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The Relationship Between Operating Efficiency, Credit Score, and Small Business Sustainability

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,

and that any and all revisions required by

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2024

Abstract

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Sustainability

by

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MBA, Financial Management La Sierra University, 2005

BSc, Economics, and Management University of the West Indies, 1989

Doctoral Study Submitted in Partial Fulfillment

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Abstract

The first 5 years of a small business (SB) life are critical because 50-60% fail. SB leaders are concerned about the inability of many SBs to attain sustainability within 5 years, given their pivotal role in owner and community financial viability. Grounded in the resource-based view theory, the purpose of this quantitative correlational study was to examine the relationship between SB operating efficiency, credit score, and sustainability. Secondary data for 211 closed and 211 companies still operating from 2013 to 2023 were collected from the Data Axle website for analysis. The results of the binary logistic regression were significant, X^2 (3, N= 422) = 11.887, p = 0.008. Operating efficiency was statistically significant (β = 1.595, p = 0.015) and accounted for most of the variation in the dependent variable sustainability. Overall, the categorical variable credit score did not significantly predict SB sustainability. A key recommendation is for SB owners to implement training and development programs, such as cash flow management and interpersonal relationships, to improve their core competencies and firms' operating efficiencies. The implication for positive social change is that more sustainable businesses will provide consistent employment and attract other businesses and infrastructure development such as roads and parks. The resulting improvements help raise the living standards for residents in these local communities.

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Section 1: Foundation of the Study

Small businesses (SBs) account for most private sector enterprises globally, and their significance to the socioeconomic development of economies has created a necessary global concern for their sustainability (Erdogan, 2023; Khyareh & Amini, 2021). There is consensus in the literature that the first 5 years of the life of a SB is critical because 50% to 60% fail (Atsan, 2016; Bonsu & Kuofie, 2019; Haron et al., 2014; Huang & Knight, 2017; Quansah & Hartz, 2021; Zaridis & Mousiolis, 2014). Like infants, SBs are vulnerable during this period because they lack vital resources such as legitimacy and finance to sustain themselves (Press et al., 2020; Nabisaalu & Bylund, 2021; Veena lyer, 2020). Therefore, it will be instructive to evaluate how a sample of SBs in Virginia measures up to this standard of economic sustainability.

Background of the Problem

SBs play a significant role in most modern economies regarding total job creation, productivity, and economic growth (Jensen et al., 2022). In the United States, many scholars and commentators describe SB as the engine of job creation, as they account for approximately 50% of all job creation (Decker et al., 2014). Bonsu and Kuofie (2019) noted that SBs account for nearly 50% of the U.S. gross domestic product. Additionally, 59.9 million people, about 50% of the U.S. labor force, are employed by SBs (Brennan & Rosacker, 2020; Honaker & Thomas, 2019).

Given their pivotal role in the U.S. economy, SB owners and policymakers are concerned with the high SB failure rate. According to Zaridis and Mousiolis (2014), scholars accept that small firms have a higher probability of failure than larger firms,

with their rate ranging between 50-80% within the first 5 years. In the United States, 50% of SBs fail within the first 5 years and 75% within the first 15 years (Bonsu & Kuofie, 2019; Frazer, 2015; Quansah & Hartz, 2021). Additionally, the 2018 US Bureau of Labor and Statistics survey showed that only 40% of U.S. SBs are profitable (Bonsu & Kuofie, 2019). Consequently, the inability of many SB owners to achieve sustainability is a concern for business leaders. Hence, the justification for investigating the relationship between SB sustainability, credit score, and operating efficiency is to create efficient models for SB owners to improve business practices.

Problem and Purpose

The specific business problem is that some U.S. SB owners lack knowledge of the relationship between operating efficiency, credit score, and SB sustainability. Therefore, the purpose of this quantitative correlational study is to examine the relationship between SB operating efficiency, credit score, and sustainability. The independent variables are operating efficiency and credit score while the dependent variable is SB sustainability.

Population and Sampling

Scholars refer to the entire collection of things, events, or groups of people that a researcher intends to investigate as the population (Sekaran & Bougie, 2019). Using sample statistics, the researchers make inferences about the population. The sample, a population subset, consists of sufficient elements selected using a probability or non-probability design (Saunders et al., 2019). The population for this study is 9,931 SBs incorporated in Virginia and listed on the Data Axle website. The privately owned website provides reference and research data on United States and Canadian businesses

and consumers. The website contains information on mom-and-pop shops and global enterprises. Consequently, I required no human participant considerations for the secondary data collection process.

I chose the population elements using specific parameters to ensure alignment with the research question. The companies employed less than 100 employees with an annual revenue of less than $500,000. They had a credit rating with a letter grade, total annual sales volume and operating expenditure, the year they were established, and the year they closed, given they had discontinued operations. This set of filters yielded 8,994 open and 937 closed SBs. From the set of closed companies, I used the non-probabilistic purposive sampling technique (Hariyanti et al., 2023; Sekaran & Bougie, 2019) to ensure the companies have the criteria required to answer the research question, leading to a sample of 211 closed SBs. I used the probability sampling method systematic sampling (Kinyua et al., 2023; Sekaran & Bougie, 2019) to obtain an equivalent sample of open SBs.

The G* Power software 3.1 allowed me to conduct a priori sample analysis using z- tests and binary logistic regression. The power analysis with a medium effect size of .5 (Sommet et al., 2023), α =.05, R^2 = .5, odds ratio = 2, and a power of .8, showed a required sample size of 163. Increasing the power to .95 yielded a sample size of 257 subjects. On the basis that a sample size within the range 163 to 257 subjects provide the best opportunity to avoid type 1 or type 2 errors (Jobst et al., 2023; Taylor, 2023a) and only 211 closed companies met the purposive sampling criteria, a sample size of 211 was deemed appropriate for this study.

Nature of the Study

In this quantitative study, the specific research design was correlational. The methods employed in quantitative research are grounded in positivism (Zyphur & Pierides, 2020), which assumes labels correspond to things, hypothesized relations are equivalent to actual relations, samples resemble populations, and inferences from probabilities are valid reasoning (Powell, 2020). The justification for the quantitative method stems from the need to objectively measure and predict SB sustainability associated with operating efficiency and credit score. Conversely, qualitative research expresses subjective philosophies and is concerned with understanding the social phenomena from the perspective of the participants through an in-depth study (Balmer & Richards, 2022; Bloomfield & Fisher, 2019) rather than seeking to explain the relationships or causes of change in social facts by measuring relational variables (M.A. Muhammad et al., 2022). Finally, the mixed method approach combines quantitative and qualitative elements; however, my envisioned study only requires one method to address the specific business problem. Therefore, the qualitative and mixed methods approaches are unsuitable for this study.

Researchers conducting correlational design do not seek cause and effect, the objective of experimental and quasi-experimental research, nor merely to describe a phenomenon in a real-life setting typical of descriptive designs (Bloomfield & Fisher, 2019). In contrast, researchers use correlational designs to examine the relationship between or among selected variables in a sample to determine the degree, strength, and type of relationships among the chosen variables (Bloomfield & Fisher, 2019; Busra et

al., 2022). This study aims to examine the relationship between independent variables (operating efficiency and credit score) and a dependent variable (SB sustainability), which makes correlational design appropriate. Consequently, a descriptive design that does not involve the manipulation of variables (Bloomfield & Fisher, 2019) and the experimental and quasi-experimental designs are not suitable for my study.

Research Question

What is the relationship between operating efficiency, credit score, and SB sustainability?

Hypotheses

Null Hypothesis (H_o): There is no statistically significant relationship between operating efficiency, credit score, and SB sustainability.

Alternative Hypothesis (H_1): There is a statistically significant relationship between operating efficiency, credit score, and SB sustainability.

Theoretical Framework

The theory that grounds this study is the resource-based view theory (RBV), which forces management to focus on the organization's internal resources to identify capabilities, assets, and competencies that they can use to grow the firm, achieve a competitive advantage, and achieve sustainability. Penrose, in her theory of the firm, outlined the core principles of RBV theory, which states that firms with unique strategic resources that are valuable, rare, inimitable, and non-substitutable (VRIN) will consistently grow and achieve a competitive advantage (Lau & Michie, 2022). Chatterjee et al. (2023) and Zahra (2021) stated that Wernerfelt coined the term RBV. The theory

was further developed by Barney (1991) and Barney, and Clark (2007) further expounded on the theory. The primary question implied in the theory is why do some firms consistently outperform other organizations? (Chatterjee et al., 2023).

As applied to this study, the RBV theory holds that I expect the independent variables operating efficiency and credit score to predict the number of unsustainable and sustainable SBs because limited resources often constrain the operation of a typical SB because they lack legitimacy and bankers and investors often mistreat them due to their newness and size (Khan & Lew, 2018; Song & Xiang, 2023). Additionally, given the correlation among the variables, I expected the number of unsustainable SBs to change with the variation in operating efficiency and credit score due to different risk factors at each stage in the firm's life cycle (Khan & Lew, 2018; Mueller & Stegmaier, 2015; Thornhill & Amit, 2003). According to Zahra (2021), the RBV theory provides a sound framework for analyzing the influence of organizations' tangible and intangible resources on growth and in achieving a competitive advantage. Consequently, the outflow and inflow of operating expenditure and sales volume are valuable indicators of the financial health of SBs. Figure 1 provides a graphical representation of the relationship between VRIN resources and firms' competitive advantage and sustainability.

Figure 1

Unique Resources and Sustainability
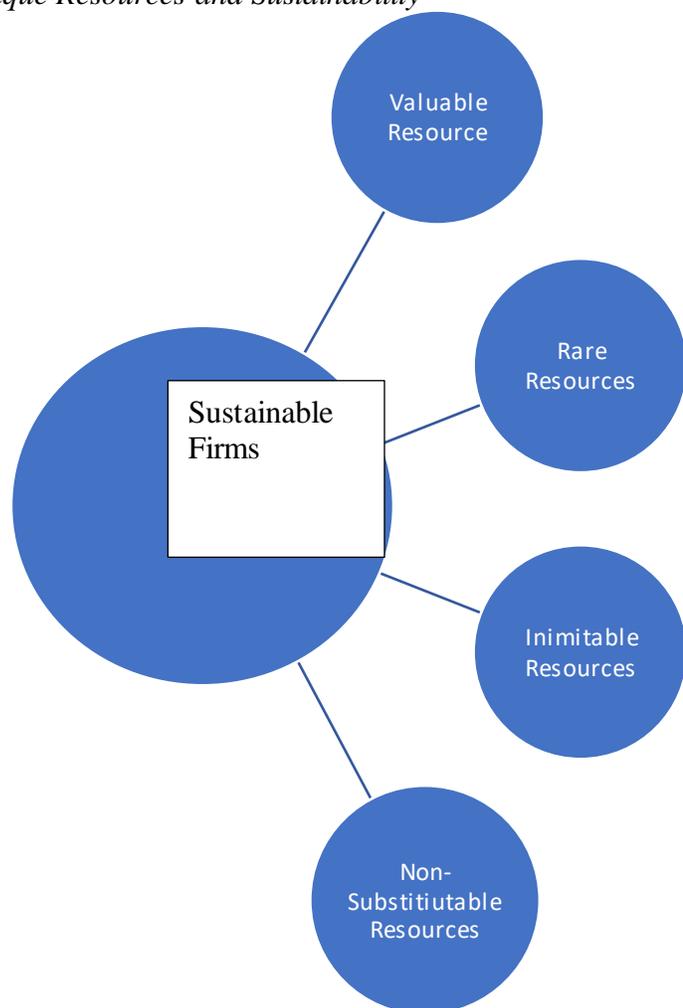
Note. Figure 1 is a graphical depiction of the RBV theory, which applies to investigating resources and firms' sustainability.

Operational Definitions

The emphasis in this study will be on the sustainability of SBs. I will provide definitions below that will make critical words succinct and unambiguous.

Economic sustainability: Economic sustainability refers to a SB's ability or capacity to continue its operation for a significant period (Warren & Szostek, 2017). In this study, I regarded 5 years as significant, given that 50% of U.S. SBs fail within 5 years after the beginning of operation (Huang & Knight, 2017; Quansah & Hartz, 2021).

Small business: Small business in this study is any privately or publicly owned business with less than 100 employees and an annual sales volume of $ 500,000 or less. This definition aligns with the Small Business Association (SBA), which classifies companies with less than 500 employees as SBs (Bonsu & Kuofie, 2019; Briegel, 2019). The SBA, created under the Small Business Act of 1953 and the subsequent amendments has the responsibility to promote and foster the SB development nationwide and is the primary arbiter of standard setting for SBs (Spector, 2023).

Small business closure: SB closures are firms with zero sales for at least one year. Invariably businesses do not reopen after four consecutive quarters without any sales. Similarly, the U.S. Census Bureau and the U.S. Bureau of Labor Statistics use 1 year to measure business closure (Fairlie et al., 2023).

Assumptions, Limitations, and Delimitations

This section of research deals with the study's assumptions, limitations, and delimitations. An assumption is something or a fact the researcher takes as accurate or will occur without proof (Wells & Brandon, 2019). Constraints or restrictions outside the researcher's control, which the researcher will address after the study, are referred to as limitations (Coker, 2022; Theofanidis & Fountouki, 2018). Delimitations are the boundaries the researcher sets to make the research manageable to achieve the study's objective (Coker, 2022; Davis, 2023).

Assumptions

Assumptions assist researchers in recognizing the certainty of the objects they are researching and the actual state of things. Additionally, the foundation of a well-aligned study begins with a series of assumptions (Almasri & McDonald, 2021). I made five significant assumptions in this study. The first assumption was that a sample of SBs drawn from the Data Axle website is representative of the population of SBs in Virginia. The second assumption was that the quantitative method was appropriate to capture the impact of operating efficiency and credit score on the SB's sustainability. Thirdly, logistic regression analysis was a suitable statistical technique for analyzing the secondary dataset. My fourth assumption is that SBs without sales for four continuous quarters were permanently closed. Finally, I assumed that the inferences and conclusions from the study's results would contribute to more SB owners in Virginia achieving sustainability.

Limitations

Limitations are restrictions uncontrollable by the researcher, which causes frailties in the study, leading to distortion and misinterpretation of results (Theofanidis & Fountouki, 2018). There are four significant limitations associated with this research. One limitation of this study is that I relied on the measurement instruments of Data Axle. Hence, their researchers could have miscalculated several concepts. A second weakness is that the researchers may have inadvertently excluded many SBs from the Data Axle dataset. Therefore, data saturation is not achievable. The third limitation is that the study seeks to establish correlations between two independent variables, credit score, and operating efficiency, and the dependent variable, sustainability and not causation. The fourth limitation is that the period under investigation, 2013 to 2023, includes the economic shock resulting from COVID-19, which may distort the findings.

Delimitations

The researcher controls the delimitation of the research, primarily associated with the theoretical background, sample, objectives, research question, and variables (Davis, 2023; Theofanidis & Fountouki, 2018). The researcher's boundaries on these aspects of the research create a manageable project and achievable goals within a specific timeframe (Coker, 2022; Davis, 2023; Theofanidis & Fountouki, 2018). In this study, I identified a few delimitations. The SBs sampled were those operating in Virginia with fewer than 100 employees and an annual sales volume of $500,000 or less. Another delimitation is that I limited the study to 2013 to 2023.

Significance of the Study

Contribution to Business Practice

This study is significant to business practices because knowledge of the association of the SB components can provide a practical model to predict business sustainability. The derived understanding of the relationship between operating efficiency, credit score, and SB sustainability will aid SB owners in identifying early signs of problems so they may take corrective actions. Additionally, the study will improve the knowledge gap because a significant portion of the research on the factors that cause SBs to be unsustainable are qualitative studies, or they emphasize social and environmental sustainability instead of economic sustainability. Atsan's (2016) qualitative study on the failure experience of entrepreneurs found that poor financial planning, such as inadequate cash flow management and the firm's age, contribute to business failure. Therefore, this quantitative correlational study investigating the relationship among operating efficiency, credit score, and SB sustainability will provide further insight. Also, this study will compare the short-term business outcomes of failure, bankruptcy, and sub-par performance with sustainability. A quantitative study on firms' sustainability will provide a comprehensive understanding of the SB phenomenon and the creation of better analytical models.

Implications for Social Change

The implication for positive social change is that providing significant knowledge to SB owners will create a more efficient and effective organization to achieve success. Therefore, more SBs sustaining their operations will alleviate the attendant social ills in

society caused by small and medium-sized enterprises (SMEs) closures within 5 years of starting operations (Umadia & Kasztelnik, 2020). Additionally, Gu et al. (2022) and Khyareh and Amini (2021) pointed out that SBs sustainability in communities attracts basic amenities such as roads and causes other businesses to spring up, thereby creating a localization of industries. Economic growth leads to reduced poverty and improved living standards for communities.

A Review of the Professional and Academic Literature

Introduction

The sources explored for the professional and academic literature review include several databases and search engines. In the first section, I discussed the theoretical framework's application to the performance of SBs and how prior researchers view the theory in that context. Also, I compared the long and short-term operational performance of SBs as shown by prior research. The following two sections discuss how prior research classified the impact of the two independent variables on SB performance with emphasis on their potential to predict SB sustainability and conclude the review with additional analysis.

I explored databases and search engines using keywords and phrases such as SB and closure, SB and failure, new ventures or startups, sustainability, RBV, operating efficiency, business credit score, and credit ratings. Additionally, I used ABI/INFORM Collection, Accounting, Tax and Banking Collection, Business Source Complete, Sage Journals, Data Axle, ProQuest One Academic, Scholar Works, and Thoreau as sources

for articles and data. The literature review contains 117 references, with 99% representing peer review articles. Additionally, approximately 85% of the references were 5 years or less to capture the current thought on the research topic.

The purpose of this quantitative correlational study is to examine the relationship between operating efficiency, credit score, and SB sustainability. For this investigation I hypothesized that credit score and operating efficiency are determinants of SB sustainability. Hence, as independent variables, they can predict whether an SB will operate for 5 or more years or 4 or fewer years.

Theoretical Framework

I used the RBV to explain SB owners' sustainability issues systematically. The theory answers an essential question in business practice: Why do some firms outperform others? The effect of the theory is that it forces SB owners to focus on the organization's internal resources to identify assets, capabilities, and competencies that they can use to grow the firm and achieve a competitive advantage (Lau & Michie, 2022; Panno, 2020). Therefore, owners and managers have a critical role in the sustainability of SBs. For this research, I considered several theories that capture the operations of SBs. The general systems theory developed by Von Bertalanffy, which asserts that groups and institutions are complex open systems with interdependent components interacting internally and externally (Katrakazas et al., 2020; S.I. Shin et al., 2024; Tadros, 2020) was relevant but lacked the specificity required to capture the essence of the critical factors for SBs sustainability.

I also examined the exchange theory, which many researchers consider the most important model for understanding workplace behavior and social interactions. Exchange theory deals with transferring valuable resources through social processes (Anwar et al., 2023; W. Zhang & Fei, 2022; Z. Zhang & Liu, 2024). However, the theory focuses on the relationships established during the exchange instead of the resources. Hence, the exchange theory is inadequate for explaining the systematic problems encountered by SBs. I also considered the relational view theory. Proponents of this theory argue that in addition to its internal resources, there are critical resources outside the boundaries of a single entity (Dubey et al., 2022; Modaffari et al., 2023; Uvet et al., 2023). Embedded in the network of relationships and interfirm operations are significant resources vital to the business's success (Swierczek, 2023; W. Zhang & Fei, 2022). The relational view theory, therefore, provides a comprehensive view of the SB phenomena. However, the scope of this study prevents an extensive examination of the SB problem, and as such, the emphasis will be on the firm's utilization of internal resources. Additionally, Prince (2023) argued that the RBV theory focuses on resources and capabilities that are firm specific and critical, making it a better fit for this research.

Knowledge-based view (KBV) theorists argue that knowledge is the firm's most valuable resource, which drives growth and entrepreneurial activities (Iftikhar et al., 2022; Kengatharan, 2019; Sang-Eun (Amelia) & Kyoung-Joo, 2023; W. Zhang & Fei, 2022). Whereas the KBV emphasizes single-resource knowledge, proponents of the RBV incorporate all resources that impact the firm's operations (Barney, 1991; Khurana & Farhat, 2021; Zahra, 2021). Furthermore, Tsvetkova and Partridge (2021) pointed out that

the KBV could be more effective in explaining U.S. firm formations in more knowledge-intensive environments. The RBV, therefore, provides more visibility on the firm's operations than the KBV. Consequently, this study was grounded in the RBV theory because it aptly delineates the critical issues in SB sustainability. SBs are typically constrained by limited resources (Chatterjee et al., 2023; Zahra, 2021); they must be operationally efficient to be sustainable.

The genesis of the RBV theory is Penrose study on the theory of the firm, in which she stated that firms with unique strategic resources that are VRIN will consistently grow and sustain a competitive advantage (Lau & Michie, 2022). According to Chatterjee et al. (2023) and Zahra (2021), Wernerfelt coined the phrase RBV, and the theory was further developed by Barney and Barney, and Clark made additional contributions. One of the dominant characteristics of the RBV is its longevity and flexibility. Chatterjee et al. and Gu et al. (2022) showed that the RBV was durable and capable of explaining the sustainability of SBs during and after COVID-19 because of the centrality of the availability and use of resources. Lau and Michie (2022) and Handoyo et al. (2021) reinforced the versatility of the RBV as their findings showed that the core tenets of the theory explained the expansion of domestic companies into international markets and created competitive advantages. Yuen et al. (2019) showed that irrespective of industry, the RBV theory is applicable because there is an association between resources and sustainable shipping management.

Additionally, El Baz and Ruel's (2021) study on how supply chain risk management can reduce the disruptive effect of COVID-19 demonstrated the robustness

of the RBV model by showing that dynamic resources and capabilities increase firms' resilience and financial health, enabling them to overcome disruptions and economic shocks and continue operating. Mehmood et al. (2023) and Smaguc (2022) showed the strength of the RBV framework as an explanatory model by demonstrating that the resources, finance, technology, and human capital were crucial in the success of new ventures. Also, that the theory is effective in explaining the entrepreneurial process. Such a conclusion interlocks with that of Jensen et al. (2022), Nabisaalu and Bylund (2021), and Press et al. (2020) that resources are a crucial determinant of survival in the first 5 years of a SB. Thus, one key strength of the RBV is that its relevance increases over time. Nagano (2020) showed the evolution of the theory displaying its adaptability to each business environment. Time does not nullify the theory's capacity and ability to explain SBs' growth and expansion. Consequently, whether researchers are investigating business performance (Emmanuel et al., 2023; Mandizwidza-Moyo et al., 2023; Panno, 2020), failure (Cera et al., 2019; Khurana & Farhat, 2021; Quach et al., 2021), bankruptcy (Kanapickiene et al., 2023; Kucher et al., 2020) or sustainability (Abdullah & Ampauleng, 2024; Gu et al., 2022; Zahra, 2021), the RBV theory explains businesses short or long-term results because the model connects resources to operational accomplishments.

To increase the likelihood of sustainability, all organizations must acquire a diverse set of resources, financial and nonfinancial (Mehmood et al., 2023; Smaguc, 2022). Additionally, SBs typically need more resources, which makes it harder for them to achieve economic sustainability (Abdulmohsen Alfalih & Tajani, 2019; Khurana &

Farhat, 2021; Song & Xiang, 2023). Hence, owners must be cognizant of the available resources and use them efficiently to succeed. The RBV theory is then appropriate for understanding the operations of SBs because survival and success depend on a consistent supply of unique resources (Y. Li et al., 2022). Many scholars have used the theory consistently in the literature to illustrate that resources are critical to the success or failure of a business. Hu and Kee (2022) used the RBV theory to show that SMEs could be sustainable post-COVID-19 by linking management strategies to the firm's internal resources. Yukiko (2021) stated that when the theory was applied, business continuity was higher in firms where managers had previous experience related to the business and had planned adequately to get access to resources. Panno (2020) stated that there is a direct relationship between the resources and capabilities principles of the RBV model and firms' performance. Cera et al. (2019) tested the theory and found it could explain SB owners' strategies to achieve sustainability. Similarly, J. Shin et al. (2023) stated that the digital transformation of organizations means managerial leadership, and competencies as resources are critical to create sustainable business performance, making the RBV theory an instructive tool. Therefore, the presence of unique resources and how management uses the resources is fundamental to the sustainability of an organization.

An analysis of the literature shows that even when studies are not grounded in RBV theory, scholars can trace the reasons for unsustainable or sustainable businesses to a deficiency or sufficiency of resources. What is evident in the literature is a need for a more direct focus by several researchers on the economic sustainability of SB. Predominantly, the focus is on whether the business failed, filed for bankruptcy, or

underperformed based on some economic metric without a direct comparison with the long-term measure of operation. Such a myopic view of business behavior in isolation devalues SBs contribution to the socioeconomic development of countries, especially in developing economies. Such short-sightedness is unimaginative, and scholars must recognize that researchers can evaluate SB operations and performance on a continuum with several possible outcomes, with each outcome contributing in a significant way to the socioeconomic development of the country.

Several studies have developed models capable of forecasting the likelihood of these short-term variables with varying degrees of accuracy. For example, Cheeneebash et al. (2021) compared the capabilities of three bankruptcy models: the artificial neural networks (ANN), the Altman Z-score, and the Taffler. Cheeneebash et al. found that all three models could forecast the onset of bankruptcy, but the ANN model produces more accurate results than the other two models. Gyimah et al. (2020) found that the Lussier model had a high degree of accuracy in predicting SB failure or success in Ghana. Gyimah et al. (2019) did a comparative study of the Lussier model in Ghana and Israel and found an 86.5 % accuracy in both countries. Thus, these findings enhance the model's validity as a universal predictor of SBs' success or failure and the validity of RBV principles as the explanatory model for SB outcomes.

Additionally, Halabi and Lussier (2014), using a sample of mediocre, failed, and successful firms constructed an ordered probit model of eight variables that predict relative business performance. The model could predict the set of resources that increased the probability of success. Gyimah and Lussier (2021), similarly using a sample of 230

businesses, found that a given set of resources could predict business outcomes. The emphasis of this study is to investigate the economic sustainability of a set of Virginia SBs directly and evaluate their existence against the average 5-year lifespan for 50% or more of SBs commonly accepted in the literature (Matloob et al., 2023). I will posit that previous studies that emphasized business failure, bankruptcy, and economic performance are other measures of SB operations that any reader can compare with sustainability.

Sustainability is a vital business topic as it captures the behavioral characteristics of firms. Comprehensively, sustainability is concerned with the capacity of an entity to maintain or support a process over time (Warren & Szostek, 2017). Sustainability consists of the firm's social, environmental, and economic performance resulting from management strategies to assemble and use resources (Y. Li et al., 2022). Many current studies on sustainability emphasize the environmental and social dimensions of the subject. For example, Corazza et al. (2022) examined how corporate networks influence SMEs to engage in sustainable behavior. Luederitz et al. (2021) also investigated how stakeholders joined together to form sustainable strategies for SBs. Researchers such as Moualawtoua (2022), Rao et al. (2023), Ribas and Cachim (2019) and Warren and Szostek (2017) all studied the economic dimension of sustainability. Other scholars such as Gu et al. (2022), Hanaysha et al. (2022), Karani and Mshenga (2021), and Mengistu and Panizzolo (2023) took the triple bottom line approach of economic, environmental, and social sustainability.

This study focuses on the economic aspect of sustainability, defined as successfully creating, expanding, and maintaining a SB for greater than or equal to 5 years. I measured sustainability, the dependent variable on the nominal scale with the dichotomous outcomes of sustainable or not sustainable, making logistic regression analysis an appropriate statistical technique (Ghimire et al., 2023; Sekaran & Bougie, 2019). The concept of economic sustainability is a crucial term depicting the behavioral performance of businesses on a continuum. This continuum has contrasting performances, such as SB failures, bankruptcy, and substandard performance. Fernando et al. (2021) aptly describes companies as living organisms that exhibit different behavioral performances during their lifespan that may end suddenly. However, the superior performance is sustainability and the achievement of sustained competitive advantages (Banka et al., 2022; Khurana & Farhat, 2021; Mengistu & Panizzolo, 2023; Rao et al., 2023; Zahra, 2021).

Numerous researchers have captured the versatility of SB's performances. However, economic sustainability as a long-term concept has yet to be fully explored, juxtaposed with other measures of SB operations, especially using the quantitative methodology grounded in the RBV theory. Few studies directly compare economic sustainability with short-term business performances such as bankruptcy and failure. Hence, juxtaposing the long- and short-term concepts improves the knowledge gap. I regarded the other dimensions of sustainability as byproducts of this exercise, the result of positive social change.

Other Measures of SB's Operations

Regarding business failure, Gyimah and Lussier (2021) and Dyer (2021) stressed the importance of managing physical and intellectual resources under managers' control, such as cash flow, and their quick response to uncontrollable factors, such as market decline and competition, for firms to succeed. SB owners practicing good cash flow management illustrate how businesses can prevent failure. Bhandari et al. (2019) showed that cash-based ratios are better predictors of business failure than models with only accrual-based ratios. Liquidity is essential for business continuity and growth (Airout et al., 2023). Thus, sustainable firms effectively managing their liquidity aligns with the core tenets of the RBV theory that organizations that possess valuable resources will grow and achieve a competitive advantage (Airout et al., 2023). The implication is that SBs with limited resources are more likely to fail. Firms find it challenging to fulfill obligations to banks and other creditors, often compounded by poor management of internal resources, which is emblematic of resource scarcity (Cera et al., 2019).

It is important to note that Cera et al. (2019) pointed out the importance of managing internal resources because Barney (1991) argued that there is an association between the internal characteristics of firms and the achievement of a competitive advantage. However, what Gyimah and Lussier (2021), Airout et al. (2023), and Cera et al. demonstrated is that managers and owners are the critical components in the sustainability of the business. Management must evaluate the resources under their control, identify where the advantage exists, and efficiently use them to obtain a competitive advantage (Barney, 1991). Therefore, management competence, experience,

and knowledge are significant variables in the RBV model. Emmanuel et al. (2023) showed that using functional, interpersonal, and cognitive abilities as proxies for managerial competency can predict SME performance. Researchers can forecast business failure from a set of internal and external factors. Poor leadership and management of resources lead to business failure. In contrast, owners with years of business experience are more adroit at navigating the factors that threaten business continuity (Cera et al., 2019).

According to Al-Shami et al. (2020), external and internal resources, such as finance, competition, and human capital, influence the success of startups. Human capital is significant, given the diversity of the American workforce. Gala and Jain (2023) pointed out that a diverse workforce reduces the risk of failure and facilitates better adaptation of business operations to the changing business environment. It would be instructive, therefore, to find out what role the diversity of human capital or other resources played in the sustainability of SB during an economic shock or significant disruptions such as COVID-19 and so build on the studies of Chatterjee et al. (2023) and El Baz and Ruel (2021). However, these studies use the RBV and connect SB success to management's ability to identify relevant resources, mobilize them, and extract value from internal capabilities.

Mantje et al. (2023) also posit that knowledge as a resource confers a competitive advantage and the ability of the firm to be sustainable. In addition to agreeing with Gala and Jain (2023) that financial and human resources are critical success factors, Abdulmohsen Alfalih and Tajani (2019) and N.I. Muhammad and Ahmad (2020)

confirmed that many startups could not grow and survive because of the scarcity of financial and human resources, especially in less developed countries where these resources are limited or underdeveloped. What is common among the different studies is that irrespective of the geographical location and the researchers' emphasis, SB, startups, or SMEs, the shared variable is the resource. Consequently, the RBV theory is an appropriate mechanism for explaining SB success or failure because of the proposition that the availability and management of resources and capabilities are necessary to prevent a discontinuation of the operations of SBs.

What has emerged from the literature is that to prevent SB failure, the firm's acquisition and usage of resources require creative ownership and management in a dynamic and competitive business environment. In a literature review, Fernando et al. (2021) stressed that many researchers agree that failure among young SBs results from deficiencies in managerial knowledge and skills in financial management. Emmanuel et al. (2023) findings that managerial competency in the form of cognitive ability had the most considerable effect on SB performance are significant. Additionally, Rao et al. (2023) found that the leadership quality available to manage SBs during the COVID-19 crisis significantly contributed to overcoming the crisis. Hu and Kee's (2022) findings showed that SB growth and resilience were associated with strong leadership and management that consistently improved their internal competencies and resources. Yukiko (2021) states that managerial experience as a resource is essential for predicting business sustainability. SB owners, therefore, who continue to develop their internal

resources, particularly human capital, and use them efficiently (Mengistu & Panizzolo, 2023) are more likely to avoid business failure and achieve economic sustainability.

SB Bankruptcy

Several studies on the bankruptcy of businesses also illustrate how profound it is to use the RBV theory as the theoretical framework for understanding SB's sustainability. Cultrera and Bredart (2016) developed a model using a set of financial ratios to forecast the bankruptcy of Belgian SMEs. They found that firms with low liquidity and profit ratios had higher bankruptcy risk than those with higher ratios. A litany of articles in the literature highlights SB owners' cash planning as a critical success factor because of the fluctuation in the business cycle (Atsan, 2016; Baker et al., 2022; Harduth, 2020; Warren & Szostek, 2017). Also, younger and smaller firms were more likely to go bankrupt. These findings corroborate the consensus in the literature that younger and smaller firms need more resources, which the financial ratios reflect. Audretsch et al. (2021) argued that young and small firms' inability to spend on research and development exacerbated their lack of resources. Thus, SB owners cannot expand their dynamic capabilities and competencies that would allow them to sustain their operations. Unsurprisingly, many researchers expect the high rate of unsustainable SBs to persist. SB owners improving the firm's internal competencies and resources is a critical success factor (Hu & Kee, 2022). However, constrained by limited resources, SB owners need help to meet the level of research and development expenditure to achieve the objective.

Cash as a valuable resource is critical for predicting business bankruptcy (Dambolena & Shulman, 1988). The researchers added a net liquid balance ratio to their

bankruptcy model and saw a significant increase in its predictive capability, which

Bhandari et al. (2019) confirmed. Baker et al.'s (2022) study also shows that as applied to

the RBV theory, cash and its management are significant variables in Barney's (1991)

theoretical framework. Barney argued that the firm's internal resources comprise its

assets, capabilities, organizational processes, attributes, information, and knowledge.

Oladimeji and Aina (2021) credited the availability and management of cash to SB

sustainability. These findings reaffirm the need for SB owners to engage in consistent

cash planning to ensure adequate liquidity to keep their businesses open.

Kucher et al. (2020), using the RBV theory, showed a strong association between

business insolvency and the firm's age. The authors noted that at different stages in the

firm's life cycle, specific causes for bankruptcy take prominence. Like Fernando et al.

(2021), Kucher et al. stated that new ventures or startups become bankrupt because of

internal deficiencies resulting from managerial incompetencies and inexperience. In

contrast, mature firms succumb to competition and adverse economic conditions. The

specificity of the reasons for the bankruptcy of new firms indicates that 50% of SBs that

fail within the first 5 years of operations (Bonsu & Kuofie, 2019; Quansah & Hartz,

2021; Salmeron et al., 2023) are caused by internal shortcomings, resulting from

managerial deficiencies. Zahra (2021) pointed out that at this stage of the firm's life cycle,

managers and owners need more experience in the management and assembly of

resources. Thus, inefficient utilization of the firms' resources results in insolvency.

Mueller and Stegmaier (2015) also found that increasing resources and

capabilities as firms age reduces bankruptcy risk. Using logistic regression, Binh et al.

(2020) also confirmed that age and financial factors such as profitability, sales to capital investments, and revenue growth are good bankruptcy indicators. Thus, researchers frequently use financial ratios to predict business bankruptcy. According to Binh et al., although financial ratios have limitations, notably when researchers do not include a liquidity measure, they contribute to a better understanding of business bankruptcy. Generally, the ratios indicate that sustainable companies show strong financial ratios while insolvent ones often have unfavorable financial ratios, especially during the 4 to 5 years before the bankruptcy. Strong financial ratios result from the efficient utilization of the firm resources (Barney, 1991; Zahra, 2021), while financial weakness invariably is due to liquidity problems, manifesting in weak ratios (Piatti, 2014).

Consequently, bankruptcy, a short-term measure of SB operations, can be explained using the RBV theory. Bankruptcy is a manifestation of the scarcity and the inefficient use of resources. It is instructive that robust financial and cash flow ratios can identify the financial weakness associated with insolvency 4 to 5 years before it occurs (Piatti, 2014). It would be interesting for researchers to investigate the association between this time and the 5-year life span of 50 % newly formed SBs (Bonsu & Kuofie, 2019; Quansah & Hartz, 2021; Salmeron et al., 2023). Cera et al. (2019) referred to this connection in their study of SME failure in Central Europe. However, a more in-depth study would be instructive.

SB Performance

As applied to bankruptcy and failure, the RBV theory can explain the performance of SBs as outlined by prior researchers because performance provides a

measure of the assembly and utilization of resources. Invariably, financial and accounting

metrics include some versions of profit (Arbelo et al., 2021; Certo et al., 2024). Panno's

(2020) research showed that the relevant performance indicators were net profit,

profitability, and efficiency ratios, such as return on investment and sales. These

measures provide insights into the operations of SBs. However, firms differ in the quality

and quantity of resources they possess. Maelah et al. (2022) state that differential

resources determine managerial strategies. Successful strategies depend on managerial

competence, especially cognitive ability, which significantly influences the firm's

performance (Emmanuel et al., 2023). The competence of managers and owners in using

resources is what provides a competitive advantage (Maelah et al., 2022). The RBV

theory, therefore, is suitable for explaining why some firms discontinue operations while

others are sustainable. Barney (1991) noted that the inherent features of the firm's

resources (including managers' cognitive ability) determine its performance and ability to

achieve and maintain a competitive advantage.

West and Noel (2009) explored the association of knowledge as a resource with

firms' performance. The authors found that knowledge as a resource facilitates the

acquisition of competitive advantage and improves performance. However, some

researchers disagree regarding the type of knowledge and their effect on firms'

performance. For example, Yukiko (2021) stated that business continuity was higher

when managers had previous experience related to the company. Several researchers have

praised this experience to the extent that Hsu et al. (2017) argued that industry and related

experience and knowledge give rise to serial entrepreneurs who are essential drivers of

economic development. Erdogan (2023) also argued that industry experience led to higher growth rates. West and Noel challenged this conclusion because their findings showed no statistically significant relationship between new venture performance and the knowledge and experience gained in a similar industry. However, West and Noel narrowed their study to the changing technology sector, limiting the result's generalizability. Nevertheless, West and Noel found a positive association between performance and business-relatedness. Therefore, while knowledge and industry experience may not significantly impact business performance, similar business experience is statistically significant. Thus, the RBV theory can provide a refined view of the conditions that lead to superior business performance.

What is prevalent in the literature is that whatever measure of SB operations researchers use, certain variables are pivotal to the success or failure of the business. For example, Harduth (2020) maintained that profitability and a positive cash balance are vital for business success. Laslo (2020) argued that cash flow information and its management impact SB's performance, profitability, and growth. Unsurprisingly, poor management results in subpar performance and eventual failure and vice versa. Kumar et al. (2022) stated that most business closures result from being unprofitable. Managers, therefore, need to devise strategies to increase revenue and reduce costs. However, one of the issues with SBs, and especially new ventures, is the need for more resources. According to Banka et al. (2022), new ventures typically need a precise business model, a reliable revenue stream, or managers with much experience. Therefore, they underperform where no accelerators can assist them financially, legally, and

organizationally (Banka et al., 2022). These findings illustrate a dominant theme in the literature: the availability of resources and the competent and efficient use of those resources by management is a critical determinant of SB's success. Consequently, the centrality of resources in the performance of SBs increases the value of the RBV framework as a mechanism for understanding SB's sustainability.

Credit Score and Sustainability

Several prior studies have referred to credit ratings and operating efficiency but have yet to investigate their relationship independently or combined with the superior term economic sustainability defined in this study. Credit ratings provide a valuable gauge of a business's sustainability because they measure the business risk level, particularly financial risk (Han et al., 2022; Saygili et al., 2019). Mitrasevic and Bardarova (2020) stated that an increase in credit score reduces the capital constraints of the firm, hence the association of credit score with SB performance. The Data Axle researchers recorded the credit scores that will be used for the sample of SBs as letters of the alphabet from C to A, making the ordinal measurement scale appropriate. The ability of credit scores to predict business performance comes from the financial and nonfinancial factors that credit institutions use to generate credit scores (Han et al., 2022; Teles et al., 2021). Saygili et al. (2019) found that crucial factors were profit or loss, probability of default, lending attitude, inventory turnover, the firm's age, and import and export operations. A credit score indicates SB's sustainability by indicating the riskiness, such as vulnerability to cash flow problems and the inability to honor financial obligations (Han et al., 2022; Mitrasevic & Bardarova, 2020).

Becker (2012) connected credit scores with the efficiency of business operations. Becker argued that many companies pay higher interest rates and fees, and some lose customers because of their low credit scores. Such a scenario is incongruent with Lee's (2022) finding that the minimization of transaction costs improves the firm's performance resulting from the efficient utilization of resources. Y. Li et al. (2022) also noted that businesses can become sustainable with above-average profits by minimizing transaction costs. Becker (2012) concluded that low credit scores exacerbate SB's scarce resource problem, leading to lower overall performance and unsustainability. Kim (2021) corroborated the relationship between credit scores and SB resources by pointing out that credit scores have a statistically significant influence on investors' credit decisions and appropriately portray borrowers' repayment performance, which impacts access to finance. Manello et al. (2023) discovered that firms with female managers have higher credit scores than less diverse firms due to their higher profitability and liquidity ratios because female managers are more risk-averse than men. Therefore, reducing costs and increasing gender equality will positively impact the firm's credit score (Manello et al., 2023).

What is also evident from the literature is that credit score plays a vital role in evaluating the quality and creditworthiness of the SB, which impacts the acquisition of resources and the firm's ability to continue as a going concern (Han et al., 2022). In their study on the role of credit scores in SB lending by community banks, Berger et al. (2011) discovered that community banks were using credit scores to evaluate SB loan applications instead of relationship lending, as commonly perceived by some scholars.

The findings of Manello et al. (2023) showed that firms with high credit ratings are more capable of raising more long-term debt and have easier access to capital than firms with lower credit ratings, which is the consensus in the literature. Additionally, they reduce their probability of default. Thus, whether a business goes bankrupt, fails, underperforms, or remains sustainable is primarily a function of its credit score.

Managers and SB owners must recognize the importance of credit scores to SB success and find ways to consistently improve or maintain their high credit scores. Berger et al. (2011) noted that SBs that are more transparent obtain more resources, which leads to better performance than firms that are difficult to evaluate. Yu et al. (2019) stated that SBs need help obtaining financing due to their credit ratings, which restricts their growth and performance. SB operators must improve the transparency of their business to make it less challenging to evaluate their quality and creditworthiness. Rating agencies compute SB credit scores primarily from financial data, which are often difficult to obtain (Berger et al., 2011; Yu et al., 2019). However, what is evident from the analysis is that the typical SB that lacks resources or has limited access to crucial resource providers (Khurana & Farhat, 2021; Zahra, 2021) can mitigate such constraints with improved credit scores.

Scholars must recognize that business credit scores given by rating agencies are high-quality information capable of predicting the financial health of businesses. Credit scores indicate the ability of the company to continue operating as a going concern (Strickett et al., 2022). Thus, the juxtaposition of the RBV theory with this analysis reveals that the theory unequivocally explains how managers and SB owners acquire and

use organizational resources to achieve profitability and sustainability (Khurana & Farhat, 2021; Zahra, 2021). However, many scholars have questioned the credibility of rating agencies and, hence, the predictive capabilities of the credit scores they provide. Hartmann (2012) stated that credit rating agencies have had mixed results with prominent misses such as the Lehman Brothers Holdings and the Enron failure. However, Hartmann argued that credit reports are valid sources of statistics and analysis for predicting the firm's performance. Therefore, as hypothesized, I expect credit scores to predict the sustainability or unsustainability of a sample of Virginia's SBs. However, readers should use credit scores with a measure of skepticism. According to Hartmann, credit ratings can be inherently biased.

Operating Efficiency and Sustainability

When evaluating business efficiency, the researcher is measuring the performance of the organization and that of management. Business efficiency describes how effectively a business can create goods and services relative to the resources needed to produce them (Ghalib, 2017; Tran & Nguyen, 2019; Ueasin, 2017). In this study, I measured operating efficiency using the ratio scale, given that my objective is to compare management expenditure outlay relative to revenue generation. The efficient use of resources is vital for a business's survival. Therefore, for this study, operating efficiency is associated with the firm's profitability and, hence, its sustainability. Harduth (2020) and Kumar et al. (2022) stated that profitability determines the success or failure of a business. Therefore, profitability is vital for business sustainability.

Ghalib (2017), in his study of operating efficiency, calculated the ratio by dividing total operating expenses by total expenses, which does not directly consider the revenue component used to determine profitability. Since the consensus in the extant literature is that profitable firms are invariably sustainable (Kumar et al., 2022), I will compute the operating efficiency ratio by dividing the total cost by the total revenue. Thus, I will include the critical variables used in computing profit. Thus, operating efficiency will provide insights into the ability of SBs to generate revenue from every dollar spent. Similarly, Nicholson and Stevens (2022) studied operational efficiency by calculating ratios using operational expenses and revenue or income. Ultimately, the researchers evaluated managers' cost minimization and revenue maximization abilities. These skills are essential for the financial health and sustainability of the business. Sulaiman and Muntaka (2019) concluded that efficient organizations that obtain maximum output from a given input level are sustainable. Additionally, proponents of the RBV framework theorized that efficient resource utilization creates and sustains a competitive advantage (Khurana & Farhat, 2021; Nason & Wiklund, 2018; Zahra, 2021).

Although operating efficiency contributes so much to the financial health of a business, many SB owners need to be made aware of the relationship between operating efficiency and sustainability. Mantje et al. (2023) stated that it is common practice for SB owners to ignore aspects of operational management, such as cost control, to improve performance. However, expense procedures designed to control costs and cash management improve the financial health of companies and increase their survival chances. Essentially, Mantje et al. argued that improving resource management and

operational efficiency leads to the dominance of markets and sustained competitive advantage. Ueasin (2017) confirmed that the optimization of resources has a positive influence on efficiency. Silambarasan and Azhagaiah (2018) argued that the key to improving operating efficiency is reducing redundancies and waste and leveraging the firm's resources. Tran and Nguyen (2019) pointed out several factors influencing business efficiency. The factors included the diversification of product lines, cost reduction, employee skills and abilities, access to capital, and managers' knowledge. Incekara (2022) corroborated the findings that SMEs' efficient use of resources or tighter cost control enhances growth and survival. Lotto (2019) also found that operating efficiency and banks' profitability are directly related. Thus, by lowering costs and boosting the institution's revenue-earning power, managers can increase profitability, which leads to sustainability.

The SB owner's revenue and cost management determine the business's operating efficiency (Lotto, 2019). Operating efficiency measures management's efficient use of the workforce, technology, business processes, and other vital resources (Silambarasan & Azhagaiah, 2018). However, many SB owners need help in understanding this relationship. For example, many SB owners must comprehend the relationship between working capital management, operating expense ratio, and business performance. Fleming (2022) found a significant relationship between working capital management , operating expense ratio, and firm performance. Therefore, SB owners must understand the magnitude and direction of the critical variables impacting operating efficiency to implement better practices to achieve business sustainability. Minimizing cost and

maximizing revenue points to SB competency because it implies the efficient use of resources, which is significant for the typical SB characterized by a variable revenue stream (Fleming, 2022; Ueasin, 2017). Ultimately, what is prevalent in the extant literature is that irrespective of how defined or computed, operating efficiency impacts business performance because of its association with profitability. Therefore, I expected operating efficiency as defined and calculated in this research to predict the magnitude, direction, and number of sustainable SBs from a random sample of SBs.

Further Analysis

In this study, I assumed that SB economic sustainability is not only an incessant behavior but also a superior term to bankruptcy, failure, and subpar business performance, all measures of SB operations. The literature on SB has several studies on bankruptcy, failure, and performance. However, more research must investigate SBs economic sustainability as a concept associated with the 5-year lifespan of 50% of the SBs created in the United States. Priority is given to SB environmental and social sustainability in the current literature instead of directly exploring economic sustainability and its relatedness to the other short-term measures of SB operations.

Embedded in the analysis of SB sustainability is the RBV theory because of its relevance over time and its ability to explain how managers can efficiently use organizational resources to improve business performance (Zahra, 2021). Nagano (2020) argued that where the theory is applied, it facilitates the growth of knowledge, presumably increasing managerial competencies. Researchers have used the RBV model in several business environments to analyze companies' assembly and use of resources.

That is, it evaluates how business managers optimize combinations of resources to achieve profitability for their business and simultaneously obtain a competitive advantage (Khurana & Farhat, 2021; Sharma et al., 2022; Zahra, 2021). Al-Shami et al. (2020) stated that when applied, the principles of the RBV theory depict the firm as a unique assembly of resources. However, a reader must be cognizant that each resource adds a unique value to the business, and hence, each will impact business operations differently. The unique features of resources partially account for why some firms are sustainable, some go bankrupt, others fail, and others perform below average. Consequently, the literature contains research examining the effects of critical factors such as cash and managerial knowledge and experience on SB bankruptcy, failure, and performance (Atsan, 2016; Fleming, 2022; Lee, 2022; Yukiko, 2021). I have hypothesized that credit score and operating efficiency derivatives of cash flow and managerial knowledge and experience in using resources are essential in predicting SB sustainability.

Penrose and Barney have etched their names to the RBV theory and emerged as its leading proponents (Barney, 1991; Lau & Michie, 2022). However, they took different approaches to characterizing organizational resources (Chatterjee et al., 2023; Lau & Michie, 2022; Nason & Wiklund, 2018). Nason and Wiklund (2018) found that Barney's VRIN classification of resources did not explain firms' growth rates, while the Penrosean depiction of resources as being versatile could explain growth rates. The superiority of the Penrose classification may be a function of resources being more transferable and productive across industries and domestic borders compared to Barney's. However, this finding should not devalue the relevance and potency of the RBV theory in explaining the

operations of SBs. SBs can be profitable and sustainable without displaying any

significant growth rates (Nason & Wiklund, 2018). De Souza and Seifert (2018) argued

that business success or failure are complex terms, and researchers should not define

them by a single metric, such as growth, as alluded to in management research. Many SB

owners have operated businesses for 30 years without significant growth rates (De Souza

& Seifert, 2018), implying that growth is only one yardstick for business success. Some

SB owners may refrain from expanding because of the complexities involved and the loss

of control that comes with growth (De Souza & Seifert, 2018). Therefore, a reader can

conclude that SB's sustainability is a function of its utility to its owner, the community, or

some other stakeholder and not necessarily determined by profitability and growth.

Economic sustainability is the concern of most SB owners, especially in the first 5

years of operations. It is too costly to engage in social and environmental sustainability

(Mengistu & Panizzolo, 2023). At its core, economic sustainability is a function of

resources, which makes the RBV theory the ideal model for analyzing SB sustainability.

The RBV framework answers the most profound question about firms. Why do similar

firms have different outcomes (Arbelo et al., 2021)? That is why some go bankrupt, fail,

underperform, or are sustainable. According to the literature, the same factors that impact

SB failure, bankruptcy, and below-average performance influence economic

sustainability. However, at the epicenter of SB operational behavior are two fundamental

factors. The core factors are liquidity and management competency. Different researchers

have used derivatives of these fundamentals of SB operations in their quest for answers

on bankruptcy, failure, and other measures of firms' operations. The RBV framework is

so versatile that even political organizations can achieve a sustained competitive advantage by applying the theory (Antoniades, 2022). This study will use the derivatives' credit scores and operating efficiency viewed through the lens of the RBV model to ascertain answers on SB economic sustainability.

From the literature, managers' competencies, cash, and its management are critical factors in SB's economic sustainability. Sustainable business owners improve their competencies, engage in networking, and regard financial management as a critical success factor (Lingens et al., 2021). Cash management is reflected in the SB credit score while operating efficiency reflects managers' employment of resources. Therefore, as hypothesized, I expected SB's operating efficiency and credit score to determine SB's sustainability and, by deductive reasoning, SB's bankruptcy, failure, and other operational outcomes.

Summary and Transition Statement

This research consists of three sections. Section 1 of the study contains materials that laid the basis for investigating the relationship between operating efficiency, credit score, and SB sustainability. I introduced the research problem, hypotheses, purpose, nature, significance, and theoretical framework, illustrating the study's value and potential impact. I conducted an exhaustive review of the professional and academic literature, which included analysis and synthesis of relevant research regarding the topic and the association between the independent and dependent variables.

Section 2 includes topics such as the role of the researcher, characteristics of the research participants, selection of the research method and design, sampling techniques,

ethical research procedures, data collection, analytical techniques, and study validity.

Section 3 will contain the results of the findings and their application to business

practices and implications for social change.

Section 2: The Project

Section 2 starts with a sketch of the project and transitions to an assessment of the researcher's role and that of the participants. The section also contains an outline of the research design and method. Section 2 additionally contains a discussion of the population, sampling, data collection and analysis, the ethical considerations associated with the research, and an evaluation of the threats to the study's validity and reliability. The section concludes with a summary and transition statement.

Problem and Purpose Statement

The specific business problem is that some U.S. SB owners lack knowledge of the relationship between operating efficiency, credit score, and SB sustainability. Therefore, this quantitative correlational study examines the relationship between SB operating efficiency, credit score, and sustainability. The independent variables are operating efficiency and credit score while the dependent variable is SB sustainability.

Role of the Researcher

In a quantitative correlational study, researchers collect, analyze, and present findings and recommendations using procedures that follow the strictest ethical guidelines and procedures other researchers can replicate (Hamilton, 2016; Saunders et al., 2019). In this study, I collected secondary data from the Data Axle website, which contains research data on United States and Canadian businesses and consumers. Secondary data are data collected by other researchers for specific purposes other than the one for the current study (Sekaran & Bougie, 2019). The scholarly literature regarding SBs contains studies that have used the Data Axle website as a data collection

source (Nalisa, 2022; Watne, 2010). The researcher using secondary data saves time and money, and the data become valuable given that it answers the research question or meets the study's objectives (Saunders et al., 2019; Sekaran & Bougie, 2019), as it does in this research.

My experience as an auditor, tax, and accounting consultant has given me first-hand knowledge of the risks of operating SBs. As a SB owner, I know the factors critical for SB's success. Consequently, in this study, I drew on my experience and expertise to select independent variables that are most likely to predict the sustainability of SBs.

Scholars understand that ethical behavior in research is maneuvering through institutional vetting processes and complying with strict guidelines, especially involving human participants (Morgan et al., 2023; Saunders et al., 2019). In this study, secondary data were publicly available instead of confidential or sensitive data from human participants. I collected the annual expenditure and revenue data, credit scores, and other relevant information from annual reports and other filings to government departments. Therefore, no secondary data were collected from human participants, requiring the continuing anonymity of participants and the confidentiality of their data. Consequently, the Belmont three ethical principles of respect for a person, beneficence, and justice will not be applicable because my role as researcher did not require human participants to understand and apply the data.

Participants

For this study, eligibility criteria and strategies for gaining access and establishing working relationships with participants are not applicable. I did not require human participants because I used secondary data analysis. The increased number of sources and the ease of access to secondary data sets have made secondary data analysis a viable alternative to collecting primary data (Saunders et al., 2019). Secondary data sources include statistical bulletins, government publications, company websites, and the Internet (Sekaran & Bougie, 2019). The researcher accessing the secondary data set can use such data to answer the research question (Pruitt, 2017; Saunders et al., 2019).

For this study the website Data Axle will be the source of secondary information. This publicly available data set updates U.S. and Canadian businesses and consumers weekly. The strategy for obtaining the data will be to log on through the Walden University student portal and navigate to the website. On the website I will search for a list of companies by setting specific parameters such as the state of Virginia, credit score, less than 100 employees, less than $500,000 in annual revenue, and others. I will download a population of 9931 companies using these requirements to an Excel file, including the independent variables' credit score, operating efficiency, and the dependent variable sustainability. I extracted a sample of 211 open and 211 closed companies from this population to be analyzed using SPSS. Therefore, I acquired the data required to answer the research question and achieve the research objectives without engaging human participants.

Research Method and Design

Research Method

I chose a quantitative method for this study, which is appropriate because I aim to use two independent variables to predict a quantitatively measurable outcome sustainability. The methods employed in quantitative research are grounded in positivism (Zyphur & Pierides, 2020), which assumes labels correspond to things, hypothesized relations are equivalent to actual relations, samples resemble populations, and inferences from probabilities are valid reasoning (Powell, 2020). Thus, researchers can capture human realities via quantification methods using samples and then generalize the results to the entire population (Torres & Nyaga, 2021). Several researchers have used the quantitative methodology to examine relationships regarding SB problems. Erdogan (2023), for example, used multiple regression analysis and found associations between the growth rate of firms and their age, size, innovation, and managerial experience. Kucher et al. (2020) also used logistic regression analysis to show a significant relationship between the firm's age and bankruptcy. Therefore, the justification for the quantitative method stems from the need to objectively measure and predict SB sustainability associated with operating efficiency and credit score.

Conversely, qualitative research expresses subjective philosophies and is concerned with understanding the social phenomena from the perspective of the participants through an in-depth study (Balmer & Richards, 2022; Bloomfield & Fisher, 2019; Pruitt, 2017) rather than seeking to explain the relationships or causes of change in social facts by measuring relational variables (M.A. Muhammad et al., 2022; Torres &

Nyaga, 2021). Finally, the mixed method approach combines quantitative and qualitative elements; however, my envisioned study only requires one method to address the specific business problem. Therefore, the qualitative and mixed methods approaches are unsuitable for this study. Consequently, the quantitative method is the logical choice for this study, given the objective of analyzing numerical data from a sample of SBs in Virginia and inferring the results to the population.

Research Design

Researchers conducting correlational design do not seek cause and effect, the objective of experimental and quasi-experimental research, nor merely to describe a phenomenon in a real-life setting typical of descriptive designs (Bloomfield & Fisher, 2019). In contrast, researchers use correlational designs to examine the relationship between or among selected variables in a sample to determine the degree, strength, and type of relationships among the chosen variables (Alajmei, 2024; Bloomfield & Fisher, 2019). This study examined the relationship between independent variables (operating efficiency and credit score) and a dependent variable (SB sustainability), which makes correlational design appropriate. Therefore, my objective is to investigate the relationship among the variables with a sample of SBs in Virginia and develop a predictive model that can enhance the business practices of SB owners.

Researchers commonly use a correlational design to identify associations and develop predictive models. For example, Yukiko (2021) used a correlational design to investigate the discontinuance of Japanese firms and found that managerial experience could predict business sustainability. Similarly, Foster (2017), using the design, found

that budget planning, control, and age could predict the performance of SBs. Also, in their quantitative correlational study, Corazza et al. (2022) found a relationship between formal corporate networks and SMEs sustainable behavior. Consequently, a descriptive design that does not involve the manipulation of variables (Bloomfield & Fisher, 2019) and the experimental and quasi-experimental designs are not suitable for my study. This research aims to establish associations among variables and develop a predictive model, not to provide causal explanations for the variations in the dependent variable.

Population and Sampling

Population

The study's population consisted of 9,931 SBs drawn from the Data Axle website, previously known as Reference USA. The website includes detailed publications on U.S. businesses and consumers by state. A researcher can find information on companies currently in operation and over four million that have closed operations. The data include business name, annual expenditure and revenue, credit ratings, year established, type of owners and business, year of closure, and many more. Therefore, I extracted my two independent (operating efficiency and credit score) and dependent variables, sustainability, from the dataset, illustrating that the population aligns with my overarching research question.

Several researchers have used the website in prior studies. Biedny (2023) used the secondary dataset to estimate the effect of broadband internet speed on business births. Nalisa (2022) explored how the COVID-19 pandemic impacted SBs in the United States from a population of 1000 SBs taken from the Data Axle website. Watne (2010) also

used data from the website to investigate the relationship between participation in the Global Compact and a set of independent variables. These studies demonstrate that the website dataset has facilitated significant studies that have contributed to the literature and improved SB owners' practices.

Sampling

I selected a sample of 211 open and 211 closed companies for 2013 to 2023 using probability and non-probability sampling methods, respectively. Scholars often use probability and non-probability sampling techniques to ensure that the sample elements represent the population (Eshenaur Spolarich, 2023). To select the 211 closed companies, I used the purposive sampling technique of the non-probability methods. Researchers use the purposive sampling method when the study requires population subjects with specific characteristics that allow the researcher to answer the research question and meet the study's objectives (Eshenaur Spolarich, 2023).

For this study, closed companies must have a known credit score, total annual revenue and expenditure, and the year they discontinued operations. Therefore, I searched through the list of companies, eliminate those that do not have those variables, and take a sample of 211 closed companies. Consequently, the purposive technique is a viable alternative to the other sampling techniques. Although it restricts generalizability, it is the best method to apply given the limited population size that can supply the variables that will be required to answer the research question (Sekaran & Bougie, 2019).

I used the systematic sampling technique on the larger population of open companies because of the greater chance of finding an adequate sample size with the

specifications to answer the research question. Systematic sampling requires drawing` the

N^{th} subject in the population, beginning with a randomly chosen element between one

and N (Saunders et al., 2019; Sekaran & Bougie, 2019). For this study, the aim was to get

a sample of 211 open companies from a population of 8994 companies. I calculated a

sample ratio of 43 (8994/211) and begin drawing the sample, with the 43rd company

from the list and every 43rd after that to achieve a sample of 211 (Sekaran & Bougie,

2019).

Researchers today are increasing interest in systematic sampling because of the

ease and suitability of selecting a random sample from a given population. Additionally,

some researchers view the method simpler than random sampling because it selects only

the first or few elements from the population (Azeem et al., 2023). Although systematic

sampling inherently has a systematic bias, simple random sampling will be time-

consuming, and only some open companies have all the desired variables to achieve the

study's objectives. Therefore, systematic sampling is preferred as a suitable alternative to

other probability sampling methods because the benefits outweigh the costs.

Power Analysis

Appropriate sample size is fundamental to a robust quantitative study. A smaller

than-required sample size increases the probability that the study's results are due to

chance, while a larger than-required sample size may overinflate the relevance of the

findings (Eshenaur Spolarich, 2023). Therefore, researchers invariably are concerned

about the sample size required to achieve statistical power, which depends on the

population effect size, which must be estimated or taken from extant literature (Jobst et

al., 2023; X. Liu & Wang, 2019). Researchers perform a priori power analysis to determine the minimum sample size required to detect a specific effect at a desired power level (Jobst et al., 2023). Researchers calculate the sample size using specified α and β error probabilities, the model degrees of freedom (df), and the population size effect (Jobst et al., 2023). Researchers with new hypotheses or where they find no effect size in prior studies often resort to Cohen's benchmarks when using G* power analysis, which uses standardized mean differences of 0.20, 0.50, and 0.80 for small, medium, and large effect sizes respectively (Sommet et al., 2023).

For this study, G*Power 3.1, a statistical software for correlation and regression analysis (Faul et al., 2009), was used to conduct a power analysis for a binary logistic regression with operating efficiency as the primary continuous predictor variable to obtain the minimum required sample size. Unable to find any prior research with matching effect size, I relied on Cohen's benchmarks (Sommet et al., 2023) and the consensus in the extant literature that 50% of SBs closed within the first 5 years of operation (Bonsu & Kuofie, 2019; Quansah & Hartz, 2021) in arriving at a medium effect size. An a priori power analysis, assuming a medium effect size ($f^2 = 0.5$), $\alpha = .05$, $R^2 = .5$, odds ratio = 2 to get a desired minimum observations of 200 (Pruitt, 2017), and two predictor variables. The results indicated a minimum of 163 subjects to achieve a minimum power of .80. Increasing the power to .95 will require a sample size 257. Therefore, I sought to obtain between 163 and 257 cases. Figure 2 below depicts sample size as a function of power.

Figure 2

Power as a Function of Sample Size
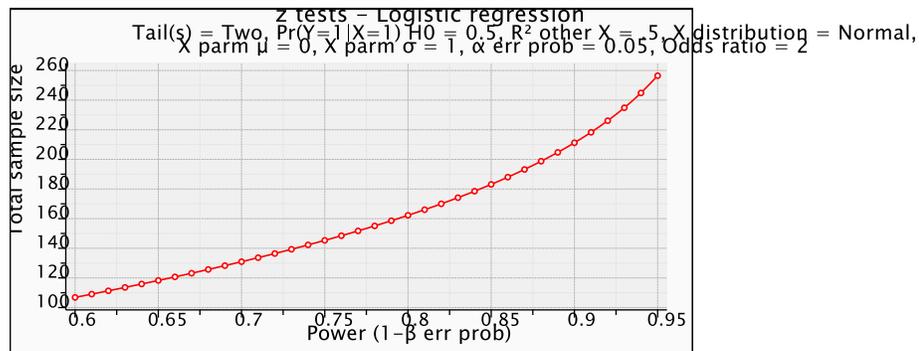
Ethical Research

There is consensus among scholars that researchers must practice ethical behavior in their work due to past unethical research activities (D. Li, 2024; Torres & Nyaga, 2021). The Declaration of Helsinki established ethical standards regarding informed consent, vulnerable populations, and privacy and confidentiality. Additionally, the Belmont Report outlined three principles, respect for persons, beneficence, and justice, that must form the nucleus of ethical research when human participants are involved (D. Li, 2024; Nunan & Yenicioglu, 2013). For this study, an informed consent process, procedures for participants' withdrawal from the study, and incentives for participants were not an issue due to the absence of human participants. I extracted secondary data

from the publicly available website Data Axle. The data gathered and analyzed will be secured for 5 years by protecting the files with passwords.

Furthermore, the identifiable information for individuals and organizations will be excluded from the dataset to retain confidentiality and anonymity. Additionally, the protocol for securing research data, which includes storage on hard drives, will be followed (Pruitt, 2017). The Walden University Institutional Review Board Approval number was 04-17-24-0070133.

Data Collection

Researchers must employ or create instruments that accurately measure the phenomena under investigation to validate the data collected and align with the research question (Sekaran & Bougie, 2019). For this study, no data collection instruments were constructed or employed. This need was alleviated because I used secondary data, often of a higher quality than could be obtained by collecting your data (Saunders et al., 2019). Therefore, I followed the standard practices of obtaining data from public websites instead of data collection instruments such as surveys and questionnaires. I accessed the Data Axle website from the Walden University Library, and the two independent variables, credit score, and operating efficiency, and the dichotomous dependent variable sustainability, were extracted. I took the variables from the central business file containing the set of companies verified through a stringent compilation process, including phone verification.

The Data Axle researchers documented the alpha credit scores for each company as letters of the alphabet ranging from the lowest C to the highest A. These scores were

measured on the ordinal scale and organized into three categories for SPSS statistical analysis. Group 1 included companies with credit scores of C. Group 2 those with scores of C+, and Group 3 consisted of companies with scores of B, B+, and A because the number of companies with scores of B+ and A is minimal. I will calculate operating efficiency measured on the ratio scale by dividing annual expenses by sales (Nicholson & Stevens, 2022). The data Axle researchers calculated annual expenditures and sales using company and industry information. I measured sustainability on the nominal scale with two categories: sustainable and unsustainable. The preferred outcome for SPSS analysis was sustainability, which includes those companies that operated for 5 or more years after the beginning of operations and will be coded as 1 in SPSS. Companies that operated for 4 or fewer years after startup are not sustainable, which I coded as 0 in SPSS.

To measure sustainability, I acquired information on the year the owners established the company and the year they closed it. The Data Axle researchers determined the year established based on phone directory advertisements and annual reports filed. Additionally, I determined that a business was closed by utility and phone disconnects, a national change of address move without a forwarding address, they could no longer find the business in any source, or the researchers could not contact company personnel. Consequently, the aggregation and definition of data variables on the Data Axle website is appropriate for my research questions and study objectives. I was able to find the required study's variables and appropriate scales of measurements applied to each.

Data Collection Technique

The data collection technique for this study involves collecting secondary data from a single source, the Data Axle website, which provides continuously updated structured data on U.S. businesses and consumers. Collecting and analyzing secondary data is a cost-efficient method for conducting new research or evaluating findings from the original research (Cheng & Phillips, 2014). I first evaluated the data on the website to ensure it can answer my research questions and facilitate the achievement of the research objectives (Hamann et al., 2013; Saunders et al., 2019). Data evaluation involves identifying data for 2013 to 2023 and my study variables' credit scores, operating efficiency, and sustainability. I then gained access to the website through the Walden University Library system.

On the website I then entered the specification required to obtain my target population. Filters I chose include the following: (a) city, (b) credit ratings, (c) expenditure, (d) sales volume (less than $500,000), (e) year established, (f) number of employees (Less than 100), (g) Business type (all), (h) Ownership (all), and (i) record type (verified including closed businesses). I next download the list of companies created from this specification to an Excel file, which is the research population. From this population, using purposive sampling and systematic sampling, I selected a sample of closed and open companies and a new Excel spreadsheet will be created with the following columns: (a) company name, (b)credit score, (c) annual sales volume, (d) year established, (e) year closed, (f) annual expenditure,(g) operating efficiency, and (h)

sustainability. In the next step, I imported the new Excel file into SPSS, where I will conduct the statistical analysis.

Associated with the use of secondary data are several advantages and disadvantages. Therefore, the researcher must ensure that the benefits of using secondary data are more significant than the cost (Saunders et al., 2019). Invariably, researchers who use secondary data experience lower costs and less time than those who collect primary data. Such an outcome is primarily where the researcher encounters difficulties with access to human participants. In such cases, archival data is a suitable alternative (Cheng & Phillips, 2014; Wohlin & Aurum, 2015). Saunders et al. (2019) argued that a researcher using secondary data spends less time on instruments of measurement and more on areas such as the theoretical framework and the analysis and interpretation of data. Pruitt (2017) pointed out that a researcher using secondary data overcomes the challenge of gathering sensitive information, minimizes bias, and threatens ethical principles.

In contrast, even though using secondary data may be cost efficient, it may need to be revised or aligned with your research question or objectives (Cheng & Phillips, 2014; Saunders et al., 2019). Additionally, the data set could be outdated or incomplete, and the definitions of variables and data aggregation may need to be more suitable. These factors may limit the scope and accuracy of the research. Cheng and Phillips (2014) further stated that sensitive information is often eliminated from the dataset to preserve confidentiality. The information eliminated could be significant covariates that researchers must control for in the secondary analysis.

Sometimes, a secondary data set collected for commercial reasons may be too costly to access (Saunders et al., 2019). These were fine with the dataset for this study. The data were accurate and easily understandable based on the tips provided on the Data Axle website, which I access via my student login. Additionally, I was able to quickly collect the three study variables from the dataset. Consequently, there are no immediate or future disadvantages in using the Data Axle website for this study.

Data Analysis

Research Question

What is the relationship between operating efficiency, credit score, and SB sustainability?

Hypotheses

Null Hypothesis (H_o): There is no statistically significant relationship between operating efficiency, credit score, and SB sustainability.

Alternative Hypothesis (H_1): There is a statistically significant relationship between operating efficiency, credit score, and SB sustainability.

Predictive analytics is an important technique used by researchers to understand business outcomes. The process involves extracting knowledge from historical data by identifying patterns or relationships and predicting the future if the pattern and relationships will continue (Hoang & Watson, 2022). Predictive analytics includes classification techniques such as decision trees, genetic algorithms, and regression analysis such as linear and logistic regression (Teles et al., 2021). I evaluated other predictive techniques before choosing logistic regression analysis for this study.

Proponents of a decision tree argue that scholars can create a framework to classify new data according to hierarchical decisions based on their different characteristics or attributes (Nikolaou et al., 2023). However, this study does not require the creation of hierarchical structures to model the relationships among the variables (Leevy et al., 2023; Nikolaou et al., 2023); the decision tree was deemed inappropriate.

Simple and multiple regression analyses are fundamental to predictive analytics (Hoang & Watson, 2022; Teles et al., 2021). However, linear regression is more suited to situations where the objective is to model continuous outcome variables, not discrete ones (Hoang & Watson, 2022; Jastrzebska et al., 2023; Sekaran & Bougie, 2019). Additionally, I examined ANOVA, the statistical technique associated with measuring mean differences (Rayner & Livingston, 2023). However, I concluded that this method did not apply because the objective of this study is not to measure statistical mean differences. Consequently, I choose logistic regression as the statistical analytical technique, where the relationship between the independent and dependent variables is assumed to be linear, or researchers can transform it to reflect linearity (Teles et al., 2021).

Several researchers have used logistic regression to predict SB outcomes. For example, Binh et al. (2020) used logistic regression to determine the most important financial factors associated with the viability of SBs. Gyimah et al. (2020) found that the logistic regression model was valid in predicting SB success or failure. The appropriateness of logistic regression to predict business outcomes has made it one of the most popular methodological tools for researchers seeking to predict business outcomes

(Hoang & Watson, 2022). Furthermore, Hoang and Watson (2022) and Teles et al. (2021) argued that logistic regression is more advanced than linear regression because it uses maximum likelihood estimation. For this study, logistic regression is ideal because the dependent variable has a dichotomous outcome (sustainable or not sustainable), and the predictors, the credit score (ordinal) and operating efficiency (ratio), can be measured on any scale (Sekaran & Bougie, 2019; Teles et al., 2021).

Logistic regression predicts group membership by computing the probability of success over the probability of failure, with the output as an odds ratio (Changpetch, 2023; Taylor, 2024). Thus, using logistic regression I will determine the impact of credit score and operating efficiency on sustainability and predict which category each company will fall into, sustainable or not sustainable. The odds ratio shows the likelihood of falling into one of the binary outcomes of the dependent variable, with a larger odds ratio indicating a higher chance of being sustainable (Changpetch, 2023; Pruitt, 2017). Ultimately, logistic regression is a superior and effective predictive tool for this study compared to the alternative methods. Pruitt (2017) also pointed out that multiple discriminant analyses could not produce odds ratios, and the variables would have to be normally distributed (Szanto, 2023). Therefore, since logistic regression overcomes these constraints, the model is an appropriate statistical analytical method for this study.

I conducted screening and cleaning procedures for this study because the secondary dataset I downloaded from the website Data Axle will contain attributes of the target population I did not need for this research. Where the sampling frame does not harmonize with the target population, the researcher must screen the elements of the

population to ensure they have the characteristics needed for the research (Sekaran & Bougie, 2019). Additionally, data cleaning and screening are required to improve the quality and integrity of the data (Griffin et al., 2022; Miao et al., 2023).

After downloading the data set from the website to an Excel file, I eliminated features not required for the research, such as SIC codes, addresses, personal information on organizational personnel, business square footage, and other miscellaneous information. The data set must also present credit score, sales volume, and total expenses. I eliminated companies with missing data from the target population.

Assumptions of Binary Logistic Regression

Researchers obtain valid results from binomial logistic regression when the dataset passes seven assumptions (Lund & Lund, n.d. -a). Before running the regression analysis, the researcher must test the model's assumptions (Taylor, 2023b). The following are the seven assumptions: (1) the dependent variable should be measured on the nominal scale with a dichotomous outcome; (2) the single or multiple independent variables can either be continuous, categorical, or a mixture of both; (3) the observations are independent of each other, and the categories for the dependent variable are mutually exclusive and exhaustive; (4) the minimum sample size must be met; (5) there should be no significant outliers; (6) no two predictor variables should be highly correlated; and (7) a linear relationship must exist between any continuous predictor variable and the logit transformation of the dependent variable. The researcher's design specification can ensure that the study does not violate the first four assumptions. In comparison, the researcher

can do a preliminary data analysis in SPSS to test the last three assumptions (Taylor, 2023b).

In this study, the dependent variable sustainability has a dichotomous outcome, sustainable or not sustainable. In contrast, the two independent variables, credit score, and operating efficiency, are measured on the ordinal and ratio scale, respectively. There will be 422 companies in the sample shared equally among the open and closed firms that will be easily distinguishable by their names and locations. The logistic regression algorithms will only group firms into sustainable or unsustainable categories. Also, I determined the minimum sample size using G* Power analysis. The results will show that the researcher needs, at the minimum power of 80%, 163 companies and, at 95% power, 257 companies. Given that only 211 closed companies met the specifications for the research, I selected an equivalent number of open companies from the population. Therefore, by the study's design, the first four assumptions of binary logistic regression will be met.

Despite the popularity of logistic regression, outliers can disrupt its algorithms, creating biased estimates and incorrect predictions (Insolia et al., 2021; Lund & Lund, n.d.-a). Insolia et al. (2021) further stated that several outliers are more problematic than having a single outlier because they can create false negative and positive results. According to Szanto (2023), the popular way to deal with outliers is to replace them with cases whose values are close but not outliers or remove them from the sample. In this study, I will check for outliers by examining zresiduals in the case- wise list for cases

with values > 2.5 or < -2.5 (Taylor, 2023b). These values indicate influential cases that I will evaluate and determine whether to eliminate or keep in the sample.

To test for linearity between the continuous independent variable in my study (operating efficiency) and the logit transformation of the dependent variable, I will use the Box-Tidwell procedure to convert the predictor variable into its natural logarithm (Changpetch, 2023; Taylor, 2023b). I then ran the regression procedure and examine the SPSS output, variables in the equation for the variable natural logarithm of operating efficiency, and the value in the significance column. If the p-value is ≤ .05, then the assumption of linearity has been violated. If the study violates the assumption of linearity, I will run bootstrapping when conducting the regression procedure (Bradley, 2023; Changpetch, 2023; Taylor, 2023b). In contrast, if the p-value is > .05, the assumption of linearity has been met (Taylor, 2023b).

In logistic regression, when the predictor variables are highly correlated, usually greater than .9, it is referred to as the problem of multicollinearity (Singh et al., 2023; Taylor, 2023b). If multicollinearity exists, it is difficult to identify each predictor variable's effect on the dependent variable (Singh et al., 2023). It is a sampling problem that increases the variance of the maximum likelihood estimator and can be fixed by increasing the sample or removing variables (Jadhav, 2020; Singh et al., 2023). In this study, I tested multicollinearity by running the Spearman correlation procedure in SPSS, given that my independent variable, credit score, is measured on the ordinal and operating efficiency on the ratio scales. Scholars use the Spearman correlation test when the independent variables are ordinal, interval, or ratio, and the coefficient r_s measures the

strength and direction of the monotonic relationship between the two rank variables (Lund & Lund, n.d.-b). For this study, I checked the correlation output of SPSS by examining the correlation coefficient for the strength of the association and the significance row for the statistical significance of the test to determine if the association exceeds the threshold of .9 (Saunders et al., 2019). I then took the appropriate action depending on the results from the correlation matrix.

SPSS is a famous statistical software used by researchers for inferential statistical analysis (Chen & Pang, 2023). I used IBM SPSS Statistics 28.0 to analyze my secondary data for this study. Researchers often use the software to conduct regression analysis on business performance. For example, Rahim et al. (2024) used multiple regression to investigate the effects of sustainability reports on company performance. Also, Frank Sylvio and Robertson (2020) used SPSS to investigate the impact of mobile money on SMEs' performance. Therefore, the software is an effective analytical tool that I can use for my research.

Running the logistic regression procedures in SPSS will produce numerous outputs. The key outputs are the omnibus test of model coefficients, the model summary, the Hosmer & Lemeshow test, and the variables in the equation (VE). The omnibus test of model coefficients contains the likelihood chi-square test that contains all the predictors and informs the researcher if they are significant forecasters of the dependent variable (Crowson, 2023; Gerrit et al., 2021). The researcher examines the significant value for the model and ascertains if it is $\leq .05$ or $> .05$. If it is $\leq .05$, the researcher rejects the null hypothesis and accepts the alternative. The reverse is also true (Taylor,

2024). Suppose the deviation from the null hypothesis was statistically significant in my study. In that case, I would accept the alternative and conclude that the relationship between credit score, operating efficiency, and SB sustainability is consequential, implying that both independent variables can predict SB sustainability.

Researchers examine the model summary output to find out how much of the variation in the dependent variable can be explained by the model (Chandrakanta et al., 2021; Lund & Lund, n.d.-a). Logistic regression produces the results of the Cox & Snell R square and the Nagelkerke R square in the model summary, which provide a measure of the variation or effect size of the predictor variables on the dependent variable (Lund & Lund, n.d.-a; Taylor, 2023b). The effect size provided by logistic regression is like the R square of multiple regression, except that researchers interpreting the R square of logistic regression do so more cautiously (Lund & Lund, n.d.-a). However, the R square tests in the model summary provide the effect size and the range of the variation in the outcome variable that is accounted for by the predictors in the model (Taylor, 2023b). Therefore, the model summary in my study will inform me of the size and range of the effect of credit score and operating efficiency on SB sustainability.

Researchers generally agree that quantitative models are evaluated for applicability using goodness of fit measures, indicating how closely the regression model follows the data. The test indicates if there is any significant difference between the observed and expected data values (Jabeen et al., 2022). The Hosmer & Lemeshow Test is the most reliable of all tests of this measure, and it informs the researcher if the model is significantly different from a good fit (Enrico et al., 2021; Taylor, 2024). Technically,

the Hosmer & Lemeshow test is a badness-of-fit test (Wu et al., 2021). Therefore, the

Hosmer & Lemeshow test will not be statistically significant if the model tracks the

observed data excellently. For a model that is a poor fit, the p-value will be ≤ .05, while

for a model that fits well, the p-value will be > .05 (Taylor, 2024; Wu et al., 2021). For

this study a similar interpretation of the results will be applied.

Researchers use logistic regression to predict categorical membership, and the

model's algorithms calculate the probability of success over the probability of failure and

present the results as odds or likelihood ratios (Hamid et al., 2020; Teles et al., 2021).

Therefore, the VE output from the logistic regression procedure is critical to the research

as it indicates what each independent variable contributes to the model and their

statistical significance (Szanto, 2023; Teles et al., 2021). The expected (B) in the VE

output provides the change in the odds ratio or the probability of the preferred outcome

for a unit change in a predictor (Hamid et al., 2020; Insolia et al., 2021). The expected

(B) in the VE is related to the B, the regression slope, as it is an exponentiation of the

latter. However, the beta (B) records the change in the log odds of the dependent variable

with a unit change in the predictor variable. In contrast, the expected (B) indicates the

variation in the likelihood of the target outcome with a unit change in the predictor

variable (Taylor, 2023b). The reader should note that the change in (B) can be positive or

negative.

The odds ratio varies between 0 and 1, where 1 signifies that the probability of

falling into the target group equals the probability of falling into the non-target group. An

odds ratio greater than 1 indicates a greater chance of falling into the preferred group than

the non-target group. A less than one odds ratio means a greater likelihood of falling into the non-target category compared to the preferred category (Changpetch, 2023; Dick & Kizito, 2022; Hamid et al., 2020). Therefore, in my study, I expected the odds ratio to predict the likelihood of the association between operating efficiency and the sustainability of SBs.

In the VE output, researchers use the Walid chi-square test to determine the statistical significance of the predictor variables, and readers can find the p values in the sig column. The conventional approach is that predictors with p values ≤ 0.05 are statistically significant contributors to the model, while those with p values > 0.05 did not contribute significantly (Lund & Lund, n.d.-a; Pruitt, 2017; Taylor, 2024). The statistical significance of the test means that the results are not likely due to chance. The statistical significance dovetails with the confidence level of the research. In social science studies, the convention is a 95% confidence level, which refers to researchers' certainty about the truth of their results and that there is only a 5 % chance that they are wrong (Sekaran & Bougie, 2019; Tesema et al., 2021). The 95 % confidence level in the VE output is for the expected (B) or odds ratio. The 95% level stipulates that the researcher is 95 % confident that the true odds ratio lies between the lower and upper boundaries of the values in the VE output. In this study the conventional 95% confidence level was adopted.

Study Validity and Reliability

The validity and reliability of research influences its quality, and the limitations connected to the research's design or methodology impact the research findings' reliability and validity (Saunders et al., 2019; Sekaran & Bougie, 2019). Scholars define

validity as the appropriateness of the researchers' measurement tools, how accurately the researcher analyzes the results, and whether scholars can apply the findings to other relevant contexts (Saunders et al., 2019; Trakakis et al., 2021). In contrast, reliability deals with how consistently an experiment, test, or measuring procedure can produce the same result with repetition (Trakakis et al., 2021). This quantitative correlation study uses archival data; therefore, I was concerned about only some threats to validity and reliability. For example, measurement validity is not applicable because I used secondary data (Saunders et al., 2019; Tompke Braden et al., 2022). Similarly, I was not concerned about maturation effects (Cause-and-effect inferences contamination) because I did not conduct an experiment or quasi-experimental study (Anderson & Wolf, 2022; Sekaran & Bougie, 2019). Additionally, events that alter participants' perceptions, participants bias, or errors were not an issue because no human participants were used in this study (Pruitt, 2017; Saunders et al., 2019).

Validity

In this study, I was concerned about statistical conclusions or internal validity (Pruitt, 2017; Saunders et al., 2019). This classification of validity refers to the level of confidence the researcher has that the findings directly result from the relationship among the variables in the model rather than flaws in the research design or methodology (Maier & Lakens, 2022; Pruitt, 2017). Scholars regard research results as invalid when the findings have been arrived at incorrectly or when the reported associations are inaccurate (Sekaran & Bougie, 2019). Researchers will likely commit a type 1 or 2 error in such situations. Type 1 error occurs when the researcher incorrectly claims that there is a

statistically significant relationship between the variables when this is false. The researcher rejects the null hypothesis and accepts the alternative. A type 2 error occurs when the researcher falsely claims that there is no relationship between the variables when it exists. The researcher rejects the alternative and accepts the null (Maier & Lakens, 2022; Saunders et al., 2019).

The sample size is very influential on the statistical conclusion validity of the research (Sivasamy, 2023). A larger than required sample size contributes to the study's accuracy up to a certain point and, after that, increases the researcher's likelihood of committing a type 1 error. In contrast, a sample that is too small has a lot of random errors, and the researcher fails to reject the null hypothesis and commits a type 2 error. For this study, I will conduct a G* Power analysis to identify the required sample size, reducing the likelihood of committing a type 1 or type 2 error and increasing internal validity. Additionally, the researcher conducting a two-tailed test, for example, during the test for multicollinearity, reduces the probability of engaging in type 1 or type 2 errors because the assumptions about the data impact statistical conclusion validity (Pruitt, 2017; Trakakis et al., 2021). For this research, my design, and the specific test for each assumption of logistic regression ensured internal validity.

Researchers have the flexibility to show no preference for type 1 and type 2 error rates, minimize the weighted average error rate, or minimize one over the other. However, given that type 1 error is the inverse of type 2 error, a reduction in the probability of one increases the likelihood of committing the other (Maier & Lakens, 2022; Saunders et al., 2019). The α (alpha) level also influences type 1 or 2 errors

(Saunders et al., 2019). Thus, if the researcher sets the significance level to 0.01 instead of the conventional 0.05, it reduces his chance of making the type 1 error but increases the probability of making the type 2 error. According to Maier and Lakens (2022), a study's lack of internal validity can severely affect the researcher, peers, and the public. Researchers prioritize minimizing type 1 error over type 2 (R. Liu, 2022; Saunders et al., 2019). For this study, I reduced the chance of committing type 1 or type 2 errors by not violating the seven logistic regression assumptions and adopting the conventional alpha level of 0.05.

Researchers often make inferences about populations and other contexts beyond the specialized conditions of the study from their findings (Saunders et al., 2019). Scholars often scrutinize researchers' generalizations to evaluate the study's external validity (Trafimow, 2023). According to Simons et al. (2023), external validity is complex, consisting of many situations where researchers can generalize their findings. Simons et al. (2023) further stated that replication of a study in other domains and the capabilities of the findings to predict actual business performance demonstrate external validity at the lowest and highest levels, respectively. Additionally, Trafimow (2023) stated that internal validity influences external validity.

For this study, the open and closed SBs sample will be drawn from all sectors of Virginia's economy, making the findings applicable across industries. However, generalizability may be restricted geographically because of differences in education level, laws, and institutions across states. Furthermore, Varela et al. (2023) stated that culture dictates human behavior, which determines the appropriateness of action for a

given domain. Therefore, the culture of each state and internationally may restrict the external validity of this study, given that the independent variables, operating efficiency, and credit score, are influenced by individual managers and institutions. However, I aimed to strengthen internal validity to improve external validity.

Reliability

Consistency associated with a measuring instrument was not an issue for this study because no instrument was used (Sekaran & Bougie, 2019). However, other categories of reliability are applicable. Saunders et al. (2019) argued that consistency in the design and execution of the research process is internal reliability. In contrast, external reliability is whether the researcher's data collection and analytical methods would provide similar results if repeated by the same researchers or different individuals. I used alignment procedures (Fusch, 2019), linking each section to produce a coherent and logical study. In addition, I outlined the standard procedures for collecting and analyzing secondary data that I followed. Also, the researcher will carry out binary logistic regression and tests of assumptions in the popular SPSS software. Therefore, any researcher can replicate these processes.

<div align="center">

Transition and Summary

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In Section 2, I restated the research's purpose and explained why I conducted the study. Section 2 also contains the role of the researcher and participants, the research method and design, sampling, ethical issues, and data collection and analysis. The information included in this section aligns with the hypotheses and the research question. Section 3 will consist of the research findings' impact on business practices and the

implications for social change. Additionally, I will provide my recommendations for future research, a summary, and the study's conclusions in Section 3.

Section 3: Application for Professional Practice and Implications for Social Change

Introduction

This quantitative correlational study examined the relationship between operating efficiency, credit score, and SB sustainability. I conducted this investigation using binary logistic regression, an essential statistical technique researchers use to explore the relationship among variables and predict group membership (Changptech, 2023). For this study, the logistic regression output, the omnibus test of model coefficients, showed a p-value of 0.008, less than the standard p-value of 0.05, indicating that the model has significantly improved compared to the null model. Therefore, I rejected the null hypothesis and accepted the alternative that there is a statistically significant relationship between operating efficiency, credit score, and SB sustainability. Hence, credit score and operating efficiency are substantial predictors of SB sustainability.

My conclusion that the predictors are determinants of sustainability was supported by the Hosmer and Lemeshow test that shows a p-value of 0.238, which is greater than 0.05, indicating that the difference between the observed and predicted data is insignificant, making the model a good fit for forecasting the sustainability of SBs in Virginia. According to Wickert et al. (2021), research that rigorously investigates and explains phenomena responsibly can impact managers and the global community. Therefore, I expect the findings of this study to influence business practices significantly.

Presentation of Findings

The statistical test used for this study was binary logistic regression. Logistic regression comes from the broad classification of linear models that provide simple

informative probabilistic outputs that are easy to interpret (Enrico et al., 2021). The regression model estimates the relationship between its predicted variable and one or more predictors with probabilities that fluctuate between 0 and 1 (Hamid et al., 2020). In this study, the response variable was SB sustainability with dichotomous outcomes of sustainable companies operating for 5 or more years. I classified those operating for 4 or fewer years as unsustainable. The preferred outcome, sustainable, was coded as 1 in SPSS, while unsustainable was given 0. Such categorical outcomes make it appropriate to use logistic regression analysis (Insolia et al., 2021).

I hypothesized that sustainable and non-sustainable outcomes depend on credit score and operating efficiency. Consequently, the logistic regression algorithms could predict the likelihood of each company's classification category. The basis for the hypothesis lies in the fact that logistic regression uses maximum likelihood estimation and produces odds ratios of the chance of each element in the sample falling into the target or non-target group (Changpetch, 2023; Dick & Kizito, 2022; Teles et al., 2021), with each unit change in the predictors. Therefore, binary logistic regression is the best statistical method for testing my null hypothesis (R. Liu, 2022) that there is no statistically significant relationship between credit score, operating efficiency, and SB sustainability.

Statistical Assumptions

Seven assumptions are associated with the parametric test logistic regression (Lund & Lund, n.d.-a; Taylor, 2024). The research design ensured that the dependent variable was dichotomous with mutually exclusive, exhaustive categories and associated

with independent observations. Also, there was more than one independent variable. I did a G*Power analysis to ensure that I met the minimum sample size requirement and that the study was not overpowered or not underpowered (Sivasamy, 2023). A sample that is too small increases the researcher's likelihood of committing a type 2 error, while a sample too large increases the probability of a type 1 error because the model is likely to detect the most negligible effect in the sample. My G* Power analysis produced a sample of 163 companies to achieve a minimum power of .80 and 257 to achieve a power of .95. I chose a sample of 211 closed and 211 open companies that lie within the lower and upper boundaries of the minimum sample size, and so the assumption was not violated.

I evaluated the other logistic regression assumptions, including multicollinearity, outliers, and linearity between the continuous variable of the model and the logit transformation of the dependent variable using SPSS. In a regression model independent variables should not be highly correlated with each other (Singh et al., 2023). Researchers encounter difficulties fitting the regression model and interpreting the output, especially when the level of correlation among variables or multicollinearity is high. (Jadhav, 2020). For example, the researcher finds it difficult to estimate the dependent variable variation accurately caused by each predictor variable. The consensus among researchers is that a correlation coefficient of 0.90 and above indicates a significant correlation, and the researcher should expand the sample or eliminate one or more variables (Saunders et al., 2019; Singh et al., 2023). In this study, the Spearman Rank correlation coefficient was 0.045, indicating that the collinearity between operating efficiency and credit score was

not substantial and, therefore, the regression output is not distorted. Table 1 below shows the results of the Spearman correlation test.

Table 1

Rank Spearman Correlation Coefficients Among Predictor Variables

	Variables	
	Credit score	Operating efficiency
Correlation coefficient Credit score	1.00	0.045
Correlation coefficient Operating efficiency	0.045	1.00

Note. $N = 422$

Regarding outliers, researchers define outliers as extreme observations of the independent variables that distort the regression algorithms, leading to estimates that are skewed and poor predictions. A widely accepted benchmark for detecting outliers is to review the residuals and zresiduals of the caswise list of the regression output for cases that are not good fits for the regression model. According to Taylor (2023b), cases with values > 2.5 or < -2.5 are likely to be significant outliers and require further examination and action, such as bootstrapping. The regression procedure did not produce a casewise list as an output because the preliminary analysis found no significant outliers. However, I did additional tests such as the creation of the normal P-P plot for operating efficiency (see Figure 3), a normal P-P plot for the transformation of operating efficiency into its

natural logarithm (see Figure 4), a scatter plot for the normalized residuals of the regression output (see Figure 5), and the normal P-P plot for the normalized residuals (see Figure 6).

The additional outputs affirm the non-production of the casewise list and that the study has met the seven assumptions of binary logistic regression that would otherwise invalidate the analysis results. According to Pruitt (2017) and Saunders et al. (2019), researchers do not assume normality or the equality of variance with logistic regression. Therefore, although the variable operating efficiency is not normally distributed and has unequal variances, the results and findings of the logistic regression are valid. This conclusion is also supported by the goodness of fit of the regression model (see Tables 6 & 7).

I also evaluated the assumption of linearity between the continuous variable and the logit transformation of the dependent variable; I conducted the Box-Tidwell procedure after converting the continuous variable operating efficiency into its natural logarithm (Changpetch, 2023; Taylor, 2023b). A researcher will examine the regression output variables in the equation to determine the significance of the natural logarithms of operating efficiency. If the p-value ≤ 0.05, the study has violated the assumption of linearity. If the p value is > 0.05 the assumption of linearity has been met. This study's p-value for the natural logarithm of operating efficiency was 0.062, indicating that the study has not violated the linearity assumption. Table 2 below shows the result of the linearity test.

Table 2

The Results of the Test for Linearity

Variable	df	Sig	Exp(B)	95% CI for Exp (B)	
				Lower	Upper
LN_ operating efficiency	1	0.062[a]	4.157	0.926	22.040

Note. [a] The linearity assumption was not violated with the p-value> 0.05.

Figure 3

Normal P-P Plot of Operating Efficiency
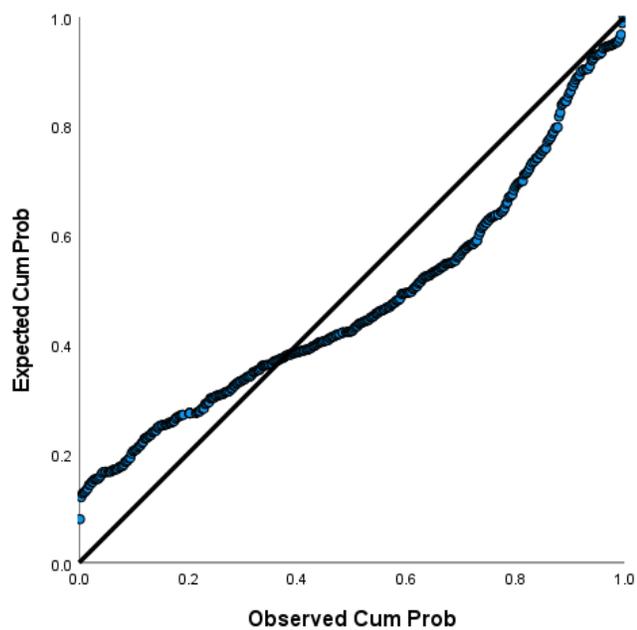
Figure 4

Normal P-P Plot of Operating Efficiency Converted to its Natural Logarithm
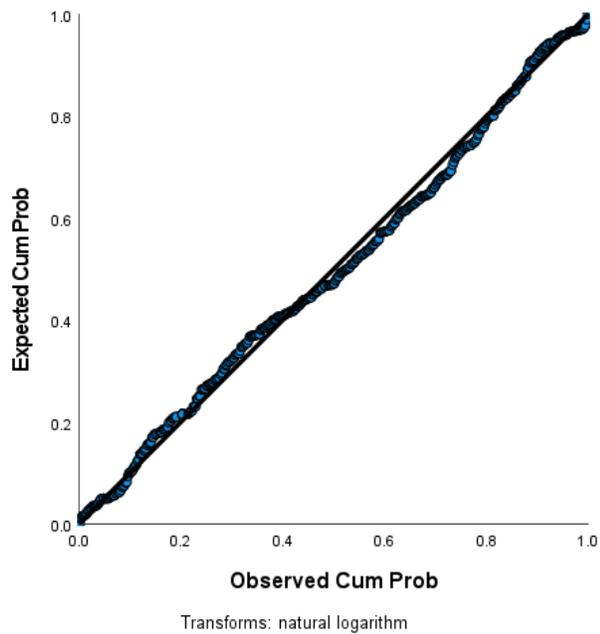
Figure 5

Scatter Plot of Normalized Residuals and Predicted Probability
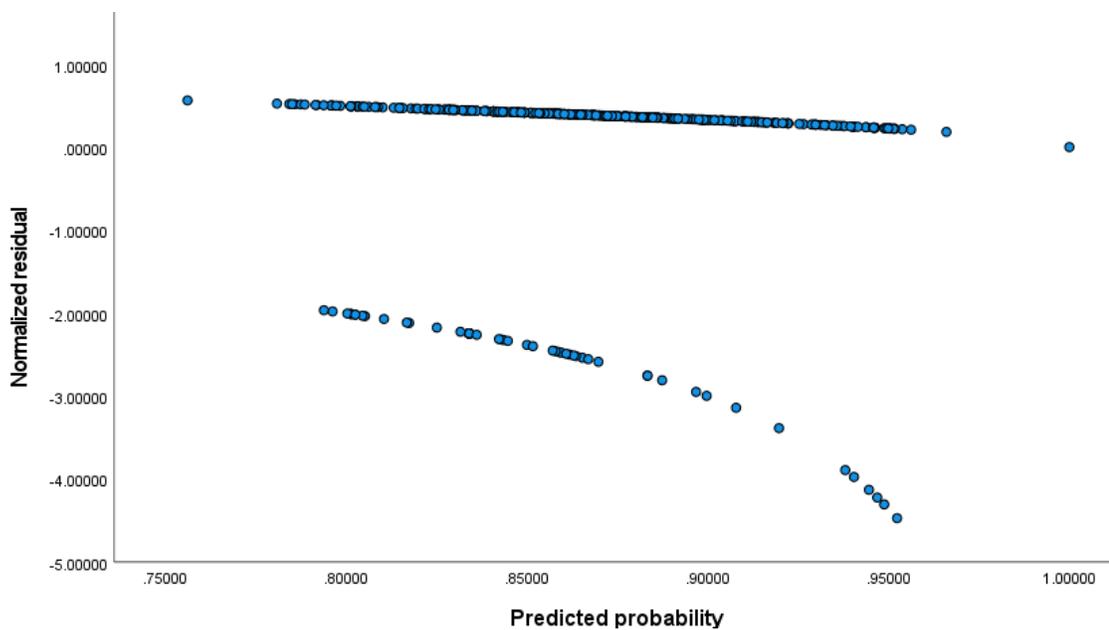
Figure 6

Normal P-P Plot of Normalized Residuals
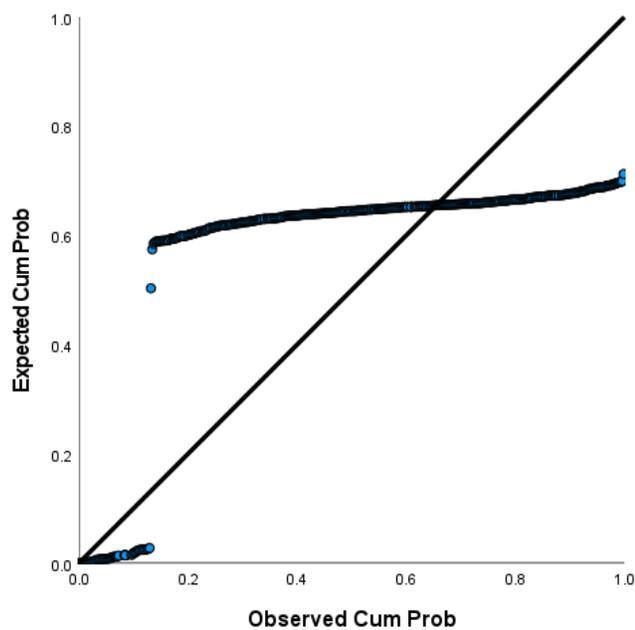
Descriptive Statistics

Researchers analyze data quantitatively using descriptive and inferential statistics (Saunders et al., 2019). This section will present relevant descriptive statistics such as means, standard deviations, and frequencies from the archival data sample of 211 closed and 211 open companies (Harremoes, 2023). Table 3 shows the frequency of the credit score , Table 4 the operating years of the companies and Table 5 the mean and standard deviation for the companies operating efficiency.

Table 3

Descriptive Statistics for Credit Score

Credit score	Frequency	Percent
C	144	34.1
C+	157	37.2
B & Above	121	28.7
Total	422	100

Note. Approximately 70 % of the companies had credit scores of C

to C+.

Table 4

Descriptive Statistics Showing the Operating Years of the Sampled Companies

Operating years	Total number of companies	Percent
1	3	0.71
2	7	1.66
3	12	2.84
4	33	7.82
5 and More [a]	367	86.97
Total	422	100

Note. [a] The majority of small businesses established between 2013 and 2023 were

sustainable because they operated for 5 or more years.

Table 5

Descriptive Statistic for Predictor Variable Operating Efficiency

	Operating efficiency	
Operating years	Mean	Standard deviation
1	0.514	0.042
2	0.525	0.129
3	0.686	0.310
4	0.623	0.279
5	0.716	0.245
6	0.756	0.690
7	0.742	0.289
8	0.663	0.211
9	0.711	0.224
10	0.759	0.260

Note. The means and standard deviations are for the companies that operated for 10

years.

Inferential Statistics

I conducted the binary logistic regression procedures to examine the relationship

between the operating efficiency, credit score, and SB sustainability using $\alpha \leq 0.05$. I also

carried out a preliminary analysis to evaluate the assumptions of multicollinearity,

outliers, and linearity. The results of the prefatory analysis indicated that there were no

potential outliers. Also, the collinearity between the predictors, credit score, and operating efficiency was not substantial because no correlation coefficient exceeded the 0.9 threshold (see Table 1). Additionally, the study did not violate the linearity assumption because the p-value exceeded the threshold of 0.05 (see Table 2).

The logistic regression result was significant, X^2 (3, $N = 422$) = 11.887, $p = 0.008$, indicating that the model could distinguish between the companies operating for 5 or more years and those operating for 4 years or fewer. Therefore, I rejected the null hypothesis and accepted the alternative that there is a statistically significant relationship between operating efficiency, credit score, and SB sustainability. The model explained between 3% (Cox & Snell R^2) and 5% (Nagelkerke R^2) of the variation in SB sustainability and correctly classified group membership for 87% of the cases. The model exhibited good sensitivity because the model correctly predicted all the companies that will operate for 5 or more years, while specificity was 0%. Additionally, the regression model adequately describes the data as the difference between the observed and predicted data was insignificant (see Tables 6 and 7). In the final model operating efficiency was statistically significant ($\beta = 1.595$, p = 0.015). However, the only credit score category with a significant predictor ($\beta = .744$, p = .034) was C+, shown as category 1 in Table 8 below. The final predictive equation was:

Small Business Sustainability = 0.455 +1.595 (operating efficiency) +0.744 (recoded credit score 1) + 0.505 (recoded credit score 2).

Table 6

Contingency Table for the Hosmer and Lemeshow Test of Goodness of Fit

4 years & fewer		5 years and more	
Observed	Expected	Observed	Expected
9	10.084	31	29.916
13	8.604	29	33.396
7	6.565	35	35.435
4	5.761	38	36.239
2	5.191	40	36.809
4	4.808	38	37.192
6	4.355	36	37.645
3	3.868	39	38.132
2	3.337	40	38.663
5	2.427	41	43.573

Note. The slight differences between the observed and predicted indicate how well the model tracked the data resulting in an excellent goodness of fit.

Table 7

Results of the Hosmer and Lemeshow Test

Step	Chi-square	df	Sig
1	10.042	8	0.238

Note. The p-value of 0.238,> 0.05, indicates the model's good fit.

Table 8

Variables in the Equation

| | B | SE | Walid | df | Sig | Exp (B) | 95 % CI for Exp (B) | |
							Lower	Upper
OE	1.595	.654	5.945	1	.015	4.926	1.367	17.751
RCS			4.916	2	.086			
RCS(1)	.744	.350	4.506	1	.034	2.103	1.059	4.179
RCS(2)	.505	.360	1.966	1	.161	1.658	.818	3.360
Constant	.455	.463	.968	1	.325	1.576		

Note. OE = Operating Efficiency. RCS = Recoded Credit Score. CI = Confidence Interval.

Operating Efficiency

The logistic regression output for this study showed that the independent variable operating efficiency is a significant predictor of SB sustainability. The reported odds ratio for operating efficiency, 4.926, indicates that a unit improvement in the operating efficiency of an SB means the company is 4.926 times more likely to be economically sustainable. Additionally, I am 95% confident that the true odds ratio ranges from 1.367 to 17.751. The results of this study corroborate the findings of prior research that organizations that minimize costs, maximize revenue, and improve efficiency are sustainable (Sulaiman & Muntaka, 2019). Additionally, efficient organizations are invariably profitable, and most profitable organizations are sustainable (Kumar et al.,

2022; Y. Li et al., 2022; Nicholson & Stevens, 2022). Consequently, the analysis proves

that management, acquisition, assembly, and use of the SB resources determine

sustainability, which reaffirms the RBV as a practical theory to explain and predict the

operational outcome of SBs systematically.

It is instructive that the period covered by this study, 2013 to 2023, is

characterized by the significant increase in resources made available to SBs because of

legislation passed by Congress. In December 2020, Congress passed The Economic Aid

to Hard-Hit Small Businesses, Non-Profits, and Venues Act to financially assist

businesses negatively affected by the COVID-19 pandemic (Cohen-Gorczyca & Hadzic,

2021). In March 2020, Congress also passed the Coronavirus Aid Relief and Economic

Security Act (CARES Act) to provide financial help to businesses to stimulate economic

activity due to the economic decline caused by the pandemic (Bailey & Sokolowski,

2022). According to Brennan and Rosacker (2020) and Briegel (2019), the Tax Cuts and

Jobs Act of 2017 significantly changed the tax code, incentivizing SBs to engage in

increased economic activity. This study showed that approximately 87% of the

companies established between 2013 and 2023 were sustainable (see Table 4), which

suggests that the VRIN principles of the RBV theory, while they may be necessary

conditions for SB sustainability and competitive advantage, may not be sufficient. SB

leaders must consider management competencies and capabilities in the assembly and use

of the firm's unique resources as part of the equation, leading to operating efficiency,

competitive advantage, and sustainability. This conclusion aligns with the findings of El

Baz and Ruel (2021), Hu and Kee (2022), and J. Shin et al. (2023) that SBs cannot be

resilient and sustainable without management specialized competencies inclusive of experience and cognitive abilities to employ the right combination of resources to prevent failure, bankruptcy, and achieve sustainability.

Credit Score

The overall credit score in this study was not a significant predictor of SB sustainability. However, Category 1, C+, contributed significantly to the model compared to the reference group C. The reported odds ratio indicates that as a company's credit score increases from C to C+, the likelihood of the company being sustainable increases by 2.103 times. Additionally, I am 95% confident that the true odds ratio falls between 1.059 and 4.179. There was no effect on sustainability when companies improved their credit scores from C to B and above. It is difficult to compare the findings of this study with prior research because of the need for more research investigating the relationship between credit score and SB sustainability. Most of the studies concentrate on the factors that influence credit scores (Han et al., 2022; Manello et al., 2023; Mitrasevic & Bardarova, 2020; Saygili et al., 2019) or evaluating credit rating systems (Strickett et al., 2022; Yu et al., 2019). However, what is dominant in the literature is that credit score impacts the acquisition, cost, and quality of the firm's resources (Becker, 2012; Berger et al., 2011; Kim, 2021; Manello et al., 2023), which reaffirms the RBV theory as the appropriate framework to explain SB operational performance.

A few studies evaluated the association between credit score and the operational outcomes of business, which supports the findings of this study. For example, Saygili et al.(2019) and Yan et al. (2023) found that credit score models can predict firms' financial

distress, including bankruptcy. Dogan et al. (2022) found that credit scores could predict the probability of business failure. According to Cai et al. (2018), there is a positive association between credit score and the performance of firms. Additionally, Iri and Gurbuz (2022) found that Turkey's credit score positively impacts the performance of export companies. In these studies, the predictor, credit score, was a continuous variable, whereas credit score was categorical in this study. Therefore, the results of future studies would be instructive, not only using categorical predictors but also evaluating the hypothesis that C+ is the optimal credit score. Consequently, operating efficiency and credit score are positively associated with SB sustainability, explaining a maximum of 5% of the variability in the dependent variable in this study. Furthermore, irrespective of the SB operational outcome, short or long-term credit score and operating efficiency will exert some influence.

Application to Professional Practice

Some SB owners need to learn more about the relationship between operating efficiency, credit score, and SB sustainability. Thus, if these SB owners learn from the results of this study that there is a statistically significant relationship among the variables, then the results will improve business practices because they will benefit scholars, SB owners, business leaders, and practitioners. For example, the findings reaffirm the robustness of the RBV theory as an explanatory tool for SB problems. Lau and Michie (2022) and Yuen et al. (2019) argued that the RBV theory can illuminate business problems irrespective of location or industry.

Silambarasan and Azhagaiah (2018) and Tran and Nguyen (2019 stated that

operating efficiency is a function of management competencies and how they manifest themselves in the assembly and utilization of internal resources. Therefore, SB owners and leaders may have to evaluate and change their recruitment and training program to ensure they employ the correct individuals and consistently develop their functional, interpersonal, and cognitive abilities. Sometimes, it may result in delegating responsibility to a staff with the requisite competency.

The predictive ability of the logistic equation provides a practical model for SB owners to forecast the operational performance of their businesses. Such predictions will provide early distress signals, allowing owners and managers to adjust their revenue maximization and cost minimization strategies. Additionally, procedures and policies can be adopted to maintain or improve credit scores, leading to better access and cheaper resources. According to Manello et al. (2023), credit score aggregates a company's business and financial risk into a single powerful indicator that financial institutions widely use in investment decisions, such as access to finance, the cost of debt, and creating investment portfolios. SB owners can also use the findings of this study as a guide in restructuring their organization to provide better access to the relevant information required by rating institutions to evaluate their financial and business risk, leading to better credit scores. Berger et al. (2011) and Yu et al. (2019) pointed out that several SBs are opaque organizations, and as such, more transparency would improve their credit scores. Therefore, this study's findings could be the catalysts for improving transparency in SBs operations. Therefore, a reader can reasonably conclude that the results of this study can facilitate the creation of better analytical models for SB owners

to use resulting in the mitigation of the global concern for SB sustainability.

Implication for Social Change

The results of these findings are likely to generate positive social change if the information is disseminated to SB leaders and owners, leading to improvement in SB practices. The concomitant improvement in SB sustainability will impact individuals, institutions, communities, and entire societies. More SBs being sustainable will reduce the negative externalities associated with discontinuing SBs.

There are many societal problems today, such as hunger, income inequality, and inadequate healthcare, which scholarly research can help solve (Wickert et al., 2021). Since SBs contribute substantially to the socio-economic development and expansion of the global economy (Jensen et al., 2022), finding the solution to the sustainability problems of SBs will alleviate these societal challenges because individuals in many communities will consistently earn an income to provide necessities such as food, housing, and healthcare and as such improve their living standard (Umadia & Kasztelnik, 2020). Therefore, due to owners and management's better understanding of the relationship between sustainability, credit score, and operating efficiency, more SBs will be successful. More sustainable businesses will attract other businesses and amenities such as roads, parks, museums, and other infrastructure development to communities. According to Khyareh and Amini (2021), the result will be the localization of industries to many communities and the economic and social improvement in the lives of many individuals.

Recommendations for Action

SB owners eager to learn the fundamentals of a sustainable business will likely find the results of this study an important starting point. Likewise, the SBA tasked with the responsibility of promoting and facilitating the expansion of SBs nationwide (Spector, 2023) will find in the results valuable information worth disseminating to SB owners and to the communities in which they operate. Additionally, legislators at the federal and state levels will find the results encouraging, given that the legislation Congress passed during the period to encourage SB activities (2013-2023) is successful, with most SBs formed in that time frame being sustainable. Domestic and international business leaders concerned with the number of unsustainable SBs are likely to find results helpful. Therefore, providing a few recommendations for these interest groups is appropriate.

The first recommendation is that SB owners continuously improve their core competency through frequent training and development programs because managerial competency determines operating efficiency (Emmanuel et al., 2023). A second recommendation is for SB owners to improve the transparency of their organization. Credit rating agencies evaluate creditworthiness using financial and non-financial data. Many SBs frequently cannot produce these relevant and timely data (Berger et al., 2011; Yu et al., 2019). Therefore, SB owners need to prioritize their information systems, which will improve their credit scores.

Another recommendation is that the SBA should disseminate the results of this study on its website, at its seminars and workshops, and via other communication channels so that SB operators can improve the efficiency and creditworthiness of their

organizations. The SBA should also liaise with state and federal legislators to encourage the passing of laws and joint public forums to facilitate more SB resources. Furthermore, the findings of this study should be published in professional accounting, finance, and management journals so that the findings may realize the potential impact on managers, scholars, and the broader society (Wickert et al., 2021).

Recommendations for Further Research

This quantitative correlational research compares economic sustainability with short-term operational business outcomes such as bankruptcy and failure. Researchers have yet to explore economic sustainability fully in the literature. Therefore, researchers conducting future qualitative studies grounded in theories other than the RBV and comparing economic sustainability with bankruptcy and SB failure could be illuminating. Additionally, studies using primary data collection techniques such as surveys instead of archival data is an area researchers could explore in the future.

One limitation of this study is that I conducted it during the period 2013-2023 when Congress enacted the Tax Cuts and Jobs Act of 2017 (Brennan & Rosacker, 2020) and COVID-19 legislation (Bailey & Sokolowski, 2022) to reduce the tax burden and to provide financial assistance to SB due to the decline in economic activity caused by the pandemic. Studies post-2023 would provide the answer to questions if the legislative changes distorted the results of this study. For example, future research could confirm whether most SBs established in this period were sustainable (see Table 4), with approximately 87% operating for 5 or more years.

Future research could also improve the predictive capabilities of the regression model by adding additional variables. Also, credit score could be used as a continuous variable compared to its categorical nature in this study. Additionally, the number of companies with B+ and As was so small that they were added to companies with Bs to comprise category 3. Therefore, future studies using a larger sample and a more equitable distribution of credit scores would allow credit scores of B+ and As to be compared with the reference category C, which was impossible in this study.

Researchers could also exploit the fact that I limited this study to the state of Virginia. Business leaders consider Virginia a state with a low tax burden for companies compared to New York and California. Therefore, replicating the study using data from those states would be enlightening, given the substantial increase in resources available to SBs from the COVID-19 legislation and tax code changes from 2013 to 2023.

Reflections

Personal reflection is essential if an individual's objective is to use his or her experience as a teachable process. Reflexing oneself as a student or novice researcher is vital because reflexivity will unearth underlying assumptions, worldviews, and perspectives that impact how we learn, think, and behave (Mills et al., 2023). I had a positive experience with the DBA Doctoral Study process. I appreciate the experience as a valuable developmental process with opportunities to improve existing competencies and learn new skills. The process is time-consuming and costly but has a potentially huge upside when we align our future aspirations and career goals with our doctoral studies.

Doctoral Studies frequently catalyze the development of expertise in a particular subject (Saunders et al., 2015).

According to Wintersberger and Saunders (2020), a researcher must critically reflect and account for personal biases and how they may influence their decision, such as research topic, strategy, method, and design. I entered the doctoral program without experience in qualitative research and minor exposure to quantitative studies. Such experience carries specific beliefs and values that have influenced my judgment and choices throughout the doctoral process. Although a qualitative approach was a suitable alternative for my study, a combination of time and a bias towards the objectivist view on research led to my choice of the quantitative method. Proponents of the objectivist view hold that quantitative methods provide the best opportunity for researchers to observe and report social facts without influencing the participants or being impacted by the social interactions (Wintersberger & Saunders, 2020).

Although quantitative studies are less biased on reflection than qualitative ones, they complement each other as each provides different information. Onwuegbuzie and Leech (2005) argue that quantitative and qualitative research supply information on a phenomenon from different perspectives. Thus, post-graduation I intend to conduct both qualitative and quantitative research.

Conclusion

Irrespective of the SB operational outcome the researcher is investigating, be it bankruptcy, failure, or sustainability, there are two critical factors, management competencies and liquidity, that determine the operational accomplishment of the SB.

Like operating efficiency and credit score, all other critical success factors of SB

performance are derivatives of these two fundamental factors.

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