the predominance of commercial banks in the sample (84.5%) further narrowed the scope of generalizability to other types of financial institutions, such as microfinance or cooperative banks, which may have different approaches to CSR (Etikan et al., 2016).

The cross-sectional design also restricted the study's ability to capture temporal trends or changes in BDAU and CSRP over time. While the snapshot provided by this study offered valuable insights into the current state of these relationships, longitudinal research is needed to observe how BDAU and CSR evolve together and how external factors, such as regulatory changes and technological advancements, might influence their interaction (Wang & Cheng, 2020). For example, AI could significantly alter how banks use big data, especially in predictive modeling for CSR initiatives or real-time decision-making, which was beyond the scope of this study.

Finally, the availability of specialized data analytics talent, leadership support, and institutional maturity in deploying big data across the sampled banks could moderate the relationships observed between BDAU and CSR outcomes. Larger banks with more advanced data infrastructures and greater leadership buy-in may experience more pronounced benefits from BDAU, while smaller banks with fewer resources may struggle to realize similar gains (Choi & Park, 2022; He et al., 2022). Although the study's sample size was adequate to detect medium-sized effects, future research could focus on more granular subgroup analyses to determine how variations in bank size, technological sophistication, and leadership support affect the outcomes (Hünermund & Louw, 2020).

Recommendations

Grounded in the strengths and limitations of the current study, as well as insights from the literature reviewed in Chapter 2, the following recommendations outline potential avenues for future research. These recommendations remain within the study's boundaries, focusing on the intersection of BDAU and CSRP, particularly in the Ghanaian banking sector.

Expand Longitudinal Big Data and CSR Research

Given the cross-sectional design of this study, future research should adopt longitudinal designs to examine how BDAU and CSRP evolve over time. The current study highlights the relationship between BDAU and CSR dimensions at a single point in time, which limits conclusions about causality and the direction of the relationships. As Calic and Ghasemaghaei (2021) pointed out, continuous engagement with data analytics could reveal long-term impacts on both economic and social outcomes. Longitudinal

studies provide more robust insights into how consistent application of big data tools shapes CSRP over time, particularly as organizations deepen their integration of advanced analytics technologies, such as AI and ML (Choi & Park, 2022; Mikalef et al., 2020).

Incorporate AI/ML Into CSR Strategies

One limitation of the current study is the reliance on traditional BDA tools, which may not fully reflect the potential of advanced technologies such as AI, ML, and generative AI to optimize CSR outcomes (Choi & Park, 2022). Future research should explore how these advanced technologies can enhance CSRP in areas like ethical-legal compliance, philanthropic efforts, and stakeholder engagement. For instance, AI-driven models could predict ethical violations, while advanced analytics could create personalized CSR communications that resonate with diverse stakeholder groups (Van Der Merwe & Achkar, 2022). Research in this area can build upon the integration of stakeholder theory and the RBV discussed in Chapter 2 (Freeman et al., 2021), examining how AI-enabled insights can enhance stakeholder relationships and provide competitive advantages (Ghasemaghaei, 2019). Particularly in the Ghanaian banking sector, where studies have highlighted both the potential and challenges of integrating advanced analytics (Gaayire et al., 2023; Kwarko, 2020), research incorporating AI and ML could provide valuable insights.

Broaden CSR Context Beyond Three Dimensions

While the current study focused on economic, ethical-legal, and philanthropic CSR dimensions, future research should incorporate other critical components, such as

environmental sustainability and governance (Sarpong et al., 2023; Van Der Merwe & Achkar, 2022). Expanding CSR research to include environmental responsibility is increasingly vital, especially as stakeholder expectations grow around corporate contributions to environmental sustainability. Additionally, Shakil et al. (2019) found that environmental and social performance positively impact financial performance in emerging market banks, whereas governance performance does not. This suggests that including environmental sustainability in future studies could provide a more comprehensive understanding of how BDAU impacts CSRP and financial outcomes.

Governance—transparency, leadership accountability, and shareholder rights—is another important dimension that remains underexplored in Ghanaian banking (Nyarku & Hinson, 2018). A broader approach to CSR could offer a more comprehensive understanding of how BDAU impacts corporate responsibility across all relevant dimensions (Choi & Park, 2022). Leveraging BDAU can significantly impact corporate responsibility by providing insights into environmental performance and enhancing governance through improved data transparency and accountability (Van Der Merwe & Achkar, 2022). By including these additional dimensions, future research can capture a fuller spectrum of corporate social performance and better assess the comprehensive impact of BDAU on CSR.

Compare Banking Sectors and Regions

Given that the sample in this study predominantly consisted of large commercial banks in Ghana, future research could benefit from comparing how BDAU and CSRP manifest across different types of banks, such as rural, community, and microfinance

banks, and in various regions, particularly within sub-Saharan Africa. Agyapong et al. (2023) examined the effect of CSR on the performance of rural banks in Ghana and found that CSR had a significant negative effect on financial performance indicators like ROA and ROE while positively influencing net interest margin. Their study highlights that the impact of CSR may vary across different banking sectors. Therefore, comparing BDAU and CSRP across various types of banks could reveal important sector-specific dynamics and inform tailored strategies for leveraging BDA in CSR initiatives (Anim et al., 2021; Gaayire et al., 2023). Such studies could also explore regional differences in regulatory environments, data governance, and stakeholder expectations, further refining the generalizability of the findings (Amoako et al., 2021; Shakil et al., 2019).

Explore Factors Moderating Big Data and CSR Outcomes

This study highlighted the potential moderating effects of organizational factors, such as technological infrastructure, leadership support, and data analytics talent, on the relationship between BDAU and CSRP (Choi & Park, 2022; Ghasemaghaei, 2019). Future research should delve deeper into how these organizational factors shape the effectiveness of BDAU in driving CSR outcomes. For example, investigating how leadership buy-in or the availability of skilled data professionals influences CSR economic, ethical, and philanthropic performance could provide actionable insights for banks looking to improve their analytics capabilities (Chatterjee et al., 2022; Ghasemaghaei, 2019). Additionally, studies should explore how organizational culture affects the adoption of big data tools and the integration of AI into CSR strategies (Dubey et al., 2019; Mikalef & Gupta, 2021). Organizational culture plays a critical role in

facilitating or hindering technological adoption, influencing the success of BDAU in enhancing CSR outcomes. Understanding these moderating factors can help banks tailor their strategies to maximize the benefits of BDA in their CSR initiatives.

Assess Ethical Issues of Big Data in CSR

While BDAU was shown to enhance ethical-legal performance in this study, future research should critically examine the ethical challenges posed by big data and AI technologies, particularly concerning privacy, transparency, and potential biases (Breidbach et al., 2019). Ethical dilemmas related to data collection and usage and algorithmic decision-making could undermine CSR efforts if not addressed proactively (Da Bormida, 2021). Future research should explore the development of comprehensive data governance frameworks that ensure the ethical use of big data while aligning with CSR goals, especially in areas like customer privacy, ethical compliance, and social justice (Van Der Merwe & Achkar, 2022).

By addressing these areas, future studies can build on the strengths of the current research while addressing its limitations. These recommendations align with the stakeholder theory and RBV perspectives discussed in Chapter 2, offering pathways for expanding the understanding of how advanced data analytics can be leveraged to enhance CSRP across multiple dimensions (Freeman et al., 2021).

Implications

The implications of this study extend across theoretical, methodological, and practical domains, with significant contributions to both scholarly discourse and real-world applications. This research adds to the growing body of knowledge regarding data-

driven CSR initiatives within the Ghanaian banking sector by exploring the interplay between BDAU and CSRP. The findings provide a deeper understanding of how BDA influences CSR's economic, ethical-legal, and philanthropic dimensions and underscore the broader implications for social change, organizational practices, and policy development. The subsequent discussion elaborates on these implications, emphasizing individual, organizational, and societal roles and offering methodological and theoretical insights to guide future research and practice.

Social Change

This study has meaningful implications for positive social change at multiple levels, particularly within the banking sector in Ghana. By demonstrating the relationship between BDAU and CSRP, the findings offer practical insights that can promote socially responsible practices across the individual, organizational, and societal levels without exceeding the boundaries of the research.

At the individual level, bank employees who engage with data-driven CSR strategies can experience an enhanced sense of purpose and responsibility. Employees who see their organization leveraging data analytics to achieve ethical, legal, and philanthropic goals may feel more motivated and connected to their mission. This can foster an inclusive work environment where employees are encouraged to contribute to social causes and align their personal values with the organization's CSR objectives (Boadi et al., 2019). Additionally, data-driven CSR efforts may improve employee well-being by ensuring ethical practices, such as fair wages and safe working conditions, are aligned with organizational transparency and responsibility (Dekoulou et al., 2023).

At the organizational level, integrating BDA into CSR strategies can significantly enhance how bank leaders manage their social responsibilities. Predictive analytics, AI, and ML could allow organizations to anticipate societal needs and respond proactively, particularly in ethical-legal compliance and philanthropic endeavors. For example, BDAU can help organizations identify underserved communities and strategically allocate resources for maximum social impact. This aligns with the findings of this study, which indicate that BDAU plays a critical role in improving CSRP in ethical-legal and philanthropic dimensions. Bank leaders and employees can improve their CSR effectiveness by leveraging advanced analytics, thus fostering trust and loyalty among customers and other stakeholders (Choi & Park, 2022).

At the societal/policy level, this study highlights the potential for banks to align their CSR initiatives with broader social goals, such as sustainable development and social justice. By integrating advanced technologies, such as AI and NLMs, into CSR strategies, banks can enhance their ability to address pressing social issues like poverty, inequality, and environmental sustainability (Horng et al., 2022). Policymakers could encourage the adoption of data-driven CSR approaches by offering incentives to banks that demonstrate measurable impacts on societal welfare through data-informed strategies (Van Der Merwe & Achkar, 2022). Moreover, findings from this study can inform regulatory bodies on the importance of creating frameworks that ensure the ethical use of BDA in advancing CSR objectives, protecting individual privacy, and promoting transparency (Da Bormida, 2021). The implications for positive social change include the potential for Ghanaian bank leaders to navigate the evolving landscape of data

technologies with advanced analytics and robust CSR frameworks to balance profitability and societal responsibility in Ghana and beyond.

Methodological Implications

Methodologically, this study contributed to the empirical examination of the relationship between BDAU and CSRP using a non-experimental, quantitative, correlational design. Multivariate multiple regression techniques enabled the identification of predictive relationships between BDA and CSR dimensions (economic, ethical-legal, and philanthropic), providing a robust statistical framework for analyzing complex, multidimensional data. Future research could expand upon this methodological approach by incorporating longitudinal designs, allowing researchers to track the evolution of BDAU's influence on CSR over time and offering deeper insights into causality (Leedy et al., 2019; Wang & Cheng, 2020).

The study also demonstrated the utility of validated instruments, such as the adapted measures from Salmones et al. (2005) for CSRP, in capturing stakeholder perspectives on how banks fulfill their social responsibilities. By employing these validated instruments, the study ensured that the data collected were reliable and valid, strengthening the credibility of the findings (Leedy et al., 2019; Salmones et al., 2005). By using these instruments in the Ghanaian banking context, the study validated their applicability in emerging markets, offering a methodological foundation for future research in similar contexts. This contributes to a global understanding of CSRP measurement and underscores the importance of using standardized tools for comparability across different settings.

Theoretical Implications

Theoretically, this study advances the integration of stakeholder theory (Freeman, 1984) and the RBV (Barney, 1991) in understanding the relationship between BDAU and CSR. Stakeholder theory posits that organizations are responsible for considering the interests of all stakeholders, not just shareholders, while the RBV focuses on how organizations can leverage their resources, such as BDA, to gain competitive advantages. This study contributes to theoretical literature by illustrating how BDAU can serve as a strategic resource that helps banks meet the needs of their stakeholders, particularly in ethical-legal and philanthropic domains (Ozdemir et al., 2023).

By leveraging BDAU as a valuable resource, banks can create sustainable competitive advantages by effectively addressing stakeholder concerns, thus aligning with both RBV and stakeholder theory (Barney, 1991; Freeman et al., 2021). This integration underscores how internal capabilities in data analytics enhance the organization's ability to meet diverse stakeholder expectations, particularly in areas like ethical compliance and social contributions. Furthermore, the study shows that CSRP is a key covariate in understanding the relationship between BDAU and CSR dimensions, reinforcing the relevance of stakeholder theory in guiding socially responsible business practices. By emphasizing the importance of leveraging internal resources (i.e., BDAU) to address multifaceted stakeholder needs, the study adds depth to the RBV literature, particularly in the context of CSR and big data (Ozdemir et al., 2023).

Empirical Implications

Empirically, this study provided evidence that BDAU significantly influenced ethical-legal and philanthropic CSRP in the Ghanaian banking sector. These findings aligned with the emerging body of research highlighting the growing role of big data in shaping CSR strategies, particularly in highly regulated industries like banking (Choi & Park, 2022; Gaayire et al., 2023). The study's empirical results suggested that banks could enhance compliance and philanthropic initiatives by investing in advanced data analytics tools and capabilities. By doing so, banks fulfilled their ethical and social responsibilities, strengthened stakeholder relationships, and built trust, which is essential in the banking industry (Freeman et al., 2021).

Moreover, the finding that BDAU did not significantly influence economic CSRP indicated the need to explore further the conditions under which BDA can generate financial returns through CSR initiatives. While BDA enhanced certain CSR dimensions, their impact on economic aspects might be limited or indirect. This suggested that additional factors might mediate or moderate the relationship between BDAU and economic CSRP, warranting further investigation (Calic & Ghasemaghaei, 2021). Understanding these conditions could help banks develop strategies to leverage BDA for economic benefits within their CSR activities.

Recommendations for Practice

To maximize the impact of CSR initiatives, banks should take a proactive approach by investing in advanced data analytics capabilities. By integrating technologies like AI, ML, and NLMs into their CSR strategies, banks can gain deeper insights into

societal trends and emerging needs. These tools enable organizations to predict challenges and opportunities more effectively, enhancing their ability to design philanthropic initiatives that resonate with stakeholders. For instance, AI-driven analytics can help banks identify underserved communities or anticipate future social issues, allowing them to respond with tailored CSR programs that address these concerns head-on (Choi & Park, 2022).

Equally important is the need to strengthen data governance and uphold high ethical standards as BDA becomes a core element of CSRP. Banks must establish robust frameworks that protect customer privacy, ensure data transparency, and mitigate potential biases in the data-driven decision-making process. Such governance frameworks not only safeguard stakeholder trust but also ensure that the social impact of CSR programs is maximized while adhering to ethical and legal obligations. Implementing robust data governance is essential to ensure ethical data use and maintain stakeholder trust (Da Bormida, 2021). By collaborating with regulatory bodies, banks can align their data governance practices with legal requirements, ensuring compliance and reinforcing public trust (Van Der Merwe & Achkar, 2022).

Additionally, banks should prioritize stakeholder engagement in their data-driven CSR strategies. By involving stakeholders in the decision-making processes of CSR program design and execution, banks can ensure that their initiatives align with the most pressing societal concerns. This inclusive approach fosters greater trust and loyalty between banks and their stakeholders, as the programs directly address the needs and expectations of those affected (Freeman et al., 2021). Effective stakeholder engagement

can also enhance the long-term sustainability of CSR initiatives, making them more responsive and impactful.

By embracing advanced data analytics, reinforcing ethical data governance, and actively engaging stakeholders, banks can significantly enhance the effectiveness of their CSR efforts. This study underscores the importance of these practices in the Ghanaian banking sector, offering a roadmap for institutions seeking to improve their social responsibility initiatives. In doing so, banks can drive positive social change, benefiting their organizations and communities. These findings provide a strong foundation for future research and offer practical insights for banks that leverage big data for sustainable, impactful CSR programs.

Conclusions

This study examined the relationship between BDAU and CSRP across economic, ethical-legal, and philanthropic dimensions within the Ghanaian banking sector, shedding light on how these relationships shape responsible business practices. The findings demonstrate that BDA significantly enhances ethical-legal and philanthropic performance, reinforcing its role in advancing responsible business practices. However, its impact on economic performance remains limited, suggesting that current infrastructure and expertise in Ghanaian banks may hinder its full potential for financial outcomes. The study also highlights the importance of integrating BDA with strong CSR practices to create synergies that boost organizational performance. Notably, CSRP emerged as a powerful covariate influencing all three CSR dimensions, underscoring the value of socially responsible practices in shaping sustainable banking operations.

The implications of this research are far-reaching. It offers practitioners actionable insights into leveraging BDA for enhanced CSR outcomes, especially in ethical compliance and philanthropic activities. For policymakers and stakeholders, the study provides a foundation for advocating data-driven CSR initiatives that align with sustainable development goals. As banks navigate the evolving landscape of data technologies, the combination of advanced analytics and robust CSR frameworks presents an opportunity to balance profitability and societal responsibility, ultimately contributing to positive social change in Ghana and beyond.

References

- Adamska, A., & Dąbrowski, T. J. (2021). Investor reactions to sustainability index reconstitutions: Analysis in different institutional contexts. *Journal of Cleaner Production*, 297, Article 126715. <https://doi.org/10.1016/j.jclepro.2021.126715>
- Adu-Gyamfi, M., He, Z., Nyame, G., Boahen, S., & Frempong, M. F. (2021). Effects of internal CSR activities on social performance: The employee perspective. *Sustainability*, 13(11), Article 6235. <https://doi.org/10.3390/su13116235>
- Afful, E., Adu-Manu, K. S., Yamoah, G. G., Abdulai, J. D., Gyamfi, N. K., Adjei, E., Wiafe, I., & Katsriku, F. A. (2018). Redefining the concept of big data: A Ghanaian perspective. *Journal of Science and Development*, 2(1), 38–51. https://www.researchgate.net/profile/Edem-Adjei/publication/332672718_Redefining_the_Concept_of_Big_Data_A_Ghanaian_Perspective/links/5cc2ef2e92851c8d220590b6/Redefining-the-Concept-of-Big-Data-A-Ghanaian-Perspective.pdf
- Agyapong, E. K., Annor, L. D. J., & Ohemeng, W. (2023). Corporate social responsibility and performance among rural banks in Ghana: The moderating role of governance structures. *International Journal of Social Economics*, 51(1), 31–45. <https://doi.org/10.1108/ijse-02-2023-0116>
- Akbari, M., & McClelland, R. (2020). Corporate social responsibility and corporate citizenship in sustainable supply chain: A structured literature review. *Benchmarking: An International Journal*, 27(6), 1799–1841. <https://doi.org/10.1108/bij-11-2019-0509>

- Akhtar, P., Frynas, J. G., Mellahi, K., & Ullah, S. (2019). Big Data-Savvy teams' skills, Big Data-Driven actions and business performance. *British Journal of Management*, 30(2), 252–271. <https://doi.org/10.1111/1467-8551.12333>
- Akter, S., Wamba, S. F., Gunasekaran, A., Dubey, R., & Childe, S. J. (2016). How to improve firm performance using big data analytics capability and business strategy alignment? *International Journal of Production Economics*, 182, 113–131. <https://doi.org/10.1016/j.ijpe.2016.08.018>
- Alexopoulos, E. C. (2010). Introduction to multivariate regression analysis. *Hippokratia*, 14(Suppl 1), 23–28. <https://pubmed.ncbi.nlm.nih.gov/21487487>
- AlShehhi, M. R., Cherian, J. P., Farouk, S., & Nahyan, M. T. A. (2023). Influential dynamic capabilities and small and medium enterprises' internationalization success: Mediating role of international entrepreneurial orientation. *Review of International Business & Strategy*, 33(1), 55–78. <https://doi.org/10.1108/ribs-12-2021-0171>
- Alyahya, M., Aliedan, M., Agag, G., & Abdelmoety, Z. H. (2023). Understanding the relationship between big data analytics capabilities and sustainable performance: The role of strategic agility and firm creativity. *Sustainability*, 15(9), Article 7623. <https://doi.org/10.3390/su15097623>
- Amoako, G. K., Ansah, E. K., Baah-Ofori, R., & Som, G. N. K. (2021). Corporate social responsibility, firm reputation, and reputational risks: A case of the banking sector in Ghana. In N. Ray & A. Bag (Eds.), *Corporate social responsibility (CSR) practices: Toward economic, environmental, and social balance* (1st ed., pp. 177–

- 199). Apple Academic Press. <https://doi.org/10.1201/9781003146414>
- Amoh, J. K., Awunyo-Vitor, D., & Ofori-Boateng, K. (2020). Customers' awareness and knowledge level of fraudulent acts in electronic banking in Ghana: Evidence from a universal bank. *Journal of Financial Crime*, 28(3), 870–882.
<https://doi.org/10.1108/jfc-08-2020-0161>
- Amo-Mensah, M. (2021). Corporate social responsibility in contemporary Ghana: A literature review. *International Journal of Business and Management Review*, 9(5), 78–93. <https://doi.org/10.37745/ijbmr.2013>
- Andersson, S., Svensson, G., Molina-Castillo, F., Del Carmen Otero Neira, M., Lindgren, J., Karlsson, N., & Laurell, H. (2022). Sustainable development—Direct and indirect effects between economic, social, and environmental dimensions in business practices. *Corporate Social Responsibility and Environmental Management*, 29(5), 1158–1172. <https://doi.org/10.1002/csr.2261>
- Anim, R. O., Amaning, N., Quartey, J. A., & Frimpong, P. T. (2021). Exploring the impact of corporate social responsibility on the financial performance of rural and community banks in Ghana. *International Business Research*, 14(2), 37.
<https://doi.org/10.5539/ibr.v14n2p37>
- Appiahene, P., Missah, Y. M., & Najim, U. (2019). Evaluation of information technology impact on bank's performance: The Ghanaian experience. *International Journal of Engineering Business Management*, 11, 1–10.
<https://doi.org/10.1177/1847979019835337>
- Apreku-Djana, P. K., Ayittah, S. K., Apreku, I. K. O., Ameyaw, F., & Opare, E. A.

- (2023). The mediating effect of corporate social responsibility and corporate accountability in the relationship between corporate governance and value-based financial performance of banks. *International Journal of Business*, 28(2), 1–36. [https://doi.org/10.55802/ijb.028\(2\).003](https://doi.org/10.55802/ijb.028(2).003)
- Asiaei, K., Bontis, N., Askari, M. R., Yaghoubi, M., & Barani, O. (2023). Knowledge assets, innovation ambidexterity and firm performance in knowledge-intensive companies. *Journal of Knowledge Management*, 27(8), 2136–2161. <https://doi.org/10.1108/jkm-04-2022-0277>
- Asiedu, M. A., Yalley, E., Boakye, K. O., Oduro, R., & Adu, I. N. (2020). Corporate social responsibility and financial performance amongst rural and community banks in Ghana. *Journal of Economics and Business*, 3(3), 1073–1094. <https://doi.org/10.31014/aior.1992.03.03.264>
- Bank of Ghana. (2021, May). *Corporate governance directive for rural and community banks*. Retrieved January 10, 2023, from <https://www.bog.gov.gh/wp-content/uploads/2021/05/bog-notice-no-9-corporate-governance-directive-for-rcbs-final.pdf>
- Bank of Ghana. (2024). *Supervision & regulation*. Retrieved January 10, 2024, from <https://www.bog.gov.gh/supervision-regulation/>
- Bansal, P., & DesJardine, M. R. (2014). Business sustainability: It is about time. *Strategic Organization*, 12(1), 70–78. <https://doi.org/10.1177/1476127013520265>
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>

- Barney, J. B. (2018). Why resource-based theory's model of profit appropriation must incorporate a stakeholder perspective. *Strategic Management Journal*, 39(13), 3305–3325. <https://doi.org/10.1002/smj.2949>
- Beldad, A., Seijdel, C. T., & De Jong, M. D. (2019). Managing corporate social responsibility (CSR) together: The effects of stakeholder participation and third-Party organization (TPO) endorsement on CSR initiative effectiveness. *Corporate Reputation Review*, 23(4), 225–240. <https://doi.org/10.1057/s41299-019-00082-0>
- Bertello, A., Ferraris, A., Bresciani, S., & De Bernardi, P. (2020). Big data analytics (BDA) and degree of internationalization: The interplay between governance of BDA infrastructure and BDA capabilities. *Journal of Management & Governance*, 25(4), 1035–1055. <https://doi.org/10.1007/s10997-020-09542-w>
- Boachie, C. (2020). Corporate social responsibility and financial performance in the banking industry in Ghana. *International Journal of Sustainable Entrepreneurship and Corporate Social Responsibility*, 5(2), 86–104. <https://doi.org/10.4018/ijsecsr.2020070106>
- Boadi, E. A., He, Z., Bosompem, J., Opata, C. N., & Boadi, E. K. (2019). Employees' perception of corporate social responsibility (CSR) and its effects on internal outcomes. *Service Industries Journal*, 40(9–10), 611–632. <https://doi.org/10.1080/02642069.2019.1606906>
- Boateng, E., Amoako, S., Amoako, K., Acheampong, K., & Abraham, A. (2022). The Role Impact of corporate social responsibility (CSR) in building small and medium enterprises (SMEs) brand image in Ghana. *International Journal of*

Current Science Research and Review, 05(05), 1542–1561.

<https://doi.org/10.47191/ijcsrr/v5-i5-17>

Bousdekis, A., Lepenioti, K., Apostolou, D., & Mentzas, G. (2021). A review of data-driven decision-making methods for Industry 4.0 maintenance applications.

Electronics, 10(7), Article 828. <https://doi.org/10.3390/electronics10070828>

Breidbach, C. F., Davern, M., Shanks, G., & Asadi-Someh, I. (2019). On the ethical implications of big data in service systems. In P. P. Maglio, C. A. Kieliszewski, J. C. Spohrer, K. Lyons, L. Patrício, & Y. Sawatani (Eds.), *Handbook of Service Science: Vol. II* (pp. 661–674).

https://www.academia.edu/download/59318889/62_Polese_Barile_Loia_Carrubbo_2018_Handbook20190519-98789-1mt852p.pdf#page=670

Brin, P., & Nehme, M. (2019). Corporate social responsibility: Analysis of theories and models. *Eureka: Social and Humanities*, 5, 22–30. <https://doi.org/10.21303/2504-5571.2019.001007>

Brosnan, K., Kemperman, A., & Dolničar, S. (2019). Maximizing participation from online survey panel members. *International Journal of Market Research*, 63(4), 416–435. <https://doi.org/10.1177/1470785319880704>

Calic, G., & Ghasemaghaei, M. (2021). Big data for social benefits: Innovation as a mediator of the relationship between big data and corporate social performance. *Journal of Business Research*, 131, 391–401.

<https://doi.org/10.1016/j.jbusres.2020.11.003>

Capurro, R., Fiorentino, R., Garzella, S., & Giudici, A. (2021). Big data analytics in

- innovation processes: Which forms of dynamic capabilities should be developed and how to embrace digitization? *European Journal of Innovation Management*, 25(6), 273–294. <https://doi.org/10.1108/ejim-05-2021-0256>
- Carroll, A. B. (1979). A three-dimensional conceptual model of corporate performance. *Academy of Management Review*, 4(4), 497–505. <https://doi.org/10.2307/257850>
- Carroll, A. B. (1991). The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders. *Business Horizons*, 34(4), 39–48. [https://doi.org/10.1016/0007-6813\(91\)90005-g](https://doi.org/10.1016/0007-6813(91)90005-g)
- Chatterjee, S., Chaudhuri, R., Vrontis, D., & Thrassou, A. (2022). Impacts of big data analytics adoption on firm sustainability performance. *Qualitative Research in Financial Markets*, 15(4), 589–607. <https://doi.org/10.1108/qrfm-01-2022-0005>
- Cho, B., Dayrit, T. E., Gao, Y., Wang, Z., Hong, T., Sim, A., & Wu, K. (2020). Effective missing value imputation methods for building monitoring data. In *2020 IEEE International Conference on Big Data (Big Data)* (pp. 2866–2875). IEEE. <https://doi.org/10.1109/bigdata50022.2020.9378230>
- Choi, H.-Y., & Park, J. (2022). Do data-driven CSR initiatives improve CSR performance? The importance of big data analytics capability. *Technological Forecasting and Social Change*, 182, Article 121802. <https://doi.org/10.1016/j.techfore.2022.121802>
- Cillo, V., Castellano, S., Lamotte, O., Ardito, L., & Del Giudice, M. (2020). The managerial implications of assessing corporate social performance. *Corporate Social Responsibility and Environmental Management*, 27(3), 1521–1524.

<https://doi.org/10.1002/csr.1903>

Coertjens, L., Donche, V., De Mæyer, S., Vanthournout, G., & Van Petegem, P. (2017).

To what degree does the missing-data technique influence the estimated growth in learning strategies over time? A tutorial example of sensitivity analysis for longitudinal data. *PLOS ONE*, 12(9), Article e0182615.

<https://doi.org/10.1371/journal.pone.0182615>

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.).

Lawrence Erlbaum Associates.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2014). *Applied multiple*

regression/correlation analysis for the behavioral sciences (2nd ed.). Psychology

Press eBooks. <https://doi.org/10.4324/9781410606266>

Crişan-Mitra, C. S., Stanca, L., & Dabija, D.-C. (2020). Corporate social performance:

An assessment model on an emerging market. *Sustainability*, 12(10), Article

4077. <https://doi.org/10.3390/su12104077>

Curtis, E. M., Comiskey, C., & Dempsey, O. (2016). Importance and use of correlational

research. *Nurse Researcher*, 23(6), 20–25. <https://doi.org/10.7748/nr.2016.e1382>

Da Bormida, M. (2021). The Big Data world: Benefits, threats and ethical challenges. In

R. Iphofen, & Dónal O'Mathúna (Eds.), *Ethical issues in covert, security and*

surveillance research (pp. 71–91). <https://doi.org/10.1108/s2398->

[601820210000008007](https://doi.org/10.1108/s2398-601820210000008007)

Deigh, L., & Farquhar, J. D. (2021). Developing corporate social responsibility in

financial services: Engaging stakeholders. *International Journal of Bank*

- Marketing*, 39(3), 478–496. <https://doi.org/10.1108/ijbm-07-2020-0410>
- Dekoulou, P., Anastasopoulou, A., & Trivellas, P. (2023). Employee performance implications of CSR for organizational resilience in the banking industry: The mediation role of psychological empowerment. *Sustainability*, 15(15), Article 11946. <https://doi.org/10.3390/su151511946>
- Dembek, K., York, J., & Singh, P. J. (2018). Creating value for multiple stakeholders: Sustainable business models at the base of the pyramid. *Journal of Cleaner Production*, 196, 1600–1612. <https://doi.org/10.1016/j.jclepro.2018.06.046>
- Dmytriiev, S., Freeman, R. E., & Hörisch, J. (2021). The relationship between stakeholder theory and corporate social responsibility: Differences, similarities, and implications for social issues in management. *Journal of Management Studies*, 58(6), 1441–1470. <https://doi.org/10.1111/joms.12684>
- Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review*, 20(1), 65–91. <https://doi.org/10.5465/amr.1995.9503271992>
- Du, S., Akremi, A. E., & Wang, T. (2022). Quantitative research on corporate social Responsibility: A quest for relevance and rigor in a quickly evolving, turbulent world. *Journal of Business Ethics*, 187(1), 1–15. <https://doi.org/10.1007/s10551-022-05297-6>
- Dubey, R., Gunasekaran, A., Childe, S. J., Papadopoulos, T., Luo, Z., Wamba, S. F., & Roubaud, D. (2019). Can big data and predictive analytics improve social and environmental sustainability? *Technological Forecasting and Social Change*, 144,

534–545. <https://doi.org/10.1016/j.techfore.2017.06.020>

Edu, A. S. (2022). Positioning big data analytics capabilities towards financial service agility. *Aslib Proceedings*, 74(4), 569–588. <https://doi.org/10.1108/ajim-08-2021-0240>

Ekeocha, D. O., Ogbuabor, J. E., & Orji, A. (2021). Public infrastructural development and economic performance in Africa: A new evidence from panel data analysis. *Economic Change and Restructuring*, 55(2), 931–950. <https://doi.org/10.1007/s10644-021-09334-8>

Elayan, M. B., Hayajneh, J. A., Abdellatif, M. a. M., & Abubakar, A. M. (2022). Knowledge-based HR practices, π -shaped skills and innovative performance in the contemporary organizations. *Kybernetes*, 52(9), 3102–3118. <https://doi.org/10.1108/k-08-2021-0737>

Elkington, J. (1997). *Cannibals with forks: The triple bottom line of 21st century business*. Capstone.

Etikan, İ., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4. <https://doi.org/10.11648/j.ajtas.20160501.11>

Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, 26(2), 132–139. <https://doi.org/10.1016/j.chb.2009.10.015>

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research*

- Methods*, 41(4), 1149–1160. <https://doi.org/10.3758/brm.41.4.1149>
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE.
- Firempong-Boakye, K. K. A., & Navarra, D. (2023). Investigation into the use of big data and analytics in Ghanas insurance industry. In *7th FEB International Scientific Conference: Strengthening Resilience by Sustainable Economy and Business – Towards the SDGs* (pp. 377–384). <https://doi.org/10.18690/um.epf.3.2023.42>
- Fisher, N. I. (2021). Performance Measurement: Issues, approaches, and opportunities. *Harvard Data Science Review*, 3(4), 1–29.
<https://doi.org/10.1162/99608f92.c28d2a68>
- Flatt, C., & Jacobs, R. L. (2019). Principle assumptions of regression analysis: Testing, techniques, and statistical reporting of imperfect data sets. *Advances in Developing Human Resources*, 21(4), 484–502.
<https://doi.org/10.1177/1523422319869915>
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.
- Freeman, R. E., & Dmytriiev, S. (2017). Corporate social responsibility and stakeholder theory: Learning from each other. *Symphonya*, 1, 7–15.
<https://doi.org/10.4468/2017.1.02freeman.dmytriiev>
- Freeman, R. E., Dmytriiev, S., & Phillips, R. A. (2021). Stakeholder theory and the resource-based view of the firm. *Journal of Management*, 47(7), 1757–1770.
<https://doi.org/10.1177/0149206321993576>
- Friedman, M. (1962). *Capitalism and freedom*. University of Chicago Press.
- Friedman, M. (1970, September 13). A Friedman doctrine—The social responsibility of

business is to increase its profits. *The New York Times*. Retrieved August 3, 2023, from <https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html>

Gaayire, R., Nikoi, S. N., & Adams, R. (2023). Improving banking and financial services in Ghana with big data analytics, a case study of Amantin and Kasei community bank. *International Journal of Latest Technology in Engineering & Management (IJLTEM)*, 8(2), 7–13. https://www.researchgate.net/profile/solomon-nikoi-4/publication/370231490_improving_banking_and_financial_services_in_ghana_with_big_data_analytics_a_case_study_of_amantin_and_kasei_community_bank/links/6447b5f48ac1946c7a4d6017/improving-banking-and-financial-services-in-ghana-with-big-data-analytics-a-case-study-of-amantin-and-kasei-community-bank.pdf

Gaille, L. (2017, September 12). *13 Advantages of disadvantages of longitudinal studies*. <https://vittana.org/13-advantages-of-disadvantages-of-longitudinal-studies>

Garson, G. D. (2012). Testing statistical assumptions: Blue book series. *Asheboro: Statistical Associate Publishing*, 12(15), 1–54. <https://docslib.org/doc/8837724/testing-statistical-assumptions-2012-edition>

Gasti, J. G., Ameyibor, J., & Quansah, E. (2021). Corporate social responsibility and bank performance: A cointegration approach. *Journal of Business & Enterprise Development*, 8, 31–59. <https://doi.org/10.47963/jobed.v8i0.118>

Ghasemaghaei, M. (2019). Are firms ready to use big data analytics to create value? The role of structural and psychological readiness. *Enterprise Information Systems*,

13(5), 650–674. <https://doi.org/10.1080/17517575.2019.1576228>

Ghasemaghaei, M., & Calic, G. (2019). Can big data improve firm decision quality? The role of data quality and data diagnosticity. *Decision Support Systems*, 120, 38–49. <https://doi.org/10.1016/j.dss.2019.03.008>

Grant, R. M. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. *California Management Review*, 33(3), 114–135. <https://doi.org/10.2307/41166664>

Grant, S. W., Hickey, G. L., & Head, S. J. (2019). Statistical primer: Multivariable regression considerations and pitfalls†. *European Journal of Cardio-Thoracic Surgery*, 55(2), 179–185. <https://doi.org/10.1093/ejcts/ezy403>

Griffith, R., & Van Reenen, J. (2021). *Product market competition, creative destruction and innovation*. <https://doi.org/10.1920/wp.ifs.2021.4321>

Gupta, M., & George, J. F. (2016). Toward the development of a big data analytics capability. *Information & Management*, 53(8), 1049–1064. <https://doi.org/10.1016/j.im.2016.07.004>

Hair, J., Babin, B. J., Black, W. C., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.

He, W., Hung, J., & Liu, L. (2022). Impact of big data analytics on banking: A case study. *Journal of Enterprise Information Management*, 36(2), 459–479. <https://doi.org/10.1108/jeim-05-2020-0176>

Heggestad, E. D., Scheaf, D. J., Banks, G. C., Hausfeld, M. M., Tonidandel, S., & Williams, E. B. (2019). Scale adaptation in Organizational Science Research: A

- review and best-practice recommendations. *Journal of Management*, 45(6), 2596–2627. <https://doi.org/10.1177/0149206319850280>
- Hermes, S., Böhm, M., & Krcmar, H. (2019). Business model innovation and stakeholder: Exploring mechanisms and outcomes of value creation and destruction. *Wirtschaftsinformatik Und Angewandte Informatik*, 1754–1768. <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1314&context=wi2019>
- Horng, J., Liu, C., Chou, S., Yu, T., & Hu, D. (2022). Role of big data capabilities in enhancing competitive advantage and performance in the hospitality sector: Knowledge-based dynamic capabilities view. *Journal of Hospitality and Tourism Management*, 51, 22–38. <https://doi.org/10.1016/j.jhtm.2022.02.026>
- Hughes, D. J. (2018). Psychometric validity: Establishing the accuracy and appropriateness of psychometric measures. *The Wiley Handbook of Psychometric Testing: A Multidisciplinary Approach to Survey, Scale, and Test Development*, 751–779. <https://doi.org/10.1002/9781118489772.ch24>
- Hünermund, P., & Louw, B. (2020). On the nuisance of control variables in regression analysis. *Organizational Research Methods*, 0(0), 1–14. <https://doi.org/10.1177/10944281231219274>
- Hung, J., He, W., & Shen, J. (2020). Big data analytics for supply chain relationship in banking. *Industrial Marketing Management*, 86, 144–153. <https://doi.org/10.1016/j.indmarman.2019.11.001>
- Ilseven, E., & Puranam, P. (2021). Measuring organizational resilience as a performance outcome. *Journal of Organization Design*, 10(3–4), 127–137.

<https://doi.org/10.1007/s41469-021-00107-1>

Kabeyi, M. J. B. (2019). Organizational strategic planning, implementation and evaluation with analysis of challenges and benefits for profit and nonprofit organizations. *International Journal of Applied Research*, 5(6), 27–32.

<https://doi.org/10.22271/allresearch.2019.v5.i6a.5870>

Kabir, M., & Chowdhury, S. S. (2023). Empirical analysis of the corporate social responsibility and financial performance causal nexus: Evidence from the banking sector of Bangladesh. *Asia Pacific Management Review*, 28(1), 1–12.

<https://doi.org/10.1016/j.apmr.2022.01.003>

Kamboj, S., & Rana, S. (2023). Big data-driven supply chain and performance: A resource-based view. *The Tqm Journal*, 35(1), 5–23. <https://doi.org/10.1108/tqm-02-2021-0036>

Kang, H. (2021). Sample size determination and power analysis using the G*Power software. *Journal of Educational Evaluation for Health Professions*, 18, 17.

<https://doi.org/10.3352/jeehp.2021.18.17>

Khan, S. Z., Yang, Q., & Waheed, A. (2018). Investment in intangible resources and capabilities spurs sustainable competitive advantage and firm performance. *Corporate Social Responsibility and Environmental Management*, 26(2), 285–295. <https://doi.org/10.1002/csr.1678>

Kruggel, A., Tiberius, V., & Fabro, M. (2020). Corporate Citizenship: Structuring the research field. *Sustainability*, 12(13), 5289. <https://doi.org/10.3390/su12135289>

Kuokkanen, H., & Sun, W. (2019). Companies, meet ethical consumers: Strategic CSR

- management to impact consumer choice. *Journal of Business Ethics*, 166(2), 403–423. <https://doi.org/10.1007/s10551-019-04145-4>
- Kusi-Sarpong, S., Orji, I. J., Gupta, H., & Kunc, M. (2021). Risks associated with the implementation of big data analytics in sustainable supply chains. *Omega*, 105, 1–52. <https://doi.org/10.1016/j.omega.2021.102502>
- Kwarko, I. K. (2020). Big data in Ghana. In *Seventh SG13 Regional Workshop on “Standardization of Future Networks towards Building a Better Connected Africa.”* ITU-T. https://www.itu.int/en/ITU-T/Workshops-and-Seminars/standardization/20200203/Documents/Big-Data-Ghana_v1.pdf
- Laerd Statistics. (n.d.). *Statistical Tests*. Retrieved March 1, 2024, from <https://statistics.laerd.com/features-tests.php>
- Leedy, P. D., Ormrod, J. E., & Johnson, L. R. (2019). *Practical research: Planning and design*. Pearson.
- Li, L., Lin, J., Ouyang, Y., & Luo, X. (2022). Evaluating the impact of big data analytics usage on the decision-making quality of organizations. *Technological Forecasting and Social Change*, 175, 121355. <https://doi.org/10.1016/j.techfore.2021.121355>
- Lin, S., & Lin, J. (2023). How organizations leverage digital technology to develop customization and enhance customer relationship performance: An empirical investigation. *Technological Forecasting and Social Change*, 188, 122254. <https://doi.org/10.1016/j.techfore.2022.122254>
- Liu, Y., Li, W., Wang, L., & Meng, Q. (2023). Why greenwashing occurs and what happens afterwards? A systematic literature review and future research agenda.

Environmental Science and Pollution Research, 30(56), 118102–118116.

<https://doi.org/10.1007/s11356-023-30571-z>

Lutfi, A., Al-Khasawneh, A. L., Almaiah, M. A., Alshira'h, A. F., Alshirah, M. H.,
Alsyouf, A., Alrawad, M., Al-Khasawneh, A., Saad, M., & AlAli, R. (2022).

Antecedents of big data analytic adoption and impacts on performance:

Contingent effect. *Sustainability*, 14(23), 1–23.

<https://doi.org/10.3390/su142315516>

Mariani, M. M., Al-Sultan, K., & De Massis, A. V. (2021). Corporate social
responsibility in family firms: A systematic literature review. *Journal of Small
Business Management*, 61(3), 1192–1246.

<https://doi.org/10.1080/00472778.2021.1955122>

McGahan, A. M. (2021). Integrating insights from the resource-based view of the firm
into the new stakeholder theory. *Journal of Management*, 47(7), 1734–1756.

<https://doi.org/10.1177/0149206320987282>

Mensah, J. K. (2019). Talent management and talented employees' attitudes: mediating
role of perceived organisational support. *International Review of Administrative
Sciences*, 85(3), 527–543. <https://doi.org/10.1177/0020852319844318>

Miah, M. T., Saha, K. B., & Karim, R. (2019). The role of private commercial bank in
corporate social responsibility with reference to Islami Bank Bangladesh Limited.

OAlib, 06(05), 1–14. <https://doi.org/10.4236/oalib.1105422>

Mikalef, P., Boura, M., Lekakos, G., & Krogstie, J. (2019). Big data analytics capabilities
and innovation: The mediating role of dynamic capabilities and moderating effect

of the environment. *British Journal of Management*, 30(2), 272–298.

<https://doi.org/10.1111/1467-8551.12343>

Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. *Information & Management*, 58(3), 103434.

<https://doi.org/10.1016/j.im.2021.103434>

Mikalef, P., Krogstie, J., Pappas, I. O., & Pavlou, P. A. (2020). Exploring the relationship between big data analytics capability and competitive performance: The mediating roles of dynamic and operational capabilities. *Information & Management*, 57(2), 103169. <https://doi.org/10.1016/j.im.2019.05.004>

Mikalef, P., Van De Wetering, R., & Krogstie, J. (2021). Building dynamic capabilities by leveraging big data analytics: The role of organizational inertia. *Information & Management*, 58(6), 103412. <https://doi.org/10.1016/j.im.2020.103412>

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of Management Review*, 22(4), 853–886.

<https://doi.org/10.5465/amr.1997.9711022105>

Munir, S., Rasid, S. Z. A., Aamir, M., Jamil, F., & Ahmed, I. (2022). Big data analytics capabilities and innovation effect of dynamic capabilities, organizational culture and role of management accountants. *Foresight*, 25(1), 41–66.

<https://doi.org/10.1108/fs-08-2021-0161>

Muthuri, J. N., Arnold, M. G., Gold, S., & Rueda, X. (2020). *Base of the pyramid*

markets in Africa. <https://doi.org/10.4324/9780429424175>

- Narteh, B., & Braimah, M. (2020). Corporate reputation and retail bank selection: The moderating role of brand image. *International Journal of Retail & Distribution Management*, 48(2), 109–127. <https://doi.org/10.1108/ijrdm-08-2017-0164>
- Nasrollahi, M., Ramezani, J., & Sadraei, M. (2021). The impact of big data adoption on SMEs' performance. *Big Data and Cognitive Computing*, 5(4), 68. <https://doi.org/10.3390/bdcc5040068>
- Nguyen, K. Q. T. (2022). Corporate social responsibility and bank's performance under the mediating role of customer satisfaction and bank reputation. *Emerging Science Journal*, 6(6), 1409–1429. <https://doi.org/10.28991/esj-2022-06-06-012>
- Niresh, J. A., & Silva, W. H. E. (2018). The nexus between corporate social responsibility disclosure and financial performance: Evidence from the listed banks, finance and insurance companies in Sri Lanka. *Accounting and Finance Research*, 7(2), 65. <https://doi.org/10.5430/afr.v7n2p65>
- Niu, Y., Ying, L., Yang, J., Bao, M., & Sivaparthipan, C. B. (2021). Organizational business intelligence and decision making using big data analytics. *Information Processing and Management*, 58(6), 1–13. <https://doi.org/10.1016/j.ipm.2021.102725>
- Nkyekyer, J., Clifford, S. A., Mensah, F., Wang, Y., Chiu, L., & Wake, M. (2021). Maximizing participant engagement, participation, and retention in cohort studies using digital methods: Rapid review to inform the next generation of very large birth cohorts. *Journal of Medical Internet Research*, 23(5), e23499.

<https://doi.org/10.2196/23499>

Nyarku, K. M., & Hinson, R. E. (2018). Corporate social responsibility reporting of banks operating in Ghana. *African Journal of Business Ethics*, 11(2), 19–37.

<https://doi.org/10.15249/11-2-146>

Obeng, A. Y., & Mkhize, P. L. (2019). Assessment of IS -innovation strategic alignment factors among universal banks in Ghana. *The Electronic Journal of Information Systems in Developing Countries*, 85(4), 1–13. <https://doi.org/10.1002/isd2.12077>

Öberseder, M., Schlegelmilch, B. B., Murphy, P. E., & Gruber, V. (2013). Consumers' perceptions of corporate social responsibility: Scale development and validation. *Journal of Business Ethics*, 124(1), 101–115. <https://doi.org/10.1007/s10551-013-1787-y>

O'Connell, M., & Ward, A. M. (2020). Shareholder theory/Shareholder value. In *Springer eBooks* (pp. 1–7). https://doi.org/10.1007/978-3-030-02006-4_49-1

Olabode, O. E., Boso, N., Hultman, M., & Leonidou, C. N. (2022). Big data analytics capability and market performance: The roles of disruptive business models and competitive intensity. *Journal of Business Research*, 139, 1218–1230.

<https://doi.org/10.1016/j.jbusres.2021.10.042>

O'Neill, A. (2024, February 2). *Ghana: Urbanization from 2012 to 2022*. Statista.

Retrieved February 12, 2024, from

<https://www.statista.com/statistics/455827/urbanization-in-ghana/>

Otchere, S. K., Nyamewaa, E. B., & Hammond, F. L. (2022). Big data characteristics and innovation performance in Ghanaian manufacturing firms: The role of the big

- data team? *OALib*, 09(02), 1–13. <https://doi.org/10.4236/oalib.1108378>
- Otchere, S. K., Tian, H., Coffie, C. P. K., & Hammond, F. L. (2021). Heterogeneous analysis of the nexus between big data analytics and value co-creation: Insight from selected service businesses in Ghana. *Technium Social Sciences Journal*, 25, 533–543. <https://doi.org/10.47577/tssj.v25i1.4869>
- Ozdemir, S., De Arróyabe, J. C. F., Sena, V., & Gupta, S. (2023). Stakeholder diversity and collaborative innovation: Integrating the resource-based view with stakeholder theory. *Journal of Business Research*, 164, 1–16. <https://doi.org/10.1016/j.jbusres.2023.113955>
- Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (7th ed.). McGraw-Hill.
- Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, 14(3), 179–191. <https://doi.org/10.1002/smj.4250140303>
- Pirson, M. (2019). A humanistic perspective for management theory: Protecting dignity and promoting well-being. *Journal of Business Ethics*, 159(1), 39–57. <https://doi.org/10.1007/s10551-017-3755-4>
- Pituch, K. A., & Stevens, J. P. (2018). Applied multivariate statistics for the social sciences. In *Routledge eBooks* (6th ed.). Routledge.
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63(1), 539–569. <https://doi.org/10.1146/annurev-psych->

[120710-100452](#)

- Porter, M. E. (1980). *Techniques for analyzing industries and competitors*. The Free Press.
- Rehman, Z. U., Zahid, M., Rahman, H. U., Asif, M., Alharthi, M., Irfan, M., & Głowacz, A. (2020). Do corporate social responsibility disclosures improve financial performance? A perspective of the Islamic banking industry in Pakistan. *Sustainability*, 12(8), 3302. <https://doi.org/10.3390/su12083302>
- Rendtorff, J. D. (2021). Managing for the common Good: Rethinking the business corporation beyond profit-maximization. In *Ethical economy* (pp. 177–196). https://doi.org/10.1007/978-3-030-81743-5_11
- Rietveld, J., & Schilling, M. A. (2020). Platform competition: A systematic and interdisciplinary review of the literature. *Journal of Management*, 47(6), 1528–1563. <https://doi.org/10.1177/0149206320969791>
- Ritala, P., Albareda, L., & Bocken, N. (2021). Value creation and appropriation in economic, social, and environmental domains: Recognizing and resolving the institutionalized asymmetries. *Journal of Cleaner Production*, 290, 125796. <https://doi.org/10.1016/j.jclepro.2021.125796>
- Sabharwal, R., & Miah, S. J. (2021). A new theoretical understanding of big data analytics capabilities in organizations: A thematic analysis. *Journal of Big Data*, 8(1). <https://doi.org/10.1186/s40537-021-00543-6>
- Salmones, M. D. M. G. D. L., Crespo, A. S., & Del Bosque, I. R. (2005). Influence of corporate social responsibility on loyalty and valuation of services. *Journal of*

Business Ethics, 61(4), 369–385. <https://doi.org/10.1007/s10551-005-5841-2>

Salunke, S., Weerawardena, J., & McColl-Kennedy, J. R. (2019). The central role of knowledge integration capability in service innovation-based competitive strategy. *Industrial Marketing Management*, 76, 144–156.

<https://doi.org/10.1016/j.indmarman.2018.07.004>

Sarpong, F. A., Sappor, P., Nyantakyi, G., Ahakwa, I., Agyeiwaa, O. E., & Cobbinah, B. B. (2023). From traditional roots to digital bytes: Can digitalizing ESG improves Ghanaian rural banks' brand equity through stakeholder engagement, and customer loyalty? *Cogent Business & Management*, 10(2).

<https://doi.org/10.1080/23311975.2023.2232159>

Sasu, D. D. (2023, December 21). *Banking industry in Ghana - Statistics & facts*.

Statista. Retrieved December 28, 2023, from

<https://www.statista.com/topics/10469/banking-industry-in-ghana/>

Seeram, E. (2019). An overview of correlational research. *Radiologic Technology*, 91(2), 176–179.

https://www.academia.edu/35153807/Importance_and_use_of_correlational_research_pdf

Serra, M., Psarra, S., & O'Brien, J. (2018). Social and physical characterization of urban contexts: Techniques and methods for quantification, classification and purposive sampling. *Urban Planning*, 3(1), 58–74. <https://doi.org/10.17645/up.v3i1.1269>

Shabbir, M. Z., & Gardezi, S. S. S. (2020). Application of big data analytics and organizational performance: The mediating role of knowledge management

practices. *Journal of Big Data*, 7(1), 1–17. <https://doi.org/10.1186/s40537-020-00317-6>

- Shahadat, M. M. H., Chowdhury, A. H. M. Y., Nathan, R. J., & Fekete-Farkas, M. (2023). Digital technologies for firms' competitive advantage and improved supply chain performance. *Journal of Risk and Financial Management*, 16(2), 94. <https://doi.org/10.3390/jrfm16020094>
- Shakil, M., Mahmood, N., Tasnia, M., & Munim, Z. H. (2019). Do environmental, social and governance performance affect the financial performance of banks? A cross-country study of emerging market banks. *Management of Environmental Quality: An International Journal*, 30(6), 1331–1344. <https://doi.org/10.1108/meq-08-2018-0155>
- Shakya, S., & Smys, S. (2021). Big data analytics for improved risk management and customer segregation in banking applications. *Journal of ISMAC the Journal of IoT in Social, Mobile, Analytics, and Cloud*, 3(3), 235–249. <https://doi.org/10.36548/jismac.2021.3.005>
- Shantal, M., Othman, Z., & Bakar, A. A. (2023). Impact of missing data on correlation Coefficient Values: deletion and imputation methods for data preparation. *Malaysian Journal of Fundamental and Applied Sciences*, 19(6), 1052–1067. <https://doi.org/10.11113/mjfas.v19n6.3098>
- Singarimbus, B. L., Dhial, A. A.-M., & Farooqi, A. F. (2022). How commercial banks in emerging economies can leverage big data analytics: A perspective of Asian countries. *International Journal of Data Science and Advanced Analytics*, 4(4),

94–97. <http://ijdsaa.com/index.php/welcome/article/view/98/27>

- Singh, P., Singh, S., & Paprzycki, M. (2023). Detection and elimination of multicollinearity in regression analysis. *International Journal of Knowledge-based and Intelligent Engineering Systems*, 27(1), 105–111. <https://doi.org/10.3233/kes-221622>
- Singh, S. K., Del Giudice, M., Jabbour, C. J. C., Latan, H., & Sohal, A. S. (2021). Stakeholder pressure, green innovation, and performance in small and medium-sized enterprises: The role of green dynamic capabilities. *Business Strategy and the Environment*, 31(1), 500–514. <https://doi.org/10.1002/bse.2906>
- Smith, K. N., Lamb, K. N., & Henson, R. K. (2020). Making meaning out of MANOVA: The need for multivariate post hoc testing in gifted education research. *Gifted Child Quarterly*, 64(1), 41–55. <https://doi.org/10.1177/0016986219890352>
- Smith, M. G., Witte, M., Rocha, S., & Basner, M. (2019). Effectiveness of incentives and follow-up on increasing survey response rates and participation in field studies. *BMC Medical Research Methodology*, 19(1). <https://doi.org/10.1186/s12874-019-0868-8>
- Stockemer, D. (2019). *Quantitative methods for the social sciences: A practical introduction with examples in SPSS and Stata*. Springer. <https://doi.org/10.1007/978-3-319-99118-4>
- Su, X., Zeng, W., Zheng, M., Xiao-Li, J., Lin, W., & Xu, A. (2021). Big data analytics capabilities and organizational performance: The mediating effect of dual innovations. *European Journal of Innovation Management*, 25(4), 1142–1160.

<https://doi.org/10.1108/ejim-10-2020-0431>

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.

Taran, Z., & Mirkin, B. (2020). Exploring patterns of corporate social responsibility using a complementary K-means clustering criterion. *Business Research*, 13(2), 513–540. <https://doi.org/10.1007/s40685-019-00106-9>

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. <https://doi.org/10.1002/smj.640>

Teece, D. J. (2018). Dynamic capabilities as (workable) management systems theory. *Journal of Management & Organization*, 24(3), 359–368.

<https://doi.org/10.1017/jmo.2017.75>

Teece, D. J., Pisano, G. P., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.

[https://doi.org/10.1002/\(sici\)1097-0266\(199708\)18:7%3c509::aid-smj882%3e3.0.co;2-z](https://doi.org/10.1002/(sici)1097-0266(199708)18:7%3c509::aid-smj882%3e3.0.co;2-z)

Temizhan, E., Mirtagioglu, H., & Mendes, M. (2022). Which correlation coefficient should be used for investigating relations between quantitative variables? *American Scientific Research Journal for Engineering, Technology, and Sciences*, 85(1), 265–277.

https://www.researchgate.net/publication/359579944_Which_Correlation_Coefficient_Should_Be_Used_for_Investigating_Relations_between_Quantitative_Variables

- Tran, M. D., & Adomako, S. (2020). How CEO social capital drives corporate social performance: The roles of stakeholders, and CEO tenure. *Corporate Social Responsibility and Environmental Management*, 28(2), 819–830.
<https://doi.org/10.1002/csr.2092>
- Van Der Merwe, J., & Achkar, Z. A. (2022). Data responsibility, corporate social responsibility, and corporate digital responsibility. *Data & Policy*, 4, e12-1–e12-12. <https://doi.org/10.1017/dap.2022.2>
- Varadarajan, R. (2023). Resource advantage theory, resource based theory, and theory of multimarket competition: Does multimarket rivalry restrain firms from leveraging resource Advantages? *Journal of Business Research*, 160, 113713.
<https://doi.org/10.1016/j.jbusres.2023.113713>
- Variyath, A. M., & Brobbey, A. (2020). Variable selection in multivariate multiple regression. *PLOS ONE*, 15(7), e0236067.
<https://doi.org/10.1371/journal.pone.0236067>
- Vatcheva, K., Lee, M., McCormick, J. B., & Rahbar, M. H. (2016). Multicollinearity in regression analyses conducted in epidemiologic studies. *Epidemiology*, 06(02).
<https://doi.org/10.4172/2161-1165.1000227>
- Wang, C., Zhang, Q., & Zhang, W. (2020). Corporate social responsibility, green supply chain management and firm performance: The moderating role of big-data analytics capability. *Research in Transportation Business and Management*, 37, 1–10. <https://doi.org/10.1016/j.rtbm.2020.100557>
- Wang, X., & Cheng, Z. (2020). Cross-Sectional studies. *Chest*, 158(1), S65–S71.

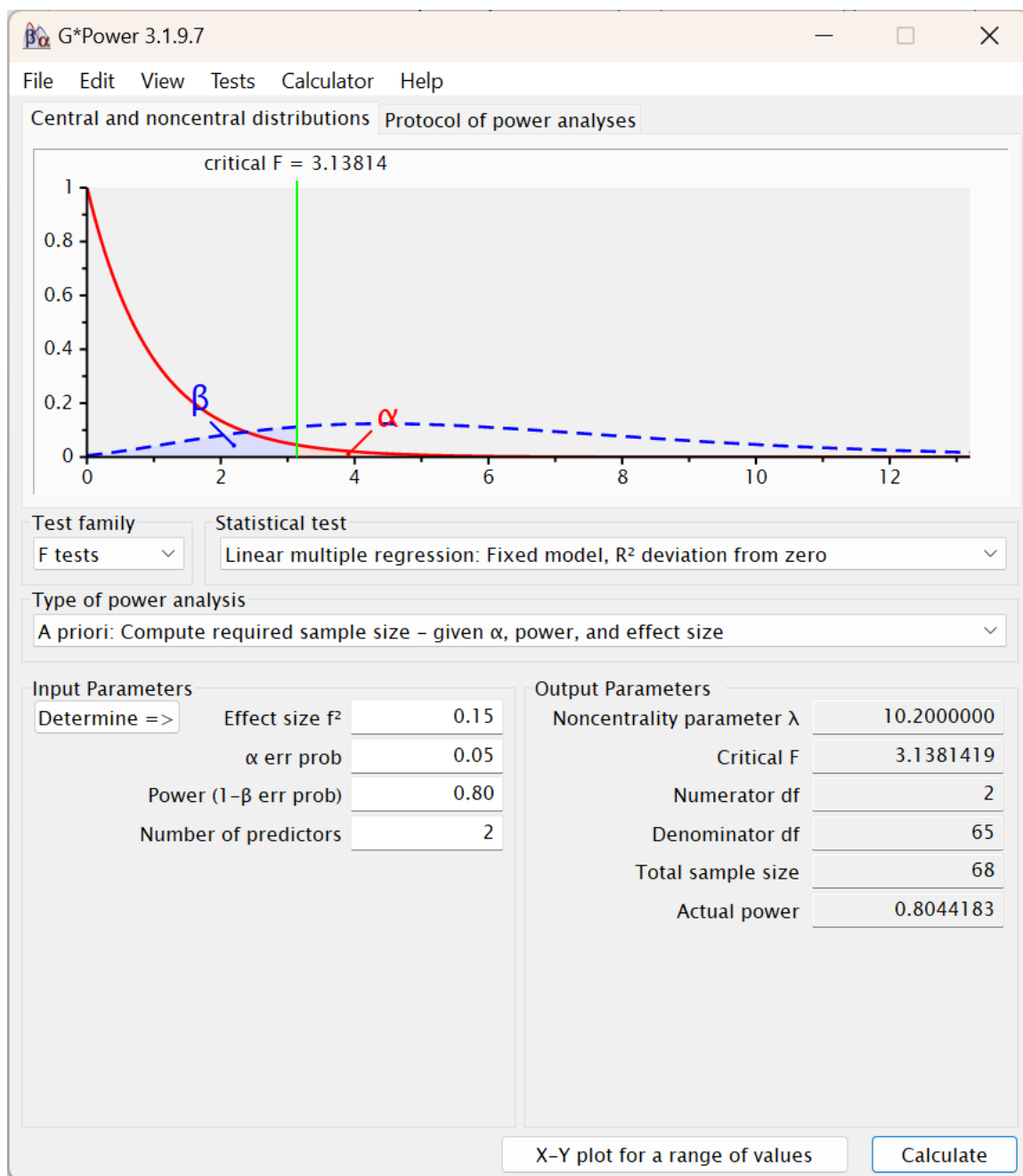
<https://doi.org/10.1016/j.chest.2020.03.012>

- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180. <https://doi.org/10.1002/smj.4250050207>
- Wilkinson, L., & Task Force on Statistical Inference. (1999). Statistical methods in psychology journals: Guidelines and explanations. *American Psychologist*, 54(8), 594–604. <https://doi.org/10.1037/0003-066x.54.8.594>
- Wulff, J., Sajons, G. B., Pogrebna, G., Lonati, S., Bastardo, N., Banks, G. C., & Antonakis, J. (2023). Common methodological mistakes. *The Leadership Quarterly*, 34(1), 101677. <https://doi.org/10.1016/j.leaqua.2023.101677>
- Yohannes, R. (2022). Impact of corporate social responsibility (CSR) on performance of Ethiopian commercial banks. *Social Science Research Network*.
<https://doi.org/10.2139/ssrn.4014526>
- Yunis, M. M., Tarhini, A., & Kassab, A. (2018). The role of ICT and innovation in enhancing organizational performance: The catalysing effect of corporate entrepreneurship. *Journal of Business Research*, 88, 344–356.
<https://doi.org/10.1016/j.jbusres.2017.12.030>
- Zahra, S. A., Petricević, O., & Luo, Y. (2022). Toward an action-based view of dynamic capabilities for international business. *Journal of International Business Studies*, 53(4), 583–600. <https://doi.org/10.1057/s41267-021-00487-2>
- Zayyad, H. M. A., Obeidat, Z. M., Alshurideh, M., Abuhashesh, M., Maqableh, M., & Masa'deh, R. (2020). Corporate social responsibility and patronage intentions: The mediating effect of brand credibility. *Journal of Marketing Communications*,

27(5), 510–533. <https://doi.org/10.1080/13527266.2020.1728565>

Zhang, H., Zang, Z., Zhu, H., Uddin, M. I., & Amin, M. (2022). Big data-assisted social media analytics for business model for business decision making system competitive analysis. *Information Processing and Management*, 59(1), 1–12. <https://doi.org/10.1016/j.ipm.2021.102762>

Appendix A: A Priori Power Analysis Result



Note. Data retrieved using G*Power 3.1 software (Faul et al., 2009)

Appendix B: ICT Use Instrument

Table 2

Factor loadings and reliability scores for ICT adoption, ICT use, innovation, corporate entrepreneurship, and performance items.

Construct	Items	Factor loadings	Cronbach
Information technology use (ICTUSE)	ICTUSE1 Frequent user of organization's ICT and IS	0.647	0.816
	ICTUSE2 I consider myself a frequent user of my organizations information technology and systems	0.889	
	ICTUSE3 ICT integration in work processes	0.803	
	ICTUSE4 Use ICT and IS capabilities	0.863	
Information technology adoption (ITADOP)	ITADOP1	0.664	0.767
	ITADOP2	0.704	
	ITADOP3	0.822	
	ITADOP4	0.780	
Innovation atmosphere (INVATM)	INVATM1 Pursuit of novel knowledge	0.773	0.883
	INVATM2 Search for latest technology	0.793	
	INVATM3 Investigation in various directions	0.799	
	INVATM4 Exploration of new areas	0.791	
	INVATM5 Discovery	0.779	
	INVATM6 Breakthrough improvements	0.838	
Innovation opportunities (INVOPR)	INVOPR1 Opportunities for product innovation are abundant in our industry	0.802	0.853
	INVOPR2 Opportunities for technological innovation are abundant in our industry	0.754	
	INVOPR3 High R&D spending in industry	0.811	
	INVOPR4 High R&D spending in company	0.849	
	INVOPR5 Our products/services require the adoption of new and different methods and procedures	0.753	
Corporate entrepreneurship (CENTRP)	CENTRP1 Dramatic changes in products and service mix over the past three years	0.771	0.884
	CENTRP2 Emphasis on major innovations in products and services over the past three years	0.844	
	CENTRP3 Tendency for high risk projects over the past three years	0.706	
	CENTRP4 Introduced new products and services over the past three years OR This company has emphasized taking bold, wide-ranging action in positioning itself and its product (services) over the past three years	0.784	
	CENTRP5 Strong commitment to research and development (R&D), technological leadership, and innovation	0.851	
	CENTRP6 Followed strategies that allow it to exploit opportunities in its external environment	0.825	
Organizational performance (PRFM)	PRFM1 Performance better than rivals	0.745	0.901
	PRFM2 High efficiency levels in operations	0.843	
	PRFM3 Productivity is high	0.885	
	PRFM4 Organization's market constantly growing	0.748	
	PRFM5 Employee satisfaction level is high in our organization	0.708	
	PRFM6 Customers are satisfied	0.750	
	PRFM7 Overall, company performance is high and improving	0.902	

Note. Red rectangle highlighting items of interest to current study. From “The role of ICT and innovation in enhancing organizational performance: The catalysing effect of corporate entrepreneurship,” By M. M. Yunis et al., 2018, *Journal of Business Research*, 88, p. 349 (<https://doi.org/10.1016/j.jbusres.2017.12.030>).

Appendix C: Big Data Analytics Use Adapted From ICT Use Instrument

Measurement items of the variables.

Variables	Item	Item description	VIF	Loading	Weight	Source
Big data analytics usage	BDU1	Our enterprise often uses big data analytics tools.	1.540	0.756***	0.321**	Yunis et al. (2018)
	BDU2	I consider myself a frequent user of my enterprise's big data analytics tools.	1.221	0.758***	0.461***	
	BDU3	Our enterprise integrates big data analytics tools into work processes.	1.445	0.746***	0.331**	
	BDU4	Our enterprise uses big data analytics tools and data analytics capabilities.	1.238	0.605***	0.266***	
Data analytics capabilities	DAC1	Our data analytics users possess a high degree of data analytics expertise.	1.571	0.825***	0.401***	Ghasemaghaei (2019)
	DAC2	Our data analytics users are knowledgeable when it comes to utilizing such tools.	1.627	0.818***	0.368***	
	DAC3	Our data analytics users are skilled at using data analytics tools.	1.787	0.867***	0.425***	
Decision-making quality	DQ1	In my enterprise, decision outcomes are often flawless.	1.492	0.488***	0.213*	Ghasemaghaei et al. (2018)
	DQ2	In my enterprise, decision outcomes are often reliable.	1.557	0.681***	0.251**	
	DQ3	In my enterprise, decision outcomes are often precise.	1.545	0.696***	0.286**	
	DQ4	In my enterprise, decision outcomes are often error-free.	1.625	0.280**	0.311**	
	DQ5	In my enterprise, decision outcomes are often correct.	1.614	0.624***	0.136*	
	DQ6	In my enterprise, decision outcomes are often accurate.	1.575	0.736***	0.437***	
	DQ7	In my enterprise, the time to arrive at decisions is fast.	1.500	0.588***	0.148	
	DQ8	In my enterprise, the speed of arriving at decisions is high.	1.407	0.523***	0.231*	

Note: BDU, Big data analytics usage; DAC, Data analytics capabilities; DQ, decision-making quality. The range for measures is from 1 to 5 (1 = Very much disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Very much agree).

Note. Red rectangle highlighting items of interest to current study. From “Evaluating the impact of big data analytics usage on the decision-making quality of organizations,” By L. Li et al., 2022, *Technological Forecasting and Social Change*, 175, p. 8 (<https://doi.org/10.1016/j.techfore.2021.121355>).

Appendix D: Corporate Social Responsibility Instrument

Dimensions of corporate social responsibility

Factor 1 – Economic responsibility		Factor loadings
ER1	Tries to obtain maximum profit from its activity	0.859
ER2	Tries to obtain maximum long-term success	0.780
ER3	Always tries to improve its economic performance	0.763
Eigenvalue		2.718
% variance explained		24.705
Factor 2 – Ethical–legal responsibility		Factor loadings
ELR1	Always respects the norms defined in the law when carrying out its activities	0.810
ELR2	Is concerned to fulfil its obligations vis-à-vis its shareholders, suppliers, distributors and other agents with whom it deals	0.722
ELR3	Behaves ethically/honestly with its customers	0.757
ELR4	Respecting ethical principles in its relationships has priority over achieving superior economic performance	0.655
Eigenvalue		2.104
% variance explained		19.131
Factor 3 – Philanthropic responsibility		Factor loadings
PR1	Is concerned to respect and protect natural environment	0.528
PR2	Actively sponsors or finances social events (sport, music...)	0.787
PR3	Directs part of its budget to donations and social works favouring the disadvantaged	0.785
PR4	Is concerned to improve general well-being of society	0.623
Eigenvalue		2.020
% variance explained		18.364

Note. From “Influence of corporate social responsibility on loyalty and valuation of services,” By M. D. M. G. D. L. Salmones et al., 2005, *Journal of Business Ethics*, 61(4), p. 375 (<https://doi.org/10.1007/s10551-005-5841-2>).

Appendix E: Corporate Social Performance Adapted From Corporate Social Responsibility Instrument

Construct names	Measurement items (7-point scale)	Mean	SD	Resource
Big data utilization	7-point Likert scale ranging from "Not at all" to "To a very great extent". Please indicate the extent to which your firm processes: <ul style="list-style-type: none"> • High volumes of data • Real time data • Different types of data 	5.28	1.13	(Ghasemaghaei et al. 2018)
Organizational innovation	7-point Likert scale ranging from "Never" to "Very often". Indicate the extent to which your firm has recently used for the first time the following organizational instruments:			(Camisón and Villar-López 2014)
Business practices	<ul style="list-style-type: none"> • Use of databases of best practices, lessons and other knowledge • Implementation of practices for employee development and better worker retention 	5.41	0.98	
Workplace organizing	<ul style="list-style-type: none"> • Use of quality management systems • Decentralization in decision-making • Use of inter-functional working groups • Flexible job responsibilities 	5.30	0.98	
External relations	<ul style="list-style-type: none"> • Collaboration with customers • Use of methods for integrating with suppliers • Outsourcing of business activities 	5.29	0.99	
Corporate social performance	7-point Likert scale from "Strongly disagree" to "Strongly agree". Please indicate the extent to which you believe your firm:			(Salmones et al. 2005)
Economic performance	<ul style="list-style-type: none"> • Obtains maximum profit from its activity • Obtains maximum long-term success • Always tries to improve its economic performance 	5.76	0.94	
Ethical-legal performance	<ul style="list-style-type: none"> • Always respects the norms defined in the law when carrying out its activities • Is concerned to fulfil its obligations vis-à-vis its shareholders, suppliers, distributors, and other agents with whom it deals • Behaves ethically/ honestly with its customers • Respecting ethical principals in its relationships has priority over achieving superior economic performance 	5.74	0.94	
Philanthropic performance	<ul style="list-style-type: none"> • Is concerned to respect and protect the natural environment • Actively sponsors or finances social events (sports, music...) • Directs part of its budget to donations and social works favoring the disadvantaged • Is concerned to improve general well-being of society 	5.34	1.18	

Note. Red rectangle highlighting items of interest to this study. From “Big data for social benefits: Innovation as a mediator of the relationship between big data and corporate social performance,” By G. Calic & M. Ghasemaghaei, 2021, *Journal of Business Research*, 131, p. 398-399 (<https://doi.org/10.1016/j.jbusres.2020.11.003>).

Appendix F: Site Authorization

GHANA ASSOCIATION OF BANKS

Location: No. 12 Tafawa Balewa Avenue, GA-029-4444, North Ridge, Accra
 Chief Executive Officer's Office
 P.O. Box 41, Accra.
 Tel: 0302-667138 / 670629
 Fax: 0302-667138
 E-mail: info@gab.com.gh
 Website: www.gab.com.gh

April 08, 2024.

Mr. Mohammed Adams
 Ph.D. Candidate
 Walden University
 100 Washington Ave S Ste 900,
 Minneapolis, MN 55401

Dear Mohammed Adams,

SUBJECT: SITE AUTHORIZATION FOR RESEARCH STUDY ON CSR PERFORMANCE IN GHANAIAN BANKS

This letter serves as formal authorization from the Ghana Association of Banks (GAB) for your proposed research study titled "Corporate Social Responsibility, Economic, Ethical-Legal, and Philanthropic Performances in Ghanaian Banks Using Big Data Analytics."

We acknowledge the importance of your study in enhancing our understanding of the interplay between big data analytics, CSR activities, and their impact on the banking sector in Ghana. The Ghana Association of Banks is committed to fostering an environment that supports research and innovation, which contributes to the sustainable growth of the financial services industry and the broader national economy.

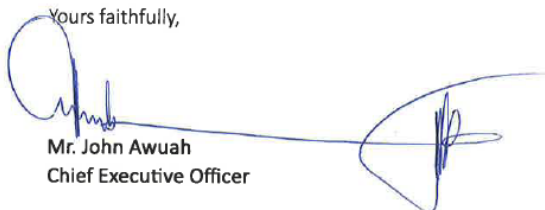
By providing this authorization, we permit you to engage with member banks under the Ghana Association of Banks to collect data through structured online surveys aimed at executives, managers, and key staff. We understand that your research is part of the requirements for completing your Ph.D. at Walden University and that it has been designed to meet the ethical standards and requirements as stipulated by your institution's Institutional Review Board (IRB).

Furthermore, we appreciate your commitment to sharing the findings of your study with the Ghana Association of Banks and the participating institutions. We expect that the insights derived from your research will contribute to the continuous improvement of CSR practices within the Ghanaian banking sector and inform policy and operational decisions.

Please ensure that all research activities conducted with our member banks adhere to the highest standards of research ethics and integrity, including confidentiality and respect for the participants' rights and well-being, as well as follow applicable laws in Ghana.

We wish you success in your research endeavors and look forward to your study's contributions to the banking industry and the wider community.

Yours faithfully,



Mr. John Awuah
 Chief Executive Officer

Appendix G: Full Survey

Section 1: Personal Information

1. Gender (Select one):
 - Male
 - Female
2. Age Group (Select one):
 - Under 25
 - 25-34
 - 35-44
 - 45-54
 - 55-64
 - 65+
3. Highest Level of Education Attained (Select one):
 - High School Diploma
 - Associate Degree/HND
 - Bachelor's Degree
 - Master's Degree
 - Doctorate or Equivalent
 - Other (Please specify): _____

Section 2: Bank Information

1. Type of Bank (Select one):
 - Commercial
 - Regional
 - Rural
 - Community
2. Bank Size in Terms of Employee Count (Select one):
 - Less than 50
 - 51 - 200
 - 201 - 500
 - 501 - 1000
 - More than 1000

Section 3: Role Information

1. Position/Title (Enter information):
 - _____
2. Length of Service in the Banking Industry (Enter information):
 - _____ years.

3. Length of Service at Your Current Bank (Enter information):

- _____ years.

4. Role in Decision-Making Related to Big Data Analytics (Select one):

- None
- Some
- Significant
- Primary Decision-Maker

5. Role in Decision-Making Related to CSR Activities (Select one):

- None
- Some
- Significant
- Primary Decision-Maker

Section 4: Big Data Analytics Use

Each of the following statements relates to big data analytics use in your bank. Please choose your level of agreement with each statement below, using the following: Strongly disagree, Disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Agree, and Strongly agree.

BDAU1. Our bank often uses big data analytics tools.

BDAU2. I consider myself a frequent user of our bank's big data analytics tools.

BDAU3. Our bank integrates big data analytics tools into work processes.

BDAU4. Our bank uses big data analytics tools and data analytics capabilities.

Section 5: Corporate Social Responsibility Performance

The following statements relate to CSR performance in economic, ethical-legal, and philanthropic aspects. Please choose your level of agreement with each statement below, using the following: Strongly disagree, Disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Agree, and Strongly agree.

Economic Performance

CSR_EP1. Our bank obtains maximum profit from its activity.

CSR_EP2. Our bank aims for maximum long-term success.

CSR_EP3. Our bank always tries to improve its economic performance.

Ethical-Legal Performance

CSR_ELP1. Our bank always respects the norms defined in the law when carrying out its activities.

CSR_ELP2. Our bank is committed to fulfilling its obligations to shareholders, suppliers, distributors, and other agents with whom it deals.

CSR_ELP3. Our bank behaves ethically and honestly with its customers.

CSR_ELP4. Our bank gives priority to respecting ethical principles over achieving superior economic performance.

Philanthropic Performance

CSR_PP1. Our bank is concerned with respecting and protecting the natural environment.

CSR_PP2. Our bank actively sponsors or finances social events (sports, music, etc.).


CSR_PP3. Our bank allocates part of its budget to donations and social works favoring the disadvantaged.

CSR_PP4. Our bank is committed to improving the general well-being of society.

Note. To view the online survey for this study, click “I Agree” on the consent form at

<https://sites.google.com/view/bda-csr-study-result/bda-csr-consent>

Appendix H: Copyright Permission for Big Data Analytics Use Instrument



Thank you for your order!

Dear Mohammed Adams,

Thank you for placing your order through Copyright Clearance Center's RightsLink® service.



Order Summary

Licensee:	Mohammed Adams
Order Date:	Mar 21, 2024
Order Number:	5753991442843
Publication:	Journal of Business Research
Title:	The role of ICT and innovation in enhancing organizational performance: The catalysing effect of corporate entrepreneurship
Type of Use:	reuse in a thesis/dissertation
Order Ref:	yunis_et_al_2018
Order Total:	0.00 USD

View or print complete [details](#) of your order and the publisher's terms and conditions.

Sincerely,

Copyright Clearance Center

customercare@copyright.com
<https://myaccount.copyright.com>



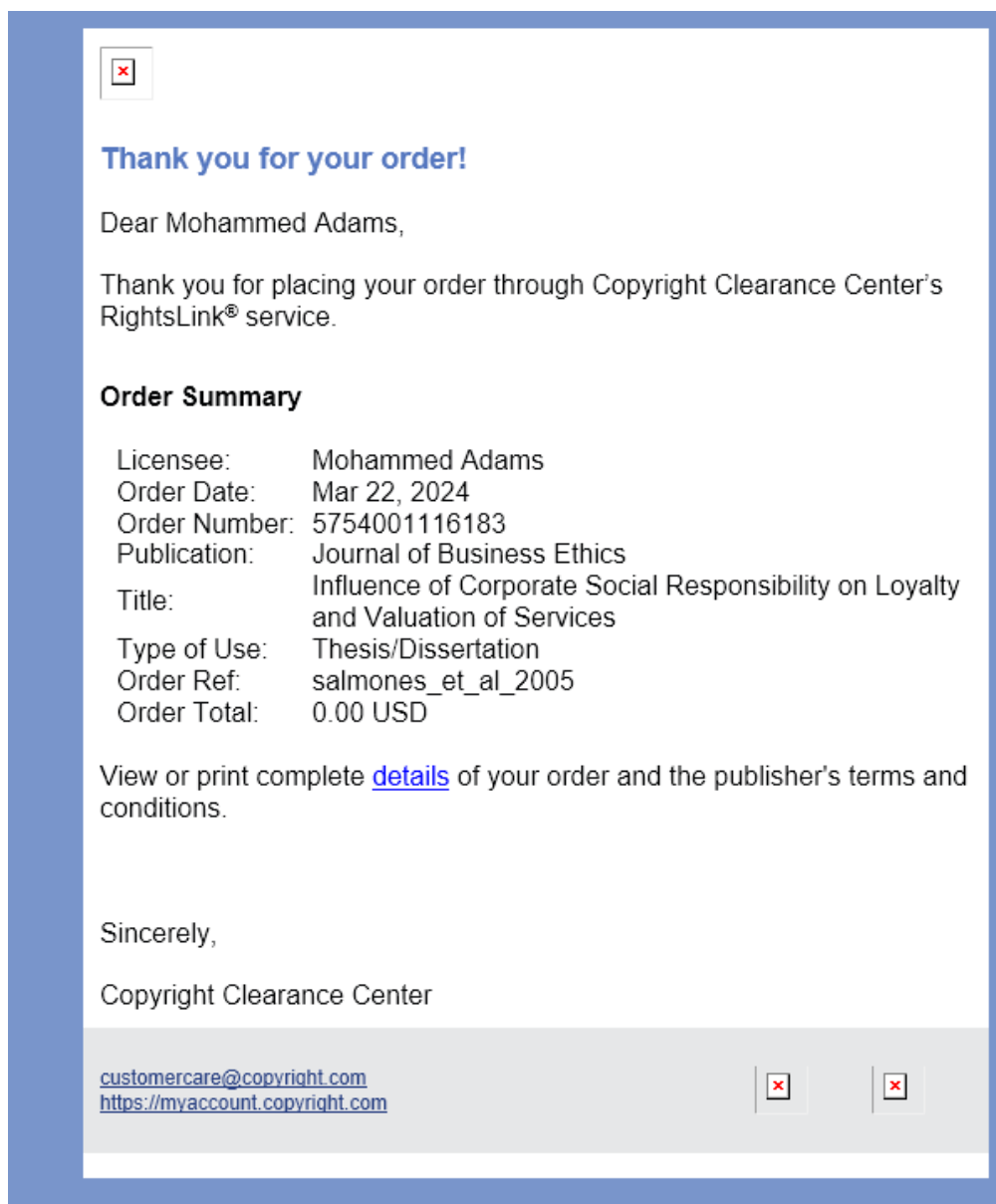
Note. The copyright permission for big data analytics use is available at

<https://alaureatena->

my.sharepoint.com/:b:/g/personal/mohammed_adams_waldenu_edu/ET6dPq7wv69AgS

[M-TTWbdvABfJl7xBR3MVK5-Fy-YSuEQ?e=1b0Kah](https://my.sharepoint.com/:b:/g/personal/mohammed_adams_waldenu_edu/ET6dPq7wv69AgS-M-TTWbdvABfJl7xBR3MVK5-Fy-YSuEQ?e=1b0Kah)

Appendix I: Copyright Permission for CSR Performance Instrument



Note. The copyright permission for the corporate social responsibility performance instrument is available at https://alaureatena-my.sharepoint.com/:b:/g/personal/mohammed_adams_waldenu_edu/ERVrmnkKSzBPs-oiutEc0n8BLgdJD7DKQRe4zXo6JIV7dQ?e=Vh5KZK

Appendix J: Online Consent Form

CONSENT FORM

Thank you for the additional information. Here is the updated online clickable consent form incorporating the changes you provided:

You are invited to take part in a research study about the relationships between big data analytics use and corporate social responsibility performance in Ghanaian banks. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study seeks 100 volunteers who are:

- Employees from commercial, regional, rural, and community banks across Ghana
- Executives, managers, and staff in corporate social responsibility, big data analytics, and organizational strategy roles

This study is being conducted by a researcher named Mohammed Alhassan Adams, who is a doctoral student at Walden University.

Study Purpose:

The purpose of this study is to explore the extent to which big data analytics use and overall corporate social responsibility (CSR) performance influence the economic, ethical-legal, and philanthropic dimensions of CSR performance within Ghanaian banks.

Procedures:

This study will involve you completing the following steps:

- Complete an anonymous online survey (20 minutes)

Here are some sample questions:

- Our bank often uses big data analytics tools. (Strongly Disagree to Strongly Agree)
- Our bank aims for maximum long-term success. (Strongly Disagree to Strongly Agree)
- Our bank behaves ethically and honestly with its customers. (Strongly Disagree to Strongly Agree)
- Our bank is concerned with respecting and protecting the natural environment. (Strongly Disagree to Strongly Agree)

Voluntary Nature of the Study:

Research should only be done with those who freely volunteer. So everyone involved will respect your decision to join or not.

If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:

Being in this study could involve some risk of the minor discomforts that can be encountered in daily life, such as minor discomfort reflecting on CSR practices or analytics use. With the protections in place, this study would pose minimal risk to your well-being.

If you experience any distress, you can reach out to the following free mental health resources in Ghana:

1. Mental Health Authority - Ministry of Health, Ghana
 - Email: info@moh.gov.gh
 - Phone: +233 302 665651
 - Website: Mental Health Authority
2. WHO Ghana Office (As part of the WHO Special Initiative for Mental Health)
 - Dr. Joana Ansong (Technical Officer, Non-Communicable Disease Risk Factors): ansongj@who.int

This study offers no direct benefits to individual volunteers. This study aims to benefit society by generating insights that can help banks improve their social and environmental performance through analytics. Once the analysis is complete, the researcher will share the overall results by posting a summary at this webpage: [Study Result Page](#).

Payment:

No compensation is offered, but the researcher expresses appreciation for participants volunteering their time to contribute to this research.

Privacy:

The researcher is required to protect your privacy. Your identity will be kept anonymous, within the limits of the law. The researcher will not ask for your name at any time or link your responses to your contact info. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. Data will be kept secure by using password protection, data encryption, and storing data on secure servers. Data will be kept for a period of at least 5 years, as required by the university.

Contacts and Questions:

You can ask questions of the researcher by emailing mo.alha@waldenu.edu. If you want to talk privately about your rights as a participant or any negative parts of the study, you can call Walden University's Research Participant Advocate at 612-312-1210 (USA number). Walden University's approval number for this study is [IRB will enter approval number here]. It expires on [IRB will enter expiration date].

You might wish to retain this consent form for your records. You may ask the researcher or Walden University for a copy at any time using the contact info above.

Obtaining Your Consent:

If you feel you understand the study and wish to volunteer, please indicate your consent by clicking "I agree" below.

I Agree

Note. The online consent form can be accessed at <https://sites.google.com/view/bda-csr-study-result/bda-csr-consent>

Appendix K: Result Summary Webpage

BDA-CSR-GHANA-BANKS
Consent
Result

Ghanaian Bank CSR and Big Data Analytics Study Results

Ghanaian Bank CSR and Big Data Analytics Study Results

Thank you for your interest in the study on the relationships between big data analytics use and corporate social responsibility (CSR) performance in Ghanaian banks. This webpage will serve as the platform where the researcher, Mohammed Alhassan Adams, will share the overall results once the analysis is complete.

Study Purpose

The purpose of this study is to explore the extent to which big data analytics use and overall corporate social responsibility (CSR) performance influence the economic, ethical-legal, and philanthropic dimensions of CSR performance within Ghanaian banks.

Current Status

The study is currently in the proposal phase. The researcher is seeking approval from the Institutional Review Board (IRB) to conduct the study. Once IRB approval is obtained, the researcher will begin recruiting participants from commercial, regional, rural, and community banks across Ghana to complete an anonymous online survey. The researcher aims to gather responses from 100 employees in corporate social responsibility, big data analytics, and organizational strategy roles.

After the data collection is complete, the researcher will analyze the data and prepare a summary of the overall results. This webpage will be updated with the summary as soon as it is available.

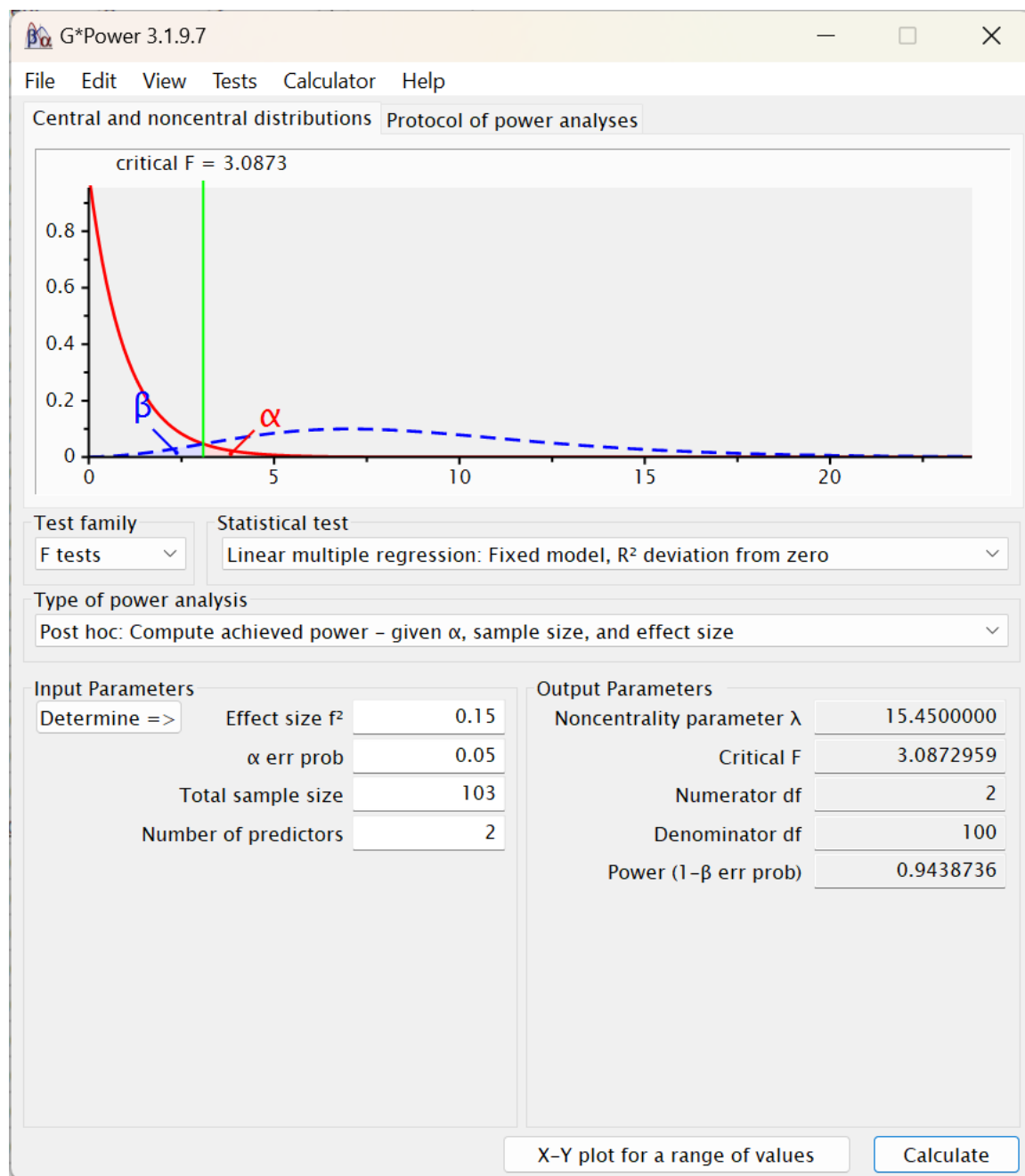
Contact Information

If you have any questions about the study or the upcoming results, please contact the researcher, Mohammed Adams, at mohammed.adams@waldenu.edu.

Thank you for your patience and understanding. We look forward to sharing the insights from this important study with you in the near future.

Note. The result summary webpage can be accessed at <https://sites.google.com/view/bda-csr-study-result/>

Appendix L: Post Hoc Power Analysis Result



Note. Data retrieved using G*Power 3.1 software (Faul et al., 2009)

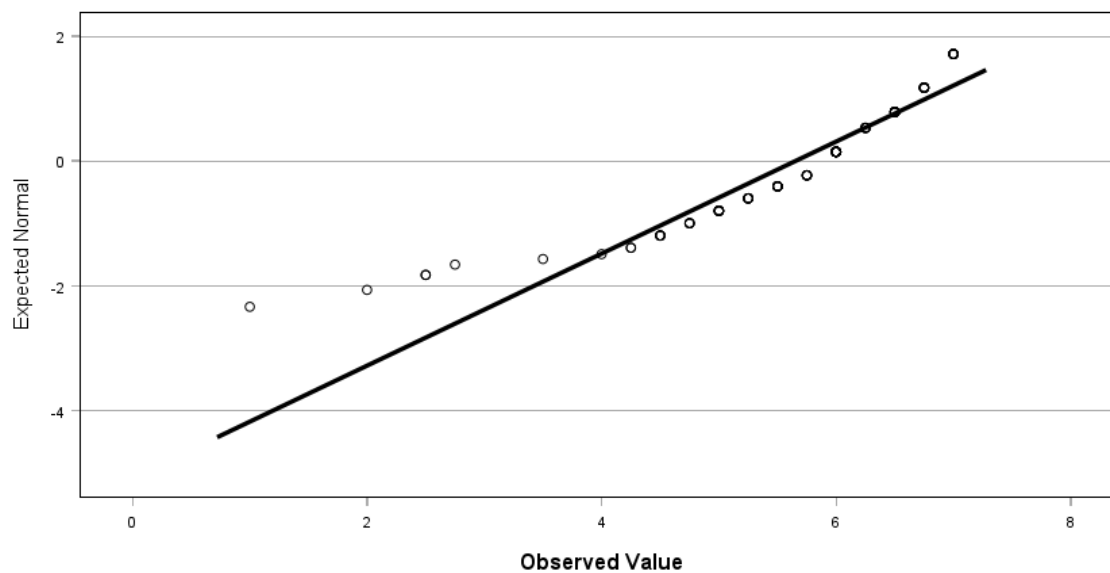
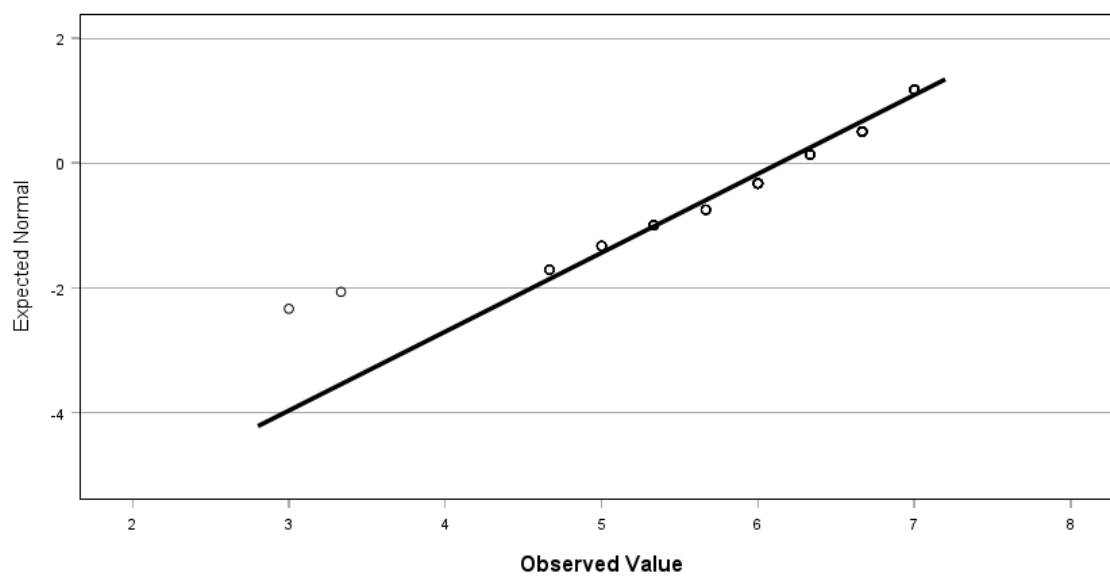
Appendix M: Case Summary

	Response number	Big data analytics use	CSR economic performance	CSR ethical- legal performance	CSR philanthropic performance	CSR performance (Overall)
1	20240623074257	2.50	3.00	1.25	1.00	1.75
2	20240616163543	1.00	6.00	7.00	4.75	5.92
3	20240621061117	6.00	7.00	7.00	6.75	6.92
4	20240621134444	4.75	5.67	6.75	6.25	6.22
5	20240621162054	6.75	5.33	6.50	7.00	6.28
6	20240621170411	5.25	6.67	6.75	6.00	6.47
7	20240623054537	4.75	5.67	6.00	6.00	5.89
8	20240623070618	6.75	7.00	6.75	6.50	6.75
9	20240623071557	6.00	6.33	6.00	6.00	6.11
10	20240623080042	7.00	5.33	7.00	7.00	6.44
11	20240623092952	5.75	6.00	6.00	5.75	5.92
12	20240624073908	6.00	6.33	7.00	7.00	6.78
13	20240625103051	5.75	4.67	6.50	5.50	5.56
14	20240626084324	2.00	6.67	7.00	6.75	6.81
15	20240627194322	4.25	5.33	5.50	4.75	5.19
16	20240628072418	5.75	6.33	7.00	7.00	6.78
17	20240628094703	5.50	6.67	6.75	6.75	6.72
18	20240628094904	6.75	5.33	7.00	7.00	6.44
19	20240628095332	6.00	5.67	6.25	5.75	5.89
20	20240628100144	6.00	6.00	6.25	6.00	6.08
21	20240628102016	5.00	5.33	4.25	3.50	4.36
22	20240628104211	6.25	7.00	6.25	6.50	6.58
23	20240628104600	5.25	6.00	6.00	3.75	5.25
24	20240628104703	5.50	6.00	6.00	1.50	4.50
25	20240628104916	6.00	7.00	6.75	6.25	6.67
26	20240628105205	6.75	7.00	7.00	6.00	6.67
27	20240628105252	4.00	6.00	6.25	4.50	5.58
28	20240628105441	5.00	5.00	7.00	6.75	6.25
29	20240628105600	6.00	7.00	7.00	7.00	7.00
30	20240628105615	6.00	6.33	4.75	5.25	5.44
31	20240628110050	6.75	6.67	7.00	6.50	6.72
32	20240628110111	6.00	6.00	6.75	5.50	6.08
33	20240628110151	6.00	6.00	6.00	5.75	5.92
34	20240628110507	6.00	6.00	7.00	6.50	6.50
35	20240628110619	5.75	6.67	4.75	4.50	5.31
36	20240628110621	6.00	6.33	6.75	6.25	6.44
37	20240628110735	7.00	6.00	7.00	6.00	6.33

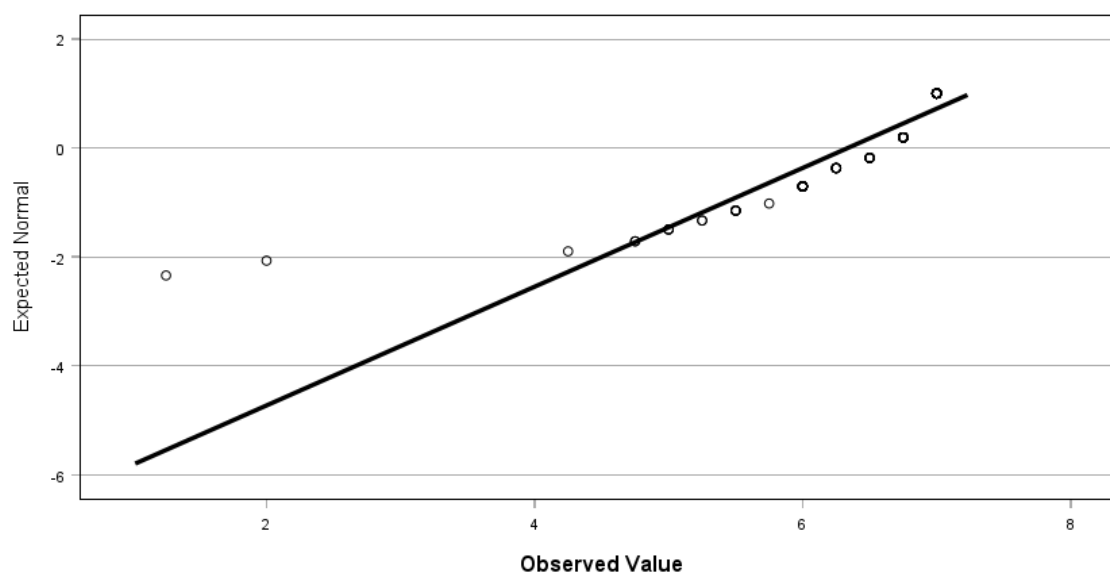
	Response number	Big data analytics use	CSR economic performance	CSR ethical-legal performance	CSR philanthropic performance	CSR performance (Overall)
38	20240628110821	7.00	7.00	7.00	7.00	7.00
39	20240628110920	3.50	7.00	2.00	6.25	5.08
40	20240628111339	6.50	6.33	7.00	5.75	6.36
41	20240628111417	6.50	6.00	6.00	6.00	6.00
42	20240628111519	5.00	5.00	5.00	5.00	5.00
43	20240628111626	4.50	4.67	5.25	4.50	4.81
44	20240628111709	5.25	6.67	6.00	4.75	5.81
45	20240628112210	4.50	6.00	6.00	4.50	5.50
46	20240628112434	6.75	6.67	6.00	6.75	6.47
47	20240628113220	6.25	6.00	6.50	5.50	6.00
48	20240628113257	2.50	7.00	5.75	5.25	6.00
49	20240628113647	6.00	4.67	5.50	6.00	5.39
50	20240628113945	6.50	6.00	6.75	6.00	6.25
51	20240628114013	7.00	7.00	7.00	7.00	7.00
52	20240628114118	5.75	6.00	6.75	5.50	6.08
53	20240628114355	6.00	6.00	6.00	6.00	6.00
54	20240628114402	6.00	6.00	6.00	6.00	6.00
55	20240628114803	6.00	7.00	7.00	6.00	6.67
56	20240628114846	6.00	6.67	6.75	6.25	6.56
57	20240628114922	7.00	7.00	6.00	6.00	6.33
58	20240628114956	6.00	6.67	6.25	5.75	6.22
59	20240628115147	5.50	6.33	6.75	5.50	6.19
60	20240628115559	6.25	6.00	6.25	3.25	5.17
61	20240628115605	6.50	7.00	7.00	6.25	6.75
62	20240628115640	4.50	7.00	6.75	5.50	6.42
63	20240628115654	5.00	3.33	5.00	5.75	4.69
64	20240628120315	5.00	7.00	7.00	6.00	6.67
65	20240628120839	5.00	7.00	7.00	5.50	6.50
66	20240628121655	6.00	6.33	6.00	5.75	6.03
67	20240628123054	5.50	6.00	6.75	4.75	5.83
68	20240629015926	4.50	6.33	7.00	5.50	6.28
69	20240630013300	6.50	7.00	7.00	6.25	6.75
70	20240630021608	6.50	6.67	6.50	7.00	6.72
71	20240630022313	6.50	6.67	5.50	6.75	6.31
72	20240630033717	5.75	6.33	6.75	6.50	6.53
73	20240630164847	6.00	6.67	6.75	7.00	6.81
74	20240630165147	6.50	7.00	6.25	6.50	6.58
75	20240630165406	6.75	6.67	7.00	6.50	6.72
76	20240630165638	6.75	6.33	6.75	6.75	6.61

	Response number	Big data analytics use	CSR economic performance	CSR ethical-legal performance	CSR philanthropic performance	CSR performance (Overall)
77	20240630165848	7.00	7.00	6.75	6.50	6.75
78	20240701052749	6.00	5.33	5.50	5.25	5.36
79	20240701161649	6.50	6.67	6.75	6.25	6.56
80	20240701162233	6.50	7.00	7.00	6.75	6.92
81	20240701162559	7.00	7.00	7.00	7.00	7.00
82	20240701162915	7.00	7.00	7.00	7.00	7.00
83	20240701163141	6.50	7.00	6.75	7.00	6.92
84	20240702051242	4.25	5.67	5.00	5.50	5.39
85	20240705144714	6.00	6.00	7.00	7.00	6.67
86	20240709075634	6.25	6.00	7.00	6.00	6.33
87	20240710073556	5.25	5.33	6.50	5.75	5.86
88	20240710074849	5.50	5.67	6.75	5.75	6.06
89	20240710094148	4.75	5.00	7.00	6.25	6.08
90	20240710094217	4.75	5.00	5.25	4.50	4.92
91	20240711085829	5.25	6.00	6.50	6.25	6.25
92	20240712015845	4.50	4.67	5.50	5.25	5.14
93	20240712020456	6.00	5.00	6.75	6.75	6.17
94	20240712025849	6.00	5.67	6.00	5.75	5.81
95	20240712085854	6.50	6.33	7.00	6.00	6.44
96	20240712095959	5.50	5.00	6.00	5.75	5.58
97	20240712101522	5.00	5.33	6.50	5.50	5.78
98	20240712103642	6.25	7.00	7.00	6.75	6.92
99	20240713030440	5.50	6.67	6.75	6.50	6.64
100	20240713052712	6.00	6.00	6.50	6.00	6.17
101	20240713062534	5.25	6.33	6.00	6.00	6.11
102	20240714150456	5.50	6.00	7.00	6.25	6.42
103	20240715035457	2.75	6.33	6.75	5.25	6.11
Total	N 103	103	103	103	103	103

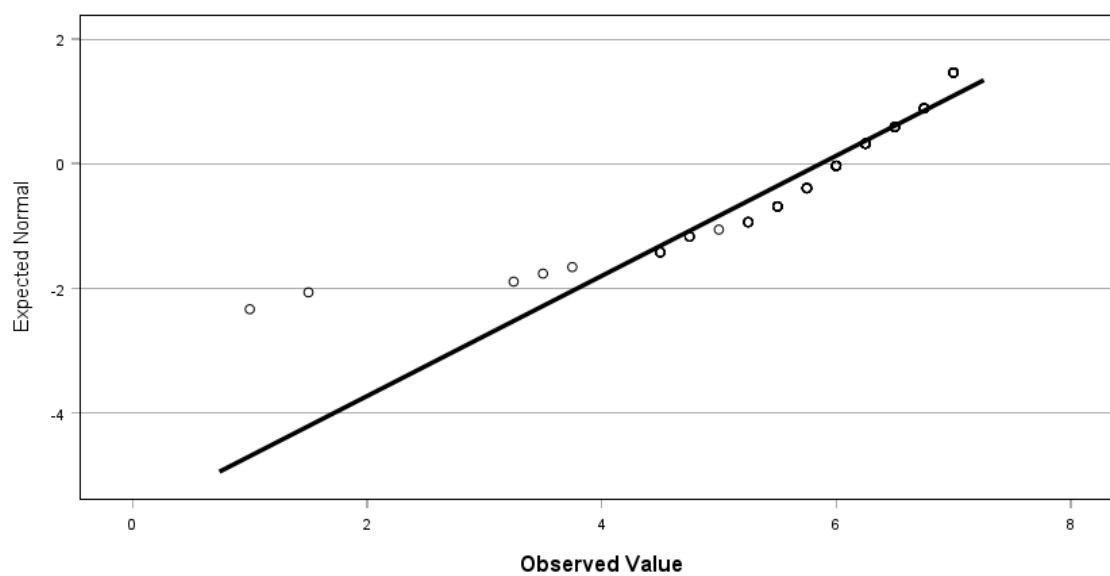
Appendix N: Normal Q-Q Plots

Normal Q-Q Plot of Big data analytics use*Normal Q-Q Plot of CSR economic performance*

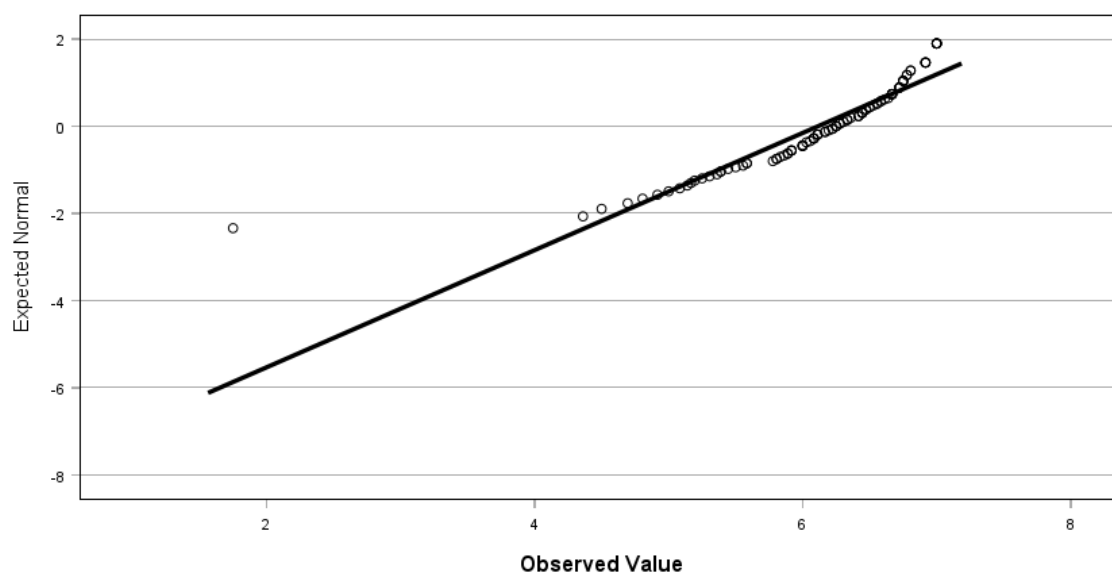
Normal Q-Q Plot of CSR ethical-legal performance



Normal Q-Q Plot of CSR philanthropic performance

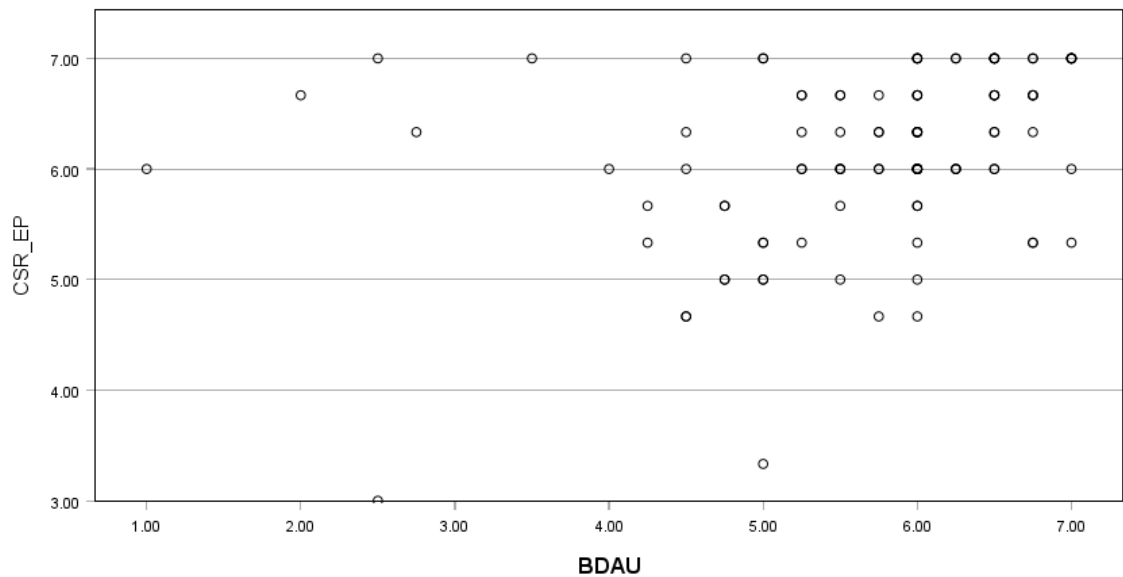


Normal Q-Q Plot of CSR performance (Overall)

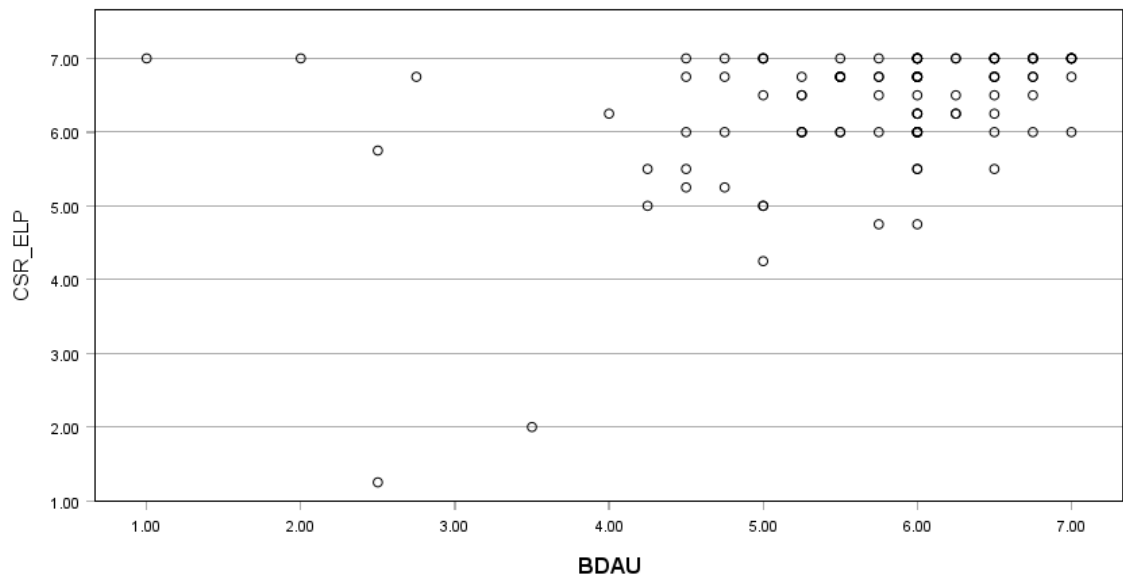


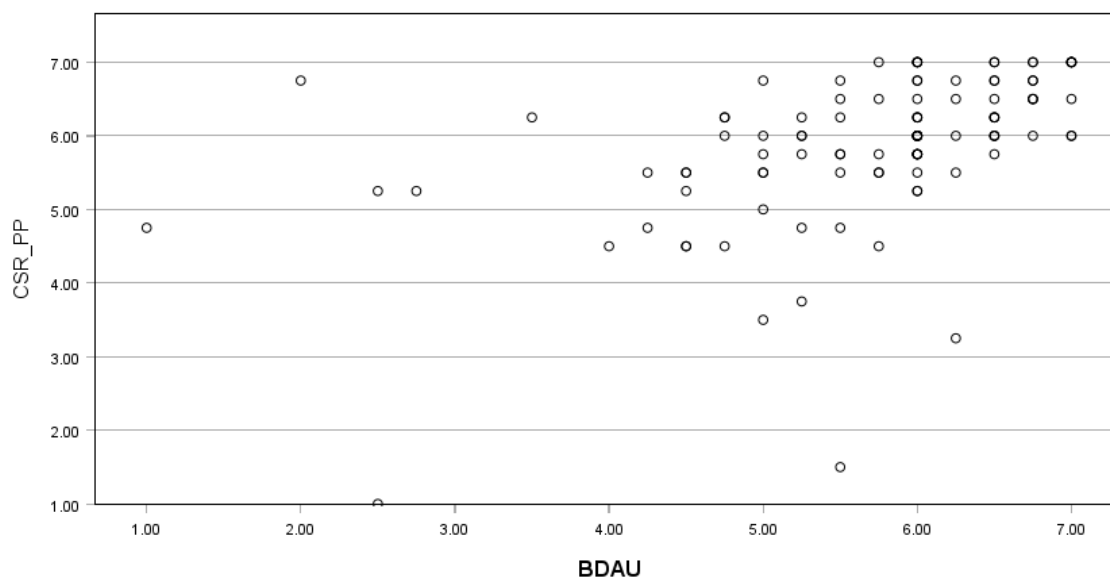
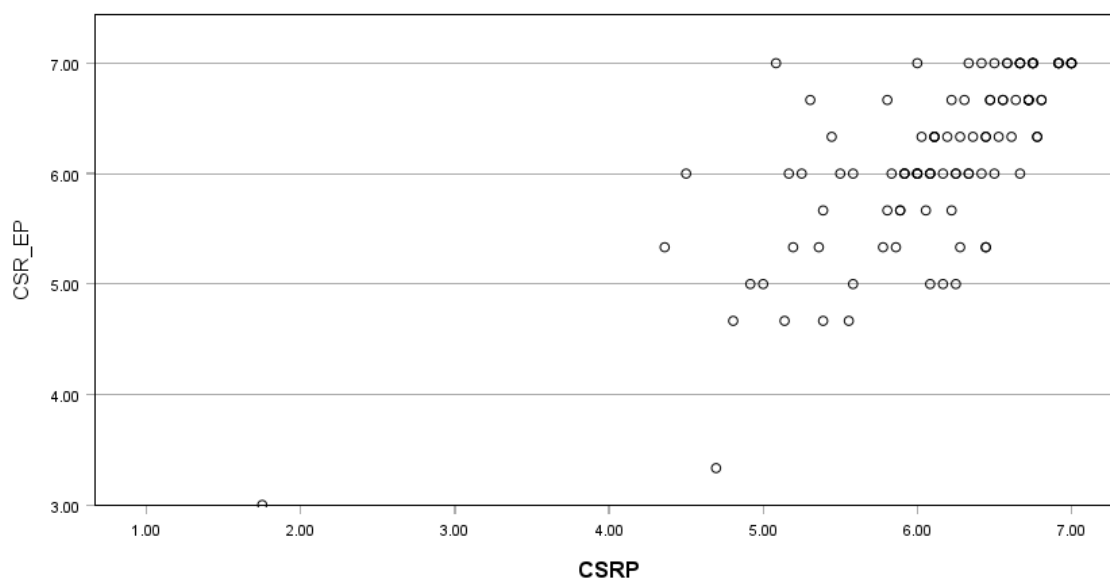
Appendix O: Scatterplots Independent Variables Vs Dependent Variables

Scatter Plot of CSR_EP by BDAU

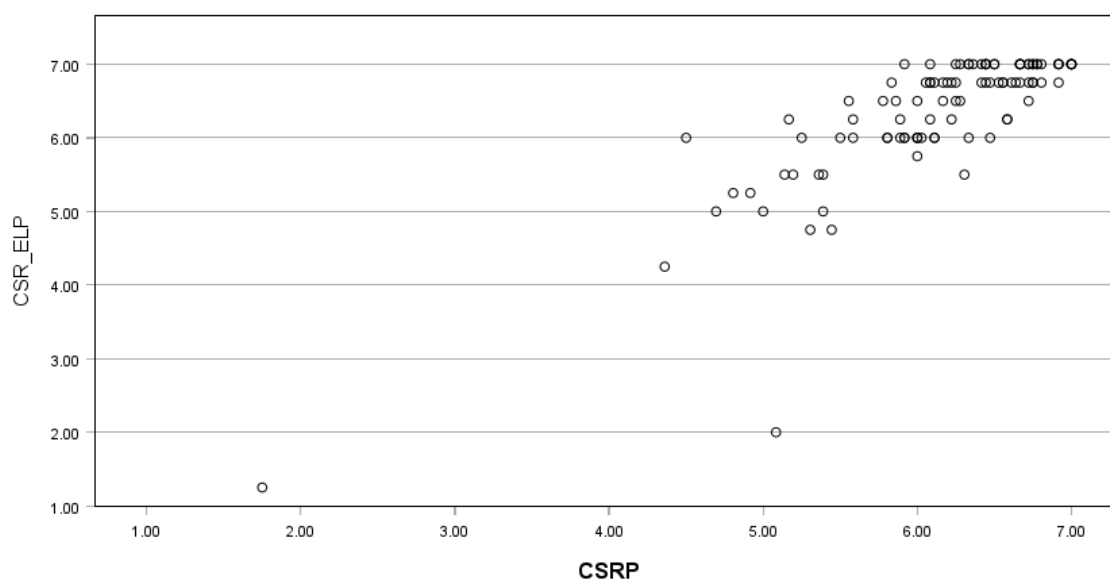


Scatter Plot of CSR_ELP by BDAU

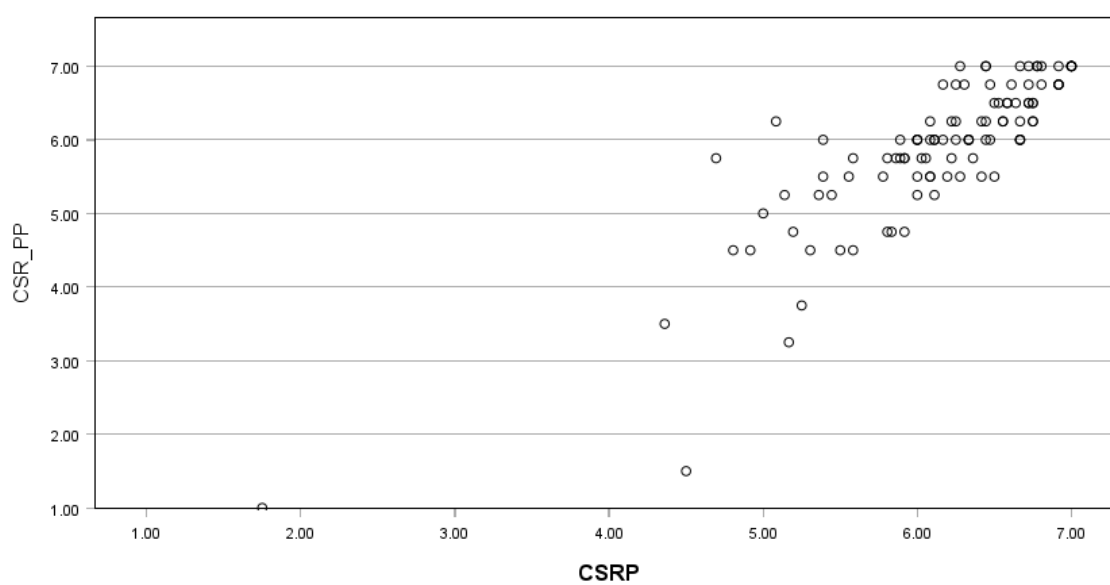


Scatter Plot of CSR_PP by BDAU**Scatter Plot of CSR_EP by CSR_P**

Scatter Plot of CSR_ELP by CSRP

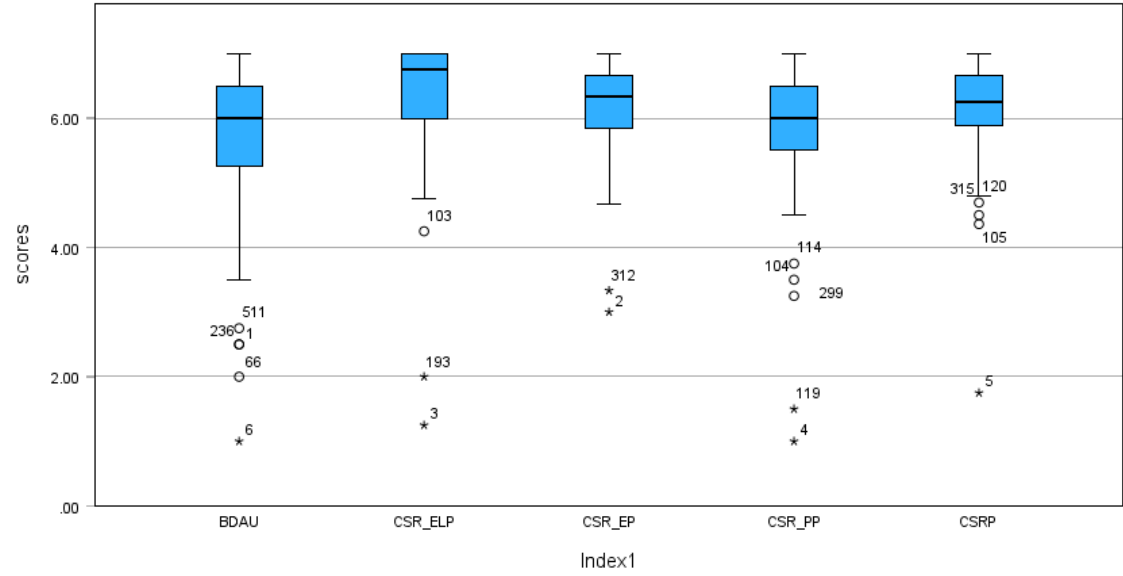


Scatter Plot of CSR_PP by CSRP



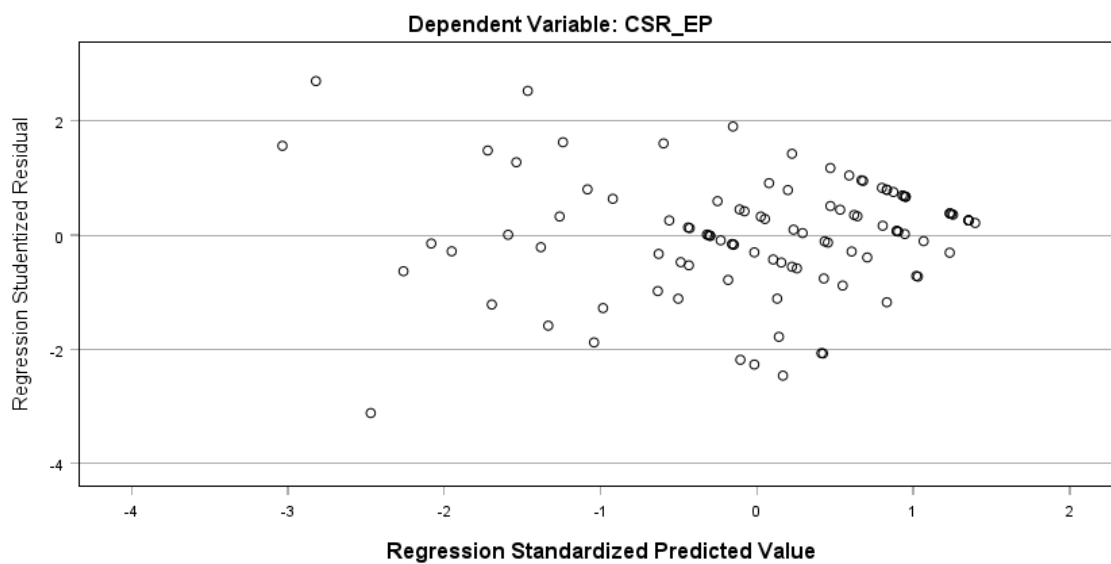
Appendix P: Boxplots of Key Variables

Simple Boxplot of scores by Index1

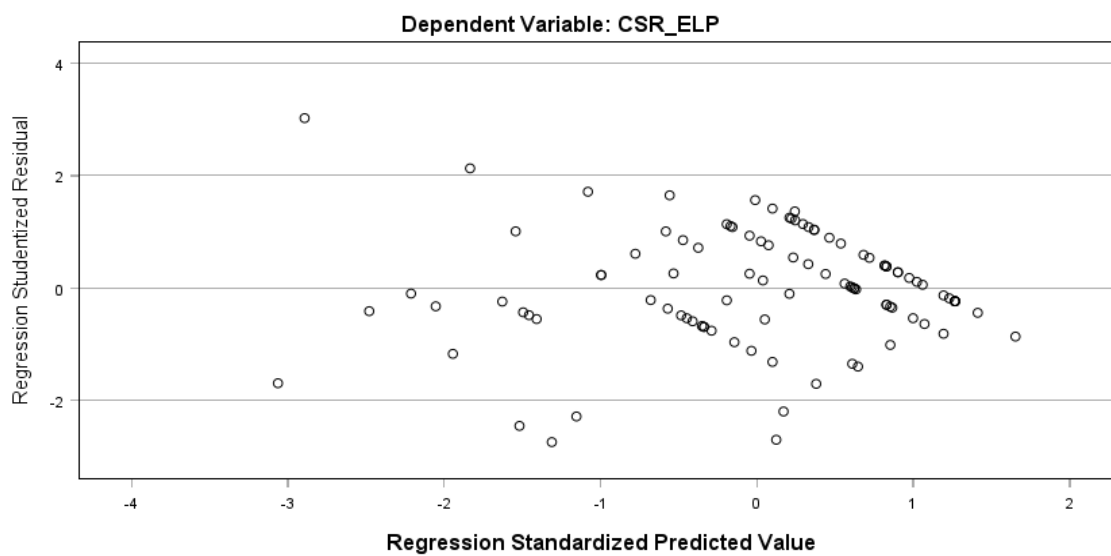


Appendix Q: Scatterplots of Standardized Residuals Vs Predicted Values

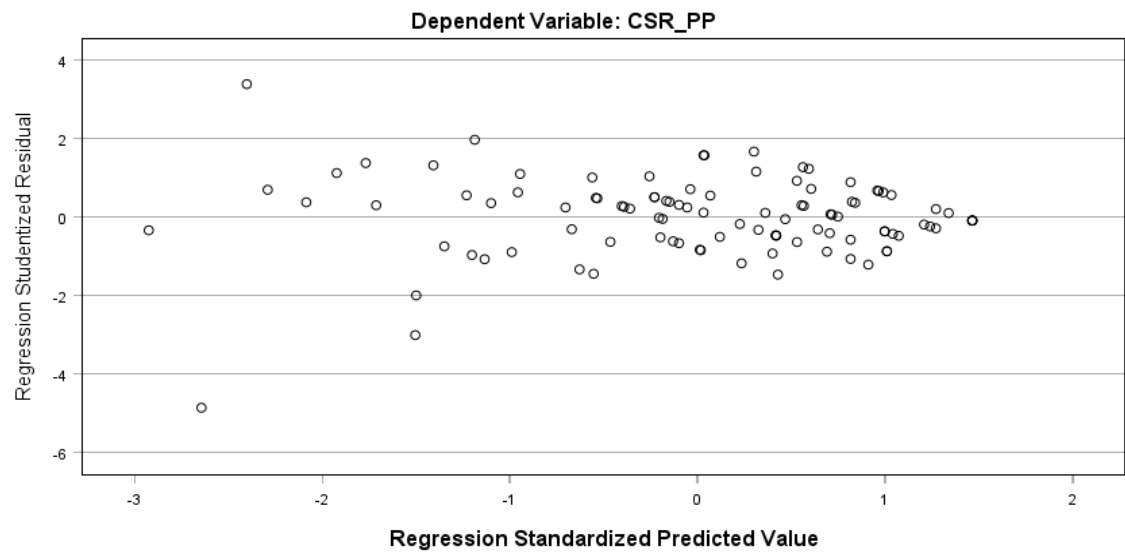
Scatterplot



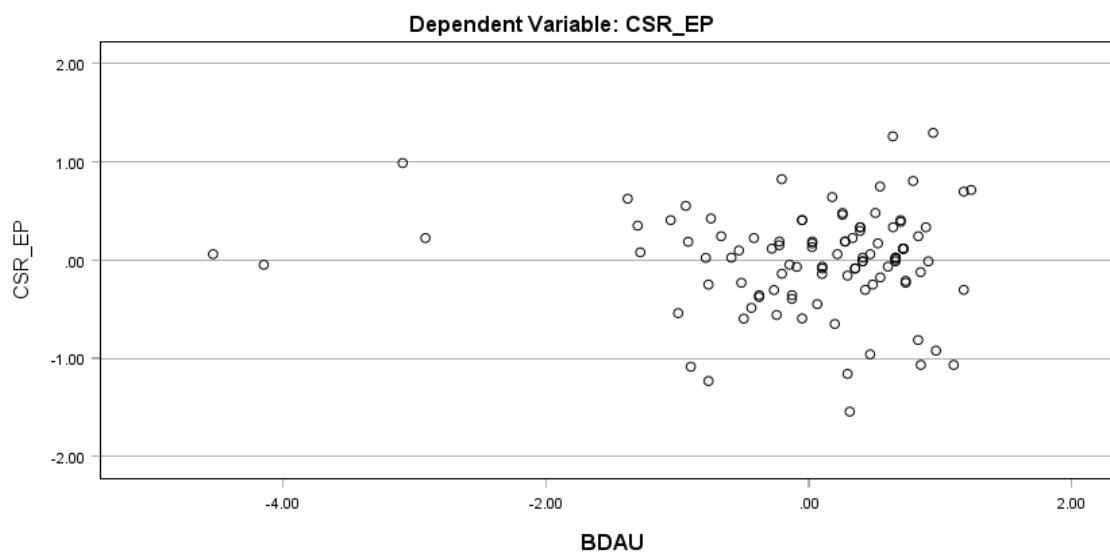
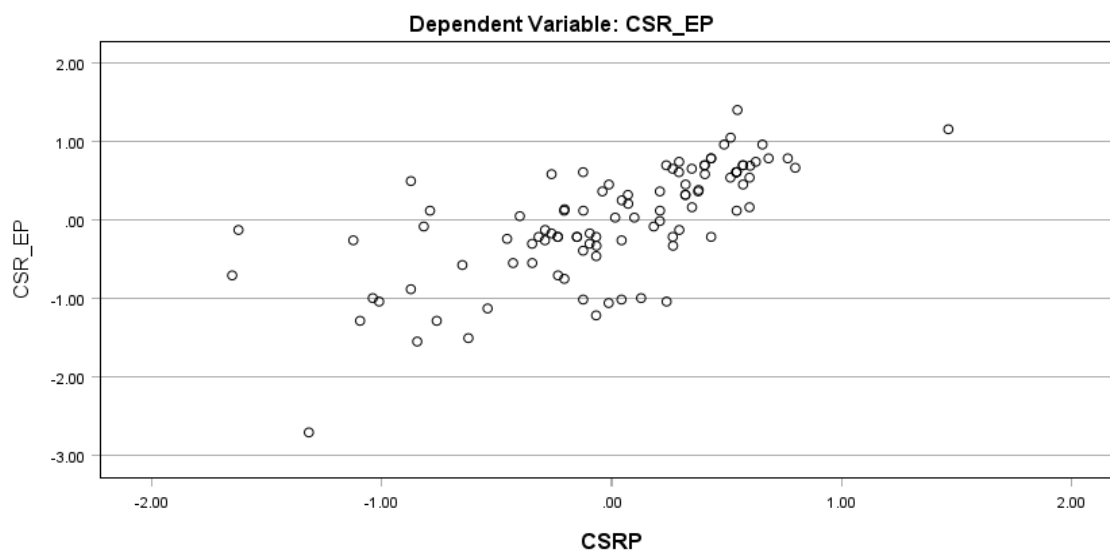
Scatterplot

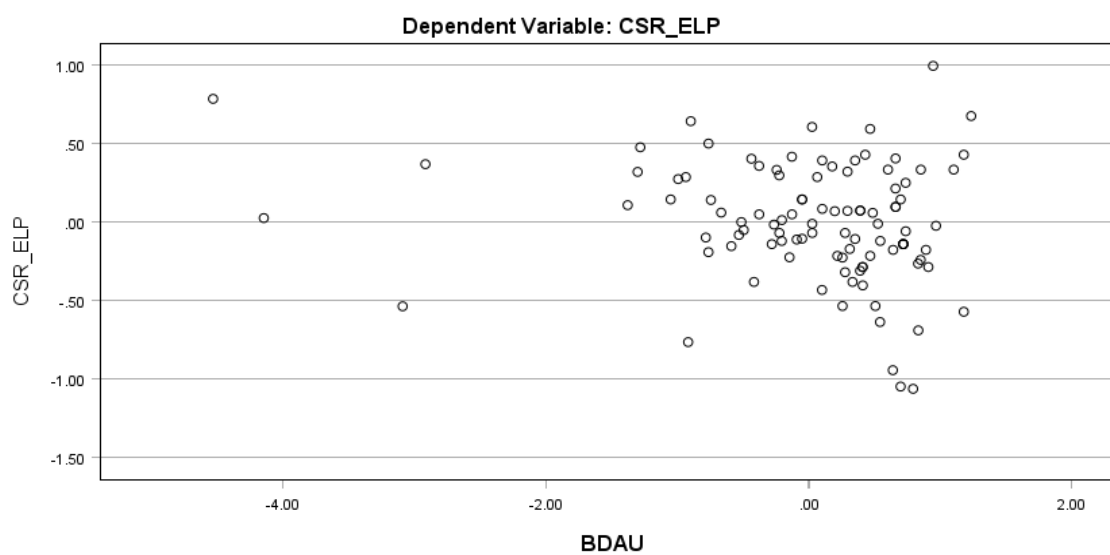
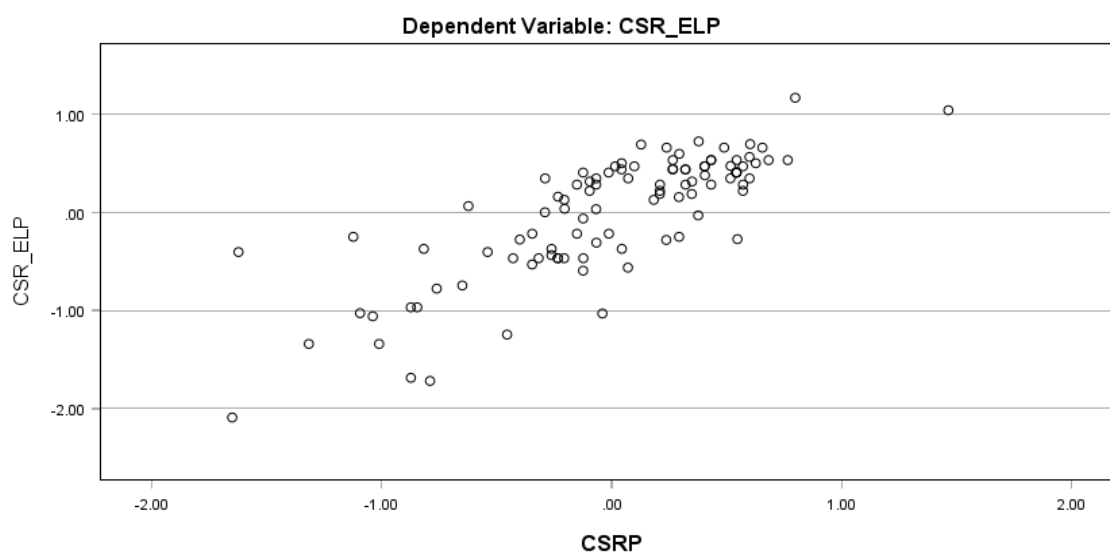


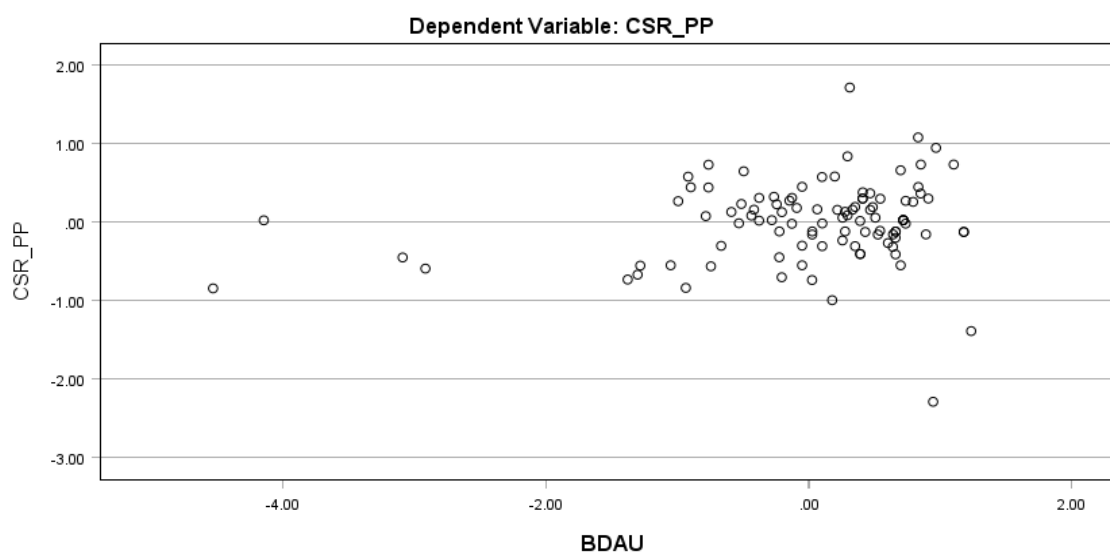
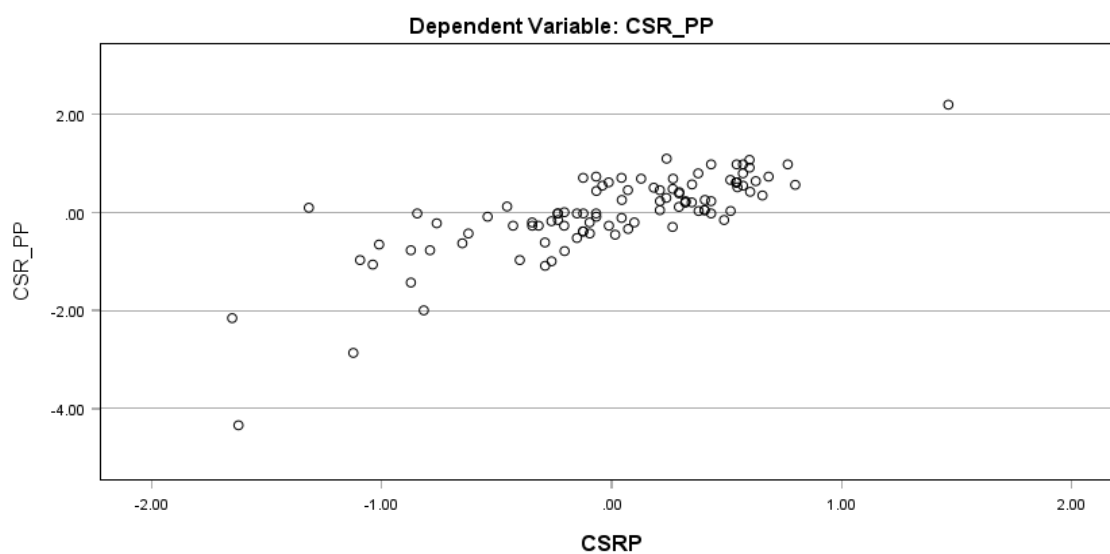
Scatterplot



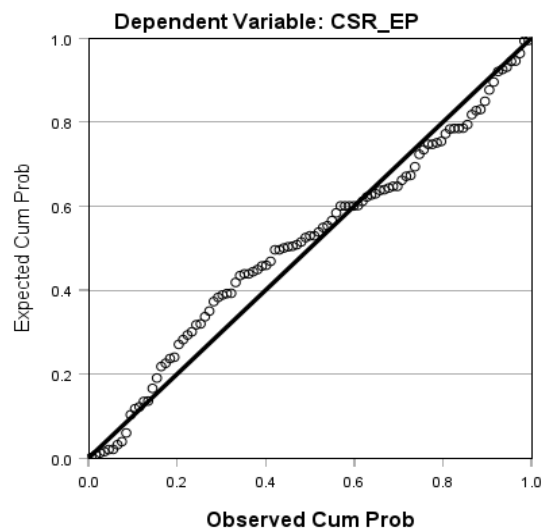
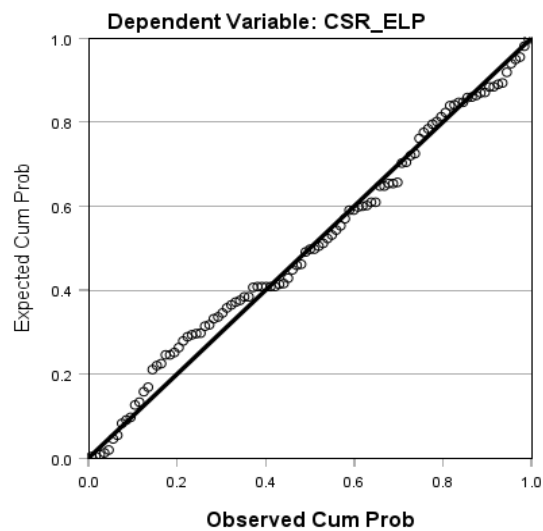
Appendix R: Partial Regression Plots

Partial Regression Plot*Partial Regression Plot*

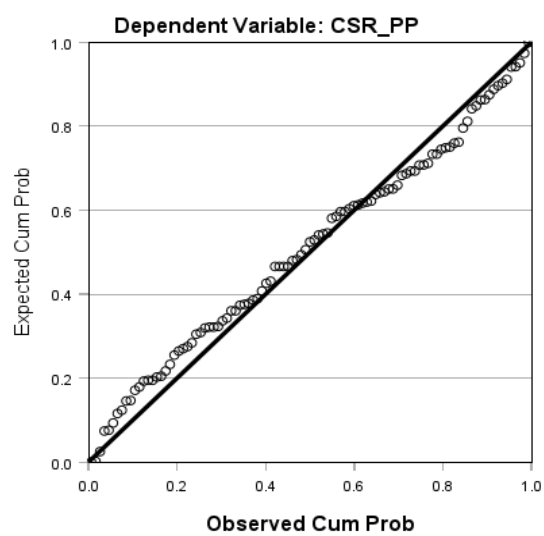
Partial Regression Plot*Partial Regression Plot*

Partial Regression Plot*Partial Regression Plot*

Appendix S: Normal P-P Plots of Regression Standardized Residual

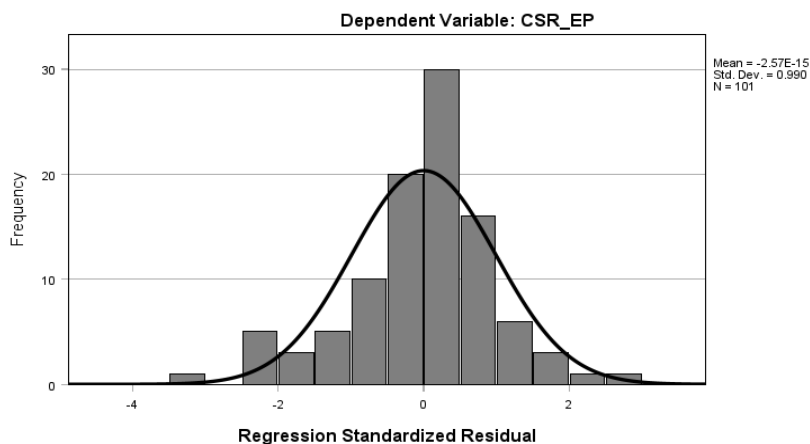
Normal P-P Plot of Regression Standardized Residual*Normal P-P Plot of Regression Standardized Residual*

Normal P-P Plot of Regression Standardized Residual

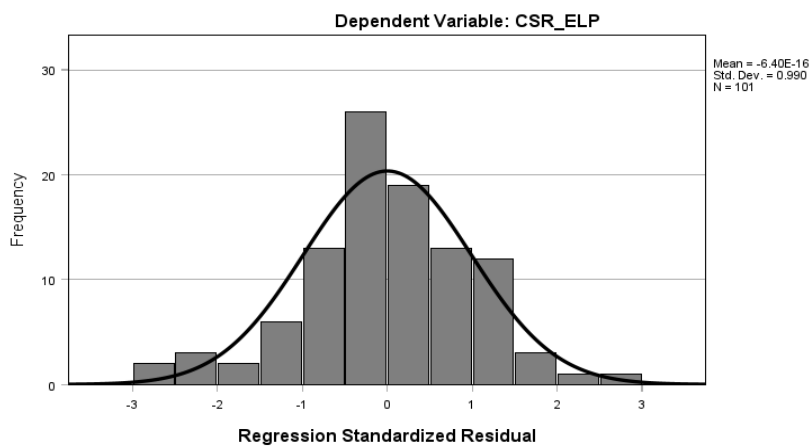


Appendix T: Histograms of Regression Standardized Residual

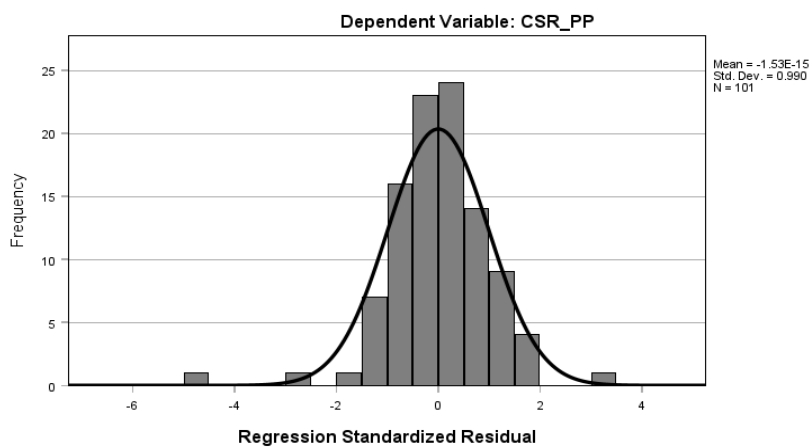
Histogram



Histogram



Histogram



Appendix U: Python Code for Breusch-Pagan Test

```

# Import necessary libraries
import pandas as pd
import statsmodels.api as sm
from statsmodels.formula.api import ols
from statsmodels.stats.diagnostic import het_breuschpagan

# Load the data
data = pd.read_spss(file_path)

# Independent variables: CSR_EP, CSR_ELP, CSR_PP, controlling for CSRP
model1_formula = 'BDAU ~ CSR_EP + CSR_ELP + CSR_PP + CSRP'
model1 = ols(model1_formula, data=data).fit()

# Perform Breusch-Pagan test for Model 1
bp_test1 = het_breuschpagan(model1.resid, model1.model.exog)

# Extract the Lagrange Multiplier statistic and p-value
bp_test1_lagrange_multiplier = bp_test1[0] # Lagrange Multiplier (LM) Statistic
bp_test1_pvalue = bp_test1[1] # p-value

print('Breusch-Pagan test results for Model 1:')
print(f'Lagrange Multiplier Statistic: {bp_test1_lagrange_multiplier:.4f}')
print(f'p-value: {bp_test1_pvalue:.4f}')

# Fit Model 2: CSRP as the dependent variable
# Independent variables: CSR_EP, CSR_ELP, CSR_PP, controlling for BDAU
model2_formula = 'CSRP ~ CSR_EP + CSR_ELP + CSR_PP + BDAU'
model2 = ols(model2_formula, data=data).fit()

# Perform Breusch-Pagan test for Model 2
bp_test2 = het_breuschpagan(model2.resid, model2.model.exog)

# Extract the Lagrange Multiplier statistic and p-value
bp_test2_lagrange_multiplier = bp_test2[0] # Lagrange Multiplier (LM) Statistic
bp_test2_pvalue = bp_test2[1] # p-value

print('Breusch-Pagan test results for Model 2:')
print(f'Lagrange Multiplier Statistic: {bp_test2_lagrange_multiplier:.4f}')
print(f'p-value: {bp_test2_pvalue:.4f}')

```

```

Breusch-Pagan test results for Model 1:
Lagrange Multiplier Statistic: 4.2651
p-value: 0.3713
Breusch-Pagan test results for Model 2:
Lagrange Multiplier Statistic: 85.1629
p-value: 0.0000

```

Appendix V: Post Hoc Interaction Overall Model Result

Multivariate Tests^a

									Observed Power ^d
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	
Intercept	Pillai's Trace	.074	2.855 ^b	2.000	71.000	.064	.074	5.711	.543
	Wilks' Lambda	.926	2.855 ^b	2.000	71.000	.064	.074	5.711	.543
	Hotelling's Trace	.080	2.855 ^b	2.000	71.000	.064	.074	5.711	.543
	Roy's Largest Root	.080	2.855 ^b	2.000	71.000	.064	.074	5.711	.543
BDAU	Pillai's Trace	.643	2.841	24.000	144.000	<.001	.321	68.173	1.000
	Wilks' Lambda	.414	3.282 ^b	24.000	142.000	<.001	.357	78.763	1.000
	Hotelling's Trace	1.281	3.736	24.000	140.000	<.001	.390	89.656	1.000
	Roy's Largest Root	1.164	6.983 ^c	12.000	72.000	<.001	.538	83.791	1.000
CSRP	Pillai's Trace	.421	25.856 ^b	2.000	71.000	<.001	.421	51.712	1.000
	Wilks' Lambda	.579	25.856 ^b	2.000	71.000	<.001	.421	51.712	1.000
	Hotelling's Trace	.728	25.856 ^b	2.000	71.000	<.001	.421	51.712	1.000
	Roy's Largest Root	.728	25.856 ^b	2.000	71.000	<.001	.421	51.712	1.000
BDAU * CSRP	Pillai's Trace	.611	2.641	24.000	144.000	<.001	.306	63.392	.999
	Wilks' Lambda	.438	3.020 ^b	24.000	142.000	<.001	.338	72.480	1.000
	Hotelling's Trace	1.168	3.407	24.000	140.000	<.001	.369	81.767	1.000
	Roy's Largest Root	1.061	6.368 ^c	12.000	72.000	<.001	.515	76.418	1.000

^a. Design: Intercept + BDAU + CSRP + BDAU * CSRP^b. Exact statistic^c. The statistic is an upper bound on F that yields a lower bound on the significance level.^d. Computed using alpha = .05

Appendix W: Post Hoc Interaction Results

Tests of Between-Subjects Effects

									Observed Power ^d
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	
Corrected Model	CSR economic performance	45.414 ^a	30	1.514	5.970	< .001	.713	179.090	1.000
	CSR ethical-legal performance	78.019 ^b	30	2.601	23.947	< .001	.909	718.398	1.000
	CSR philanthropic performance	97.702 ^c	30	3.257	19.904	< .001	.892	597.132	1.000
Intercept	CSR economic performance	.016	1	.016	.064	.801	.001	.064	.057
	CSR ethical-legal performance	.465	1	.465	4.280	.042	.056	4.280	.532
	CSR philanthropic performance	.308	1	.308	1.880	.175	.025	1.880	.272
BDAU	CSR economic performance	3.989	12	.332	1.311	.231	.179	15.732	.674
	CSR ethical-legal performance	3.623	12	.302	2.780	.004	.317	33.362	.972
	CSR philanthropic performance	10.419	12	.868	5.306	< .001	.469	63.677	1.000
CSRP	CSR economic performance	2.972	1	2.972	11.719	.001	.140	11.719	.922
	CSR ethical-legal performance	1.020	1	1.020	9.396	.003	.115	9.396	.856
	CSR philanthropic performance	4.416	1	4.416	26.989	< .001	.273	26.989	.999
BDAU * CSRP	CSR economic performance	3.994	12	.333	1.312	.231	.179	15.748	.675
	CSR ethical-legal performance	3.076	12	.256	2.360	.013	.282	28.319	.938
	CSR philanthropic performance	9.824	12	.819	5.004	< .001	.455	60.043	1.000
Error	CSR economic performance	18.258	72	.254					
	CSR ethical-legal performance	7.819	72	.109					
	CSR philanthropic performance	11.781	72	.164					
Total	CSR economic performance	3945.667	103						
	CSR ethical-legal performance	4222.563	103						
	CSR philanthropic performance	3660.188	103						
Corrected Total	CSR economic performance	63.672	102						
	CSR ethical-legal performance	85.839	102						
	CSR philanthropic performance	109.483	102						

^a R Squared = .713 (Adjusted R Squared = .594)^b R Squared = .909 (Adjusted R Squared = .871)^c R Squared = .892 (Adjusted R Squared = .848)^d Computed using alpha = .05

Appendix X: SPSS Output Model 1 Multivariate Tests

Multivariate Tests^a

Observed Power ^d								
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter
Intercept	Pillai's Trace	.070	3.104 ^b	2.000	83.000	.050	.070	6.207
	Wilks' Lambda	.930	3.104 ^b	2.000	83.000	.050	.070	6.207
	Hotelling's Trace	.075	3.104 ^b	2.000	83.000	.050	.070	6.207
	Roy's Largest Root	.075	3.104 ^b	2.000	83.000	.050	.070	6.207
BDAU	Pillai's Trace	.744	2.929	34.000	168.000	<.001	.372	99.582
	Wilks' Lambda	.348	3.397 ^b	34.000	166.000	<.001	.410	115.489
	Hotelling's Trace	1.611	3.885	34.000	164.000	<.001	.446	132.076
	Roy's Largest Root	1.425	7.040 ^c	17.000	84.000	<.001	.588	119.687
CSRP	Pillai's Trace	.855	244.788 ^b	2.000	83.000	<.001	.855	489.577
	Wilks' Lambda	.145	244.788 ^b	2.000	83.000	<.001	.855	489.577
	Hotelling's Trace	5.899	244.788 ^b	2.000	83.000	<.001	.855	489.577
	Roy's Largest Root	5.899	244.788 ^b	2.000	83.000	<.001	.855	489.577

^a. Design: Intercept + BDAU + CSRP^b. Exact statistic^c. The statistic is an upper bound on F that yields a lower bound on the significance level.^d. Computed using alpha = .05

Appendix Y: SPSS Output Model 1 Univariate Tests

Tests of Between-Subjects Effects

									Observed Power ^d
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	
Corrected Model	CSR economic performance	41.421 ^a	18	2.301	8.687	< .001	.651	156.365	1.000
	CSR ethical-legal performance	74.944 ^b	18	4.164	32.101	< .001	.873	577.821	1.000
	CSR philanthropic performance	87.878 ^c	18	4.882	18.982	< .001	.803	341.672	1.000
Intercept	CSR economic performance	.922	1	.922	3.479	.066	.040	3.479	.454
	CSR ethical-legal performance	.097	1	.097	.746	.390	.009	.746	.137
	CSR philanthropic performance	1.616	1	1.616	6.281	.014	.070	6.281	.698
BDAU	CSR economic performance	6.648	17	.391	1.476	.124	.230	25.097	.843
	CSR ethical-legal performance	15.452	17	.909	7.008	< .001	.586	119.134	1.000
	CSR philanthropic performance	8.337	17	.490	1.907	.028	.278	32.415	.938
CSRP	CSR economic performance	23.741	1	23.741	89.625	< .001	.516	89.625	1.000
	CSR ethical-legal performance	29.975	1	29.975	231.107	< .001	.733	231.107	1.000
	CSR philanthropic performance	43.841	1	43.841	170.454	< .001	.670	170.454	1.000
Error	CSR economic performance	22.251	84	.265					
	CSR ethical-legal performance	10.895	84	.130					
	CSR philanthropic performance	21.605	84	.257					
Total	CSR economic performance	3945.667	103						
	CSR ethical-legal performance	4222.563	103						
	CSR philanthropic performance	3660.188	103						
Corrected Total	CSR economic performance	63.672	102						
	CSR ethical-legal performance	85.839	102						
	CSR philanthropic performance	109.483	102						

^a. R Squared = .651 (Adjusted R Squared = .576)^b. R Squared = .873 (Adjusted R Squared = .846)^c. R Squared = .803 (Adjusted R Squared = .760)^d. Computed using alpha = .05

Appendix Z: SPSS Output Model 2 Multivariate Tests

Multivariate Tests^a

Observed Power ^d								
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter
Intercept	Pillai's Trace	.986	1672.995 ^b	2.000	47.000	<.001	.986	3345.990
	Wilks' Lambda	.014	1672.995 ^b	2.000	47.000	<.001	.986	3345.990
	Hotelling's Trace	71.191	1672.995 ^b	2.000	47.000	<.001	.986	3345.990
	Roy's Largest Root	71.191	1672.995 ^b	2.000	47.000	<.001	.986	3345.990
CSRP	Pillai's Trace	1.752	6.404	106.000	96.000	<.001	.876	678.877
	Wilks' Lambda	.005	11.567 ^b	106.000	94.000	<.001	.929	1226.084
	Hotelling's Trace	46.867	20.339	106.000	92.000	<.001	.959	2155.883
	Roy's Largest Root	43.428	39.331 ^c	53.000	48.000	<.001	.977	2084.543
BDAU	Pillai's Trace	.321	11.093 ^b	2.000	47.000	<.001	.321	22.187
	Wilks' Lambda	.679	11.093 ^b	2.000	47.000	<.001	.321	22.187
	Hotelling's Trace	.472	11.093 ^b	2.000	47.000	<.001	.321	22.187
	Roy's Largest Root	.472	11.093 ^b	2.000	47.000	<.001	.321	22.187

^a. Design: Intercept + CSRP + BDAU^b. Exact statistic^c. The statistic is an upper bound on F that yields a lower bound on the significance level.^d. Computed using alpha = .05

Appendix AA: SPSS Output Model 2 Univariate Tests

Tests of Between-Subjects Effects

									Observed Power ^d
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	
Corrected Model	CSR economic performance	55.503 ^a	54	1.028	6.039	<.001	.872	326.109	1.000
	CSR ethical-legal performance	82.754 ^b	54	1.532	23.844	<.001	.964	1287.595	1.000
	CSR philanthropic performance	103.437 ^c	54	1.915	15.206	<.001	.945	821.129	1.000
Intercept	CSR economic performance	77.463	1	77.463	455.141	<.001	.905	455.141	1.000
	CSR ethical-legal performance	80.837	1	80.837	1257.769	<.001	.963	1257.769	1.000
	CSR philanthropic performance	37.575	1	37.575	298.285	<.001	.861	298.285	1.000
CSRP	CSR economic performance	49.394	53	.932	5.476	<.001	.858	290.215	1.000
	CSR ethical-legal performance	70.057	53	1.322	20.567	<.001	.958	1090.041	1.000
	CSR philanthropic performance	78.935	53	1.489	11.823	<.001	.929	626.624	1.000
BDAU	CSR economic performance	.514	1	.514	3.019	.089	.059	3.019	.399
	CSR ethical-legal performance	.536	1	.536	8.338	.006	.148	8.338	.808
	CSR philanthropic performance	2.099	1	2.099	16.666	<.001	.258	16.666	.979
Error	CSR economic performance	8.169	48	.170					
	CSR ethical-legal performance	3.085	48	.064					
	CSR philanthropic performance	6.046	48	.126					
Total	CSR economic performance	3945.667	103						
	CSR ethical-legal performance	4222.563	103						
	CSR philanthropic performance	3660.188	103						
Corrected Total	CSR economic performance	63.672	102						
	CSR ethical-legal performance	85.839	102						
	CSR philanthropic performance	109.483	102						

^a. R Squared = .872 (Adjusted R Squared = .727)

^b. R Squared = .964 (Adjusted R Squared = .924)

^c. R Squared = .945 (Adjusted R Squared = .883)

^d. Computed using alpha = .05