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The effects of management control systems and innovation presence on bank efficiency

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THE EFFECTS OF MANAGEMENT CONTROL SYSTEMS AND INNOVATION PRESENCE ON BANK EFFICIENCY

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Approval of Dissertation

We, the committee supervising the work of *Marjorie M Abney*, affirm that the dissertation, *The Effects of Management Control Systems and Innovation Presence on Bank Efficiency,* meets the high academic standards for original scholarship and creative work established by the Marshall University and the Lewis College of Business. The work also conforms to the requirements and formatting guidelines of Marshall University. With our signatures, we approve the manuscript for publication.

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Abstract

The banking industry is currently experiencing its most notable period of technological transformation in history. Community banks in the U.S. have invested heavily in technology over the past decade with the goal of improving efficiency but have not achieved the expected outcomes in efficiency ratio. The literature identifies management control systems (MCS) in accounting as having the potential to benefit corporate innovation processes, suggesting that flexible and interactive MCS generally benefit corporate innovation. More specifically, the research suggests that the effectiveness of management controls on firm performance is dependent on the mode of innovation in which the firm operates. Following the framework of Simons Levers of Control, this study utilizes an established scale to survey U.S. community banks to measure management control structures' effect on financial institution efficiency, moderated by innovation mode. The findings could provide valuable information for community bank managers. This study contributes to the management accounting, management control systems literature by extending a previous stream of research to incorporate the examination of community banks.

Keywords: Management Control Systems, Innovation Mode, Community Bank Performance, Bank Efficiency

Chapter 1: Introduction

The Effects of Management Control Systems and Innovation Mode on Bank Efficiency

Community banks in the U.S. are key contributors to the health of the national economy and serve as the lifeblood for communities across the nation by providing businesses and consumers access to financial services (Bowman, 2020). Community banks are facing increased competition and rapid technological developments that require innovation to remain competitive including technology investments to ensure their operating frameworks are efficient (Dobbeck, 2022). In order to remain competitive, ensure long-term growth, and maintain market share, community banks must be innovative (Crossan & Apaydin, 2010; Dyer et al., 2019) and efficient (Hays et al., 2009). New developments in technology offer the resources for banks to achieve innovation and efficiency. In her 2020 speech, Michelle Bowman, the first designated Federal Reserve Board Governor with community banking experience in U.S. history, stated "Successful innovation is not just about adopting the latest technologies." In the speech, she continues to explain that responsible innovation begins with bank strategy, then identifying the technology that can assist in implementing that strategy (Bowman, 2020).

In an effort to innovate and increase efficiency, community banks in the U.S. have invested heavily in technology over the past decade with the primary goal of improving bank efficiency and performance, while sustaining and expanding competitive advantage (West Monroe, 2019). Bank efficiency is measured by the bank efficiency ratio, which is the indicator of how efficiently a financial institution is achieving profitable growth and shareholder returns (Koch, 2014). According to a 2019 survey of more than 150 middle market banks conducted by West Monroe and American Banker, 98% of respondents report that improving efficiency is the number one strategic priority of the bank, and 61% of responding banks are investing in digital

technology specifically to boost productivity. Furthermore, their research found that 80% of the survey respondents perceive that the implementation of new technologies has been extremely successful or very successful at improved efficiency. However, the authors note that the reality is that the banks surveyed are experiencing minimal improvements in efficiency, with only 34% of the surveyed banks having an efficiency ratio at the desired benchmark of less than 50%.

From 2015 to 2018, fewer than 20% of mid-market banks improved efficiency ratio by five points and less than 10% of mid-market banks incurred ten-point improvements (West Monroe, 2019). Strategic management experts suggest that selection of strategies is less complex than implementation of the strategies, and that implementation of strategies is up to ten times more time, resource, and expertise consuming than developing the strategic plan (Board of Governors of the Federal Reserve System, 2021; Thompson & Strickland, 1987), and that the investment in strategy implementation at the executive level is not sufficient to fully achieve intended outcomes (Jauch & Glueck, 1988).

Accounting literature identifies the proper utilization of management control systems as an important factor in achieving innovative organizational priorities (Hejazi & Ramsheh, 2013). This study seeks to determine whether effective alignment of management controls, which provides a more supportive path for strategy implementation, provides resolve for community banks in achieving improved performance in different modes of innovation. The specific research question explored in this study is:

- Do U.S. community banks that align management control system emphasis with the innovation mode of bank operation perform with greater efficiency?

Simons Levers of Control Theory (Simons, 1994b) provides the framework to analyze the use of management controls in different modes of innovation through a previously utilized scale (Bedford, 2015). Simons' (1995) constructs of management control are defined as four levers of control – diagnostic, interactive, boundary, and belief; and the innovation of the firm is defined by two modes of innovation—exploitation and exploration. The efficiency performance of the bank is measured by the industry standard bank efficiency ratio, which is calculated by dividing non-interest expense by net revenues. The bank performance data was extracted from the Federal Financial Institutions Examination Council (FFIEC) central data repository of financial data and institution characteristics collected by the Federal Reserve System.

Hypotheses are developed for banks operating in one single mode of innovation (exploitation or exploration), as well as combined innovation mode of ambidexterity (emphasizing both exploitation and exploration). Based on prior findings in the literature (Bedford, 2015), it is hypothesized that banks operating in exploitation mode will exhibit enhanced performance when emphasizing diagnostic and boundary controls; and that banks operating in exploration mode will exhibit enhanced performance when emphasizing interactive controls and belief systems. Finally, it is predicted that banks operating in ambidexterity mode will exhibit higher performance when emphasis on diagnostic (interactive) controls is associated with emphasis on interactive (diagnostic) controls and emphasis on boundary (belief) systems is associated with emphasis on belief (boundary) systems.

Literature Contribution

This research study responds to the FDIC and Federal Reserve's national call for research in the area of community banking, as well as the call for additional research on management control systems' role in organizational innovation (Barros & Ferreira, 2019). It contributes to the

literature by utilizing an existing survey instrument (Bedford, 2015) to analyze the performance of community banks. The scale has been utilized previously to evaluate businesses in general but has not been applied specifically in the community banking sector. Prior studies using this survey instrument (Bedford, 2015) included survey questions to measure the manager knowledge of financial performance of the firms. In this study, actual financial performance data is utilized to determine the true financial performance of the financial institutions instead of relying on the knowledge of the survey respondents for this data. The results of this study will be useful in identifying the characteristics of MCS utilization in high performing community banks as a contribution to the literature and will also provide valuable information to community banking practitioners who seek this information to incorporate into MCS operational and strategic planning processes. In addition to publication in the literature and presentations at academic conferences, the results of this study will be presented to community bank managers at industry conferences. The balance of the levers of control is an important and developing area of study that continues to evolve in the literature (Kruis et al., 2016). The value of this study will be improved as the understanding of balance of controls evolves in the literature over time.

Chapter 2: Literature Review and Theoretical Framework

Literature Review

Management Control Systems and Innovation

The history of MCS originated with the work of the pioneer of management controls, Frederick Taylor. In the study of 'scientific management' in his seminal work in the late 1800's, he was the first to conduct a scientific examination of work processes that led to improved efficiency and productivity in organizations (Taylor, 1919). In this era of scientific management studies, management control systems focused on establishing clear guidelines and procedures.

The early to mid-20th century is referred to as the classical management era, a period during which knowledge in management and organizational structure emphasized expertise through extraordinary growth in theories of management focused on principles of management and organizational structures (Fayol & Coubrough, 1930; Weber, 1947). During this era, management control systems studies expanded to emphasize organizational hierarchy, formal policies and procedures, and organizational decision-making (Dalton, 1942; Frank, 1958; Holden et al., 1941; Simon, 1944). By the mid-2oth century, the MCS literature began to incorporate the impact of human behavior on firm performance, including constructs such as motivation and the dynamics of a groups as opposed to individuals (Horngren, 1967; House & Miner, 1969; Livingstone & Ronen, 1975).

The literature has provided valuable insight on the utilization of MCS to achieve innovative organizational priorities (Roman, 1970). Early literature identified MCS as restrictive to innovative practices with findings that MCS were cybernetic (Ashby, 1957), characterized by formalized rules and procedures (Anthony, 1965), and were associated with improving efficiency in mechanistic organizations (Brownell, 1987). MCS were found to be restrictive and act as a

hinderance to innovative initiatives when utilized to create standardization across an organization (Amabile, 1988; Damanpour, 1991; Ouchi, 1979). Minimal controls within an unstructured environment were believed to provide the most effective environment for corporate innovation (Burns & Stalker, 1961). Multiple diverse studies attempted to support this proposition with inconclusive results (Kimberly, 1981; Rogers & Shoemaker, 1971).

A separate stream of early research began to support the hypothesis that MCS can be utilized to support the implementation of strategic objectives (Linn, 1966). Further studies following this study revealed evidence that firms participating in increased product competition and entrance to new markets actually require more sophisticated MCS procedures (Khandwalla, 1972; Lawrence & Lorsch, 1967). Studies in this stream continued to suggest that management controls should be developed to align with business strategy within a firm (Dermer, 1977; Otley, 1980).

As businesses became more complex organizations, researchers recognized that MCS should be tailored for the individual needs of each organization, and the literature began analyzing business strategy through the lens of contingency theory (Evans et al., 1986; J. Fisher, 1995; J. G. Fisher, 1998). Contingency theory of organizations states that there is not one best practice for organizational leadership, but that the optimal leadership for any organization is contingent upon the unique internal and external factors the organization is facing (Donaldson, 2001). The theoretical work based upon the contingency theory of organizational design solidified the link between organization strategy and structure (Chandler, 1962; Galbraith & Nathanson, 1979; Rumelt, 1974). In a review of the contingency theory based MCS literature, Chenhall (2003) reports that researchers continued to examine MCS designs that are most effective for organizational characteristics including size, structure, technology, and culture. As

the research continued to evolve, the contingency perspective of MCS remained popular among researchers and the literature suggests that the contingency perspective could encompass a variety of theories to explain MCS in an organizational context (Chenhall, 2003).

Meanwhile, other researchers during this time period shared the hypotheses that in more complex work environments, formal MCS should be replaced with social control systems (Ouchi, 1979). Organization theory provides a sociological perspective on the study of the operations of organizations (Hatch, 2018). Miller and Friesen (1982) examined the relationship between strategy, MCS, and product innovation from an organizational theory perspective, resulting in findings that suggest that a conservative product innovation model and an entrepreneurial model both interact with management controls differently. Their findings suggest that MCS are negatively correlated with firm innovation in firms that utilized MCS to monitor continuous product development, and MCS are positively correlated with identifying potential opportunities in firms operating in a more conservative innovation setting (Miller & Friesen, 1982).

More recent research suggests that heavily structured MCS are effective in environments in which there is great uncertainty about the consequences of certain decisions by using MCS in an enabling manner (Ahrens & Chapman, 2004). Additionally, research findings indicate that formal MCS have direct paths to innovation (Chenhall et al., 2011), can be integrated into performance measurement systems for the management of strategic uncertainties (Ittner et al., 2003), and that innovation is associated with each management control system dimension (Hejazi & Ramsheh, 2013). Qualitative studies suggest that heavily utilized MCS can encourage flexibility and efficiency in an organization (Simons, 1990), and that the interactive use of MCS direct the development of organizational innovations and play a moderating role in the

relationship between process of innovation and financial performance (Lopez-Valeiras et al., 2016). Further, the literature suggests MCS utilized in innovative organizations should utilize a multiplicity of controls (Revellino & Mouritsen, 2009).

In times of transformative market change, appropriately designed MCS can support organizational learning, change, and survival through periods of rapid transformation (Kloot, 1997). As researchers attempt to identify evidence for the relationship between management control systems and firm performance, Ferreira and Otley (2009) respond to the need for a theoretical framework for performance management systems by integrating Otley's 1999 performance management framework with the Simons Levers of Control Framework.

The literature has evolved significantly and in recent years focuses on methods for implementing MCS to achieve a positive influence on firm innovation (Amabile & Pratt, 2016; Barros & Ferreira, 2019; Christner & Strömsten, 2015; Davila et al., 2009), only repressing to innovation as a result of the design of the control, not the control itself (Lill et al., 2021). Management controls may be interdependent on one another, meaning that when a control is studied in isolation, it may provide different results than when analyzed as a package (Bedford et al., 2016). When management accounting constructs are more clearly defined (Bisbe et al., 2007), certain types of formal management controls support efficiency and flexibility (Jørgensen & Messner, 2009), which supports innovation.

Success in organizations can be driven by both creativity and management controls (Gilson et al., 2005), and in fact creativity can thrive under the influence of controls (Speklé et al., 2017). Additionally, environments with great uncertainty about consequences of actions taken, such as the rapidly evolving community banking sector, are found to benefit from more stringent accounting controls (Jørgensen & Messner, 2009). Management controls were found to

act as a useful tool for decision making in the process of innovation (Pfister, 2014). However, the effectiveness of management controls has been found to be dependent on the mode of innovation the firm operates within (Bedford, 2015).

Recent case studies have provided important contributions to the literature. In a case study on two firms examining the balance of creativity and innovation against risk management and MCS, the findings suggest that neither firm properly utilized ambidexterity necessary to properly deploy exploration to capture the value of innovation or to implement the controls for internal exploitative activities (Gurd & Helliar, 2017). In a separate mixed methods case study of an innovative firm examining the role of MCS in innovation through the lens of institutional theory, the authors examine data from 32 interviews and observations and identify the existence of a rationality formed around the priority of innovation that is the foundation of the organization strategy, incorporated into internal controls including employee objectives contracts to align employee actions with innovation strategy (Barros & Ferreira, 2023).

Criticisms of Simons Levers of Control Theory claim that there is ambiguity in the definitions of the controls causing difficulty in building a coherent body of knowledge (Tessier & Otley, 2012). This is outside the scope of the current study. Ambiguity of the Levers of Control will be addressed in future research that will increase the value of this study as the literature evolves. More specifically, the balance of the levers of control is an important and developing area of study that continues to evolve in the literature (Kruis et al., 2016). This study focuses on its unique contribution to the current stream of literature supporting Simons Levers of Control theory. The criticisms above will continue to be addressed as the literature evolves but are outside the scope of this study. The value of this study will be improved as the understanding of balance of controls and the definitions of controls evolves in the literature over time.

Modes of Innovation

Modes of innovation were examined through the lens of leadership theory (Van Seters & Field, 1990) in the early literature as two roles: the administrator role, which is responsible for managing the internal environment; and the legislator (or entrepreneur) role, which is responsible for prioritization and decisioning of external opportunities and firm growth (Penrose, 1959; Selznick, 1957; Simon, 1950). As the literature evolved, the roles were discussed as organizational roles as opposed to individual roles, and contingency theory (Evans et al., 1986) and decision theory (Slovic et al., 1977) were utilized to explain exploitation and exploration as perfect substitutes and imperfect substitutes (Knott, 2002; Kuran, 1988). Early studies of organizational theory suggest that organizational variables are more predictive of innovation adoption than individual employee characteristics (March & Simon, 1958), which was supported in studies of large corporations (Lieberson & O'Connor, 1972) and again supported in a study of government agencies (Salanick & Pfeffer, 1977). As the broad topic of organizational innovation was examined in the literature, the vast collection of articles from economic, political, psychological, sociological, and managerial perspectives was reviewed and categorized into organizational innovation (Gordon et al., 1975), technological innovation (Kelly & Kranzbert, 1978), and ambidextrous structures for innovation (Duncan, 1977). Several authors attempted to summarize this area of research, concluding that the conditions for innovation lacked conclusive results in the literature due to the diversity in researcher area of study (Kimberly, 1981).

To respond to the call for direction in the research stream, Kimberly & Evanisko (1981) conducted an analysis that separately examined technological innovation and administrative innovation and found evidence that the two types of innovation are influenced by different variables. While organization size was found to be a predictor of both types of innovation,

Kimberly & Evanisko found that larger organizations that are specialized and decentralized were the most active in adoption of technological innovation, and age was found to have a negative correlation with adoption of technological innovation when size and specialization were statistically controlled. The authors' findings further indicate that technological innovation adoption is driven by organization structure and scale needs, whereas administrative innovation adoption is driven by manager needs for coordination and control, which tend to be more prevalent in larger organizations (Kimberly & Evanisko, 1981). The role of MCS in organizational innovation has been discussed in a vast stream of academic research in recent history (Aaltola, 2018; Barros & Ferreira, 2019; Curtis & Sweeney, 2017; Su et al., 2017), and even specifically in banks following the financial crisis (Christensen et al., 2018).

The literature describes firm innovation modes as exploitative or explorative (Yalcinkaya et al., 2007). Exploitative innovation involves an iterative process of experiential learning activities directed toward constant improvement of the efficiency of organizational use of technical systems (Benner & Tushman, 2003; He & Wong, 2004). A firm in explorative innovation mode is seeking new and innovative paths, entering new markets, or creating new technologies. Firms in explorative mode operate in a flexible environment of constant experimentation (Andriopoulos & Lewis, 2009; J. P. Jansen et al., 2006). Firms with enhanced performance tend to engage in exploratory innovation as opposed to exploitative innovation (Bedford, 2015). Organic control has been found to be an important control method in explorative innovations and an enhancer of exploitative innovations, and the interaction of organic and mechanistic controls enhance performance in exploratory and exploitative innovations, suggesting they are complimentary (Ylinen & Gullkvist, 2014). Prior studies have analyzed exploration and exploitation in the context of product development, finding evidence

that both exploration and exploitation are present in product development, and exploitation in product development enhances exploration, further supporting that they are complements and not substitutes (Knott, 2002).

In order to survive, a firm must find the appropriate balance of the two modes of innovation and determine the most effective deployment of the strategies (Gupta et al., 2006). Exploitation and exploration can be balanced using many strategies, including rotational human resource practices (Un, 2007). March (1991) examined the complexity of the coexistence of exploitation and exploration within a firm, concluding that both are essential to the organization and that a balance must be formed. Pursuing exploitation more aggressively than exploration would result in short-term effectiveness, but long-term detriment (Levitt & March, 1988). Firms pursuing exploration too aggressively with limited emphasis on exploitation may incur the expense of experimentation but fail at implementing the benefits of the results (March, 1991).

Recent research has focused on balancing the two modes of innovation using either the ambidexterity strategy or punctuated equilibrium strategy (Uotila, 2018). Ambidexterity involves the simultaneous use of exploration and exploitation modes in an effort to remain competitive and sustain competitive advantage (Zakrzewska-Bielawska, 2021). Under the ambidexterity strategy the organizational operations environment is more complex and diverse, where managers simultaneously balance the use of both modes of innovation (Dekker et al., 2013). Results of prior studies indicate that ambidexterity can be categorized into competence ambidexterity and innovation ambidexterity; that success in competence ambidexterity is supported by frequent and intensive debate between top managers; and that the cognitive conflict among managers drives innovation ambidexterity (Bedford et al., 2019). Depending on the

current economic and market environment, an organization may focus heavily on one mode at a time, switching between modes in response to market conditions, which is referred to as punctuated equilibrium strategy (Boumgarden et al., 2012; Geerts et al., 2010; Gupta & Govindarajan, 1986; Mudambi & Swift, 2011). Bedford (2015) extends the prior research by examining both individual use of control levers as well as the balance of multiple control levers across exploration, exploitation and ambidexterity modes of innovation (Bedford, 2015). Bedford, Malmi and Sandelin (2016) find evidence that effectiveness of MCS and structural control choices are impacted by both their fit with organizational strategy and their fit with each other as "packages". In defender firms, diagnostic controls and mechanistic controls are complementary; in prospector firms, interactive controls and organic structural controls are complementary (Bedford et al., 2016).

Theoretical Framework – Simons Levers of Control

In response to evidence in the literature developed from theoretical examinations that management control systems should be adjusted according to the firm's business strategy, Simons (1987) began a series of research studies that led to the development of a comprehensive theory illustrating the use of management controls in balance between top-down instruction and bottom-up creativity, called Simons Levers of Control Theory (Simons, 1994b). The term "controls" has many different definitions (Rathe, 1960), which has led to barriers to progress in the research literature (Malmi & Brown, 2008). Therefore, Simons' first step was to define management control systems as formal information-based systems managers use to develop routines and procedures to maintain or alter patterns in organizational activities, where formal procedures include budgets, plans, and software systems (Simons, 1994b).

Simons work on the development of this theory began with a qualitative examination of differences in use of accounting control systems under different strategies, indicating a relationship between accounting control systems, business strategy, and firm performance (Simons, 1987). Next, he examined the role of budgets in a large sample of Canadian firms- specifically how tight budget goals effect firm performance- resulting in evidence that tight budget goals and firm performance have a positive relationship, and that strategy and internal culture are associated with the tightness of budget goals (Simons, 1988).

Much of the early MCS research focused on the effects of interactive controls (Bisbe & Malagueño, 2009). Another two year study conducted by Simons resulted in the development of a model illustrating how the use of interactive management control systems can be utilized not only to implement firm strategy but also to formulate the strategy by focusing on strategic uncertainties to guide the development of continuing firm strategy to ensure the firm maintains competitive advantage (Simons, 1990). To further develop the model, Simons analyzed field data from 30 U.S. businesses which led to a more complex model that demonstrates the use of controls in the development of strategies in response to strategic uncertainties (Simons, 1991).

Then, the results of a ten-year qualitative analysis conducted on over 50 businesses in the U.S. led Simons to broaden the definition of control and identify an important relationship between business strategy and accounting management control systems, identifying and defining four control systems that managers utilize to guide strategic renewal (Simons, 1994a).

Simons' Levers of Control provide a theoretical framework for the association between interactive use of management control systems and innovation. The control levers should be utilized to maintain control in companies that are flexible and innovative (Simons, 1995a). Simons (1994a) concludes that via formalized policies and procedures, levers allow managers to

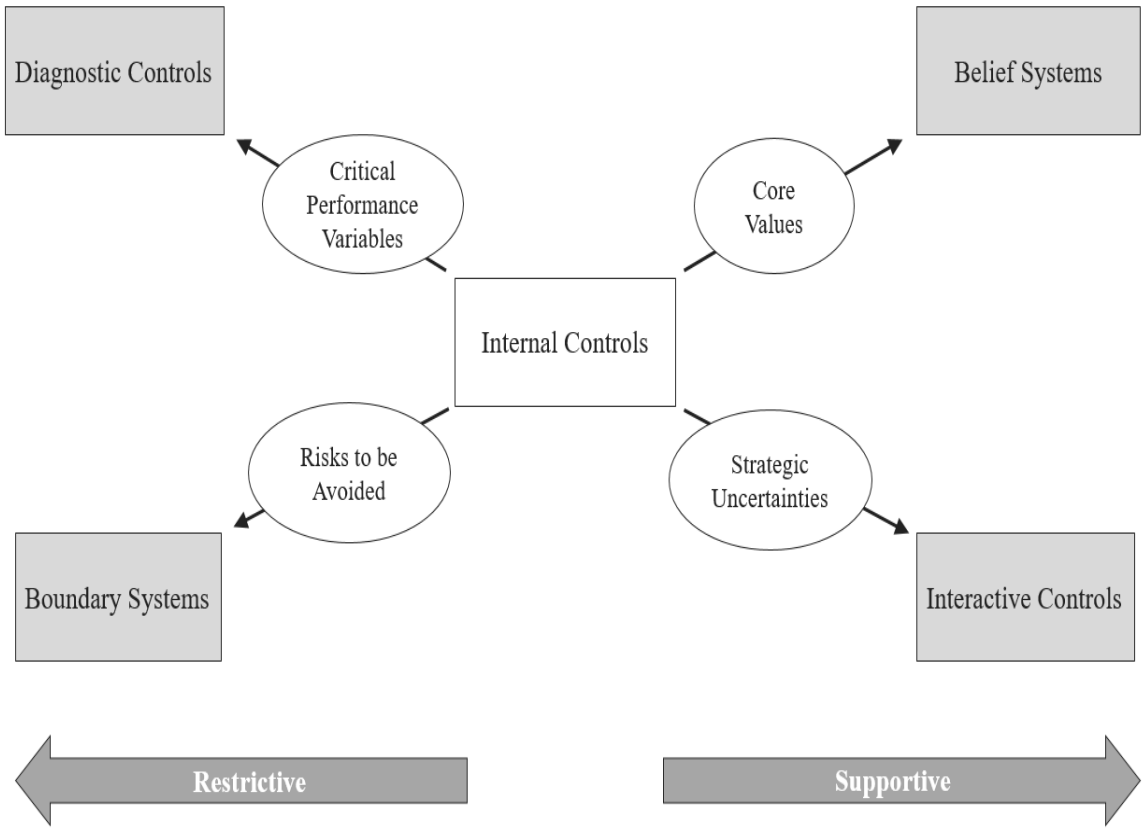
influence organizational behavior. Simons' framework provides corporate managers with four levers of control to lead the firm: diagnostic controls, boundary systems, interactive controls, and belief systems (Simons, 1994a). Belief systems and interactive control systems provide positive guiding forces, whereas boundary systems and diagnostic control systems create constraints and ensure that employees comply with instructions (Simons, 1994b).

The Levers of Control have been examined through numerous surveys analyzing real-world data (Bisbe & Otley, 2004; Simons, 1987; Widener, 2007). The balance of the levers of control is an important and developing area of study that continues to evolve in the literature (Kruis et al., 2016). Several recent contributions to the literature are providing important guidance toward the understanding of increasing the validity of constructs in MCS research (Bedford & Speklé, 2018b, 2018a; Henri, 2006; Widener, 2007) and the interactions of combinations of control levers (Bedford, 2020; Bedford et al., 2016; Henri, 2006; Widener, 2007). The value of this study will be improved as the understanding of balance of controls evolves in the literature over time.

Figure 1 provides a diagram of Simons Levers of Control (1994b) adapted from his original diagram, describing the independent variables that are analyzed in this study. Each of the four levers of control are discussed below, as described in Simons book titled "Levers of Control: How managers use innovative control systems to drive strategic renewal" (Simons, 1994b).

Figure 1

Simons Levers of Control



Diagnostic Management Control Systems

Diagnostic controls are feedback systems that include the use of performance measures, the balanced scorecard (Kaplan & Norton, 2005), budgets, goals, and metrics to monitor and evaluate the progression toward strategic goals. Simons (1994b) describes diagnostic controls as a tool that can be utilized to identify shortcomings in targets, provide performance feedback, and prompt managers to enforce corrections in activities when they are not effective. Examples of diagnostic controls include business plans, budgets, market share data systems, cost accounting systems and any other data systems a firm utilizes to monitor progress toward targets (Simons, 1994b). The role of diagnostic controls can be considered restrictive to the innovation process

due to the quantitative measurement of performance (Turner & Makhija, 2006). On the other hand, diagnostic controls can act as reassurance for managers when decisioning innovation opportunities because it provides a method to evaluate the innovation projects to identify a flight from strategic objectives (Kaplan & Norton, 2005). Further, poor implementation, or lack of emphasis on diagnostic controls has been associated with underperformance (Yolanda & Rachmawati, 2020). Uses of the balanced scorecard as a diagnostic management control tool in community banks have been found to benefit the community bank through mapping relationships from nonfinancial measures of performance, including employee education, internal operations processes, and customer focus to financial measures of performance and efficiency (Albright et al., 2009).

Interactive Management Control Systems

Interactive controls are considered a supportive lever for innovativeness and include tools such as interactive budgets. They are utilized within a firm to frequently communicate information to the highest levels of management from the front line and vice versa so leaders can make informed decisions around strategic opportunities. The key to interactive controls is that meetings across the organization occur regularly to ensure information from all levels of the organization is communicated so that current knowledge is frequently incorporated into action plans (Simons, 1994b). The features of an organization's interactive control system should be determined by factors including the technology utilized within the organization, the degree of government regulation imposed upon the organization. Especially for organizations with high levels of regulation, interactive controls can be utilized as 'intelligence systems' to gather data and understand and influence the complex social, political and technological environment their business operates in (Simons, 1994b).

Belief Systems

Belief systems and boundary systems are the two control levers that guide the organizational activities of searching for new opportunities. Belief systems are broad and inspirational. Simons (1994b) describes belief systems as a supportive lever for innovation culture. Simons' LOC framework explains that belief systems encompass the communication of the core mission and purpose of the organization to all employees through the corporate mission statement, value statement, credos, and statement of purpose. Belief systems are broad and inspirational, and therefore offer support to exploration; however they may also benefit exploitation because they provide the structure to keep all employees following the same mission and shared values (Simons, 1994b). Belief systems have been found to be positively associated with managerial performance, regardless of strategic fit, strategic uncertainty and the three other levers of control (Hermawan et al., 2021).

Boundary Systems

Boundary systems are utilized to implement limitations on organizational activities to transform the beliefs into focused activities that follow the strategic direction of the firm. Belief and boundary systems are individually discussed below in more detail.

Boundary systems provide guidelines for employee decisions and help to ensure employee compliance with regulatory requirements (Simons, 1994b). Simons LOC Framework describes boundary systems as a negative lever for exploration as they are utilized within a firm to provide boundaries for employee behavior. Simons considers boundary systems a positive lever for exploitation because they can direct employees to fall within the current strategic initiatives.

Control Lever Interaction and Dynamic Tension

The emphasis of Simons Levers of Control within an organization have been examined independently but it is also important to consider the interaction of the levers, and the dynamic tension that is created by the influence the four levers have on each other in a complex organization. The four levers of control integrate to create a complex set of empowering and constraining effects on efficiency, performance (Ragaigne, 2021), and innovation (Barros & Ferreira, 2022). Belief systems, interactive controls, and diagnostic controls have been found to mediate the impact of sustainable leadership on organizational resilience (Baird et al., 2023).

Ruiter et al. finds evidence that belief systems and interactive controls are the most relevant levers for business model innovation (Ruiter et al., 2022). Tavares et al. finds that diagnostic controls, belief systems, and interactive controls have statistically significant association with strategic alignment (Tavares et al., 2023). Harrison et al. finds that belief systems positively moderate the diagnostic controls and client performance, whereas boundary systems negatively moderate the use of interactive controls on client performance (Harrison et al., 2022).

Importantly, research suggests that firms that face the challenge of being innovative and standardized simultaneously can use management control systems to support the co-existence of these processes (Zarzycka et al., 2019). The preceding section summarizes the uniqueness of the U.S community banking business environment dynamics that establish the necessity for the examination of effective implementation of management controls.

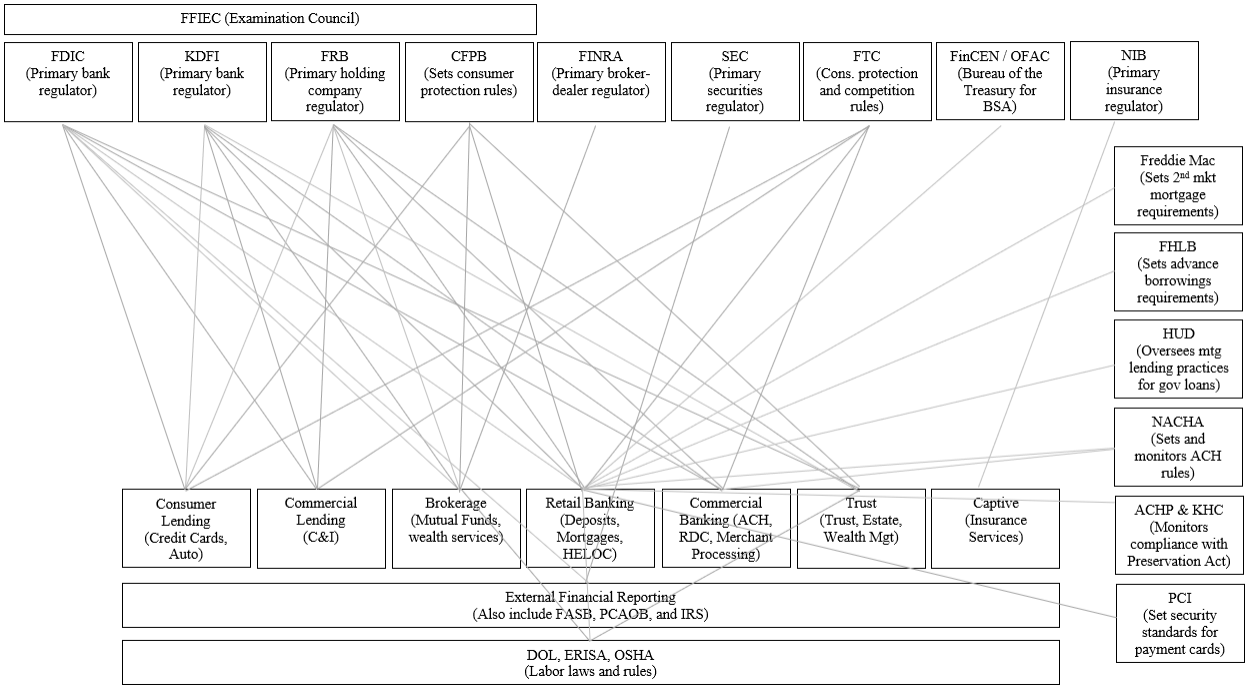
Application of Literature to the Community Banking Sector

The banking industry currently faces an environment of rapid technological transformation, which requires focus on explorative innovation to remain competitive (Benner &

Tushman, 2003; Simsek, 2009). Prior research suggests that bank performance is most heavily influenced by internal management decisions and much less by local or macroeconomic variables (Neves et al., 2022). The regulatory framework of the banking system in the United States is much more complex than the banking industry in most other countries, and banks are more heavily regulated than any other industry in the U.S. (Morris et al., 2019). Community banks are fraught with restrictions imposed by as many as 25 regulatory agencies per bank (Morris et al., 2019). In Figure 2 below, a diagram produced by Kentucky Bancshares, Inc illustrates the complexities of U.S. bank regulation that can impede explorative innovation in community banks (Kentucky Bancshares, Inc., 2019).

Figure 2

Agencies that Set or Enforce Rules Applicable to Kentucky Bancshares Inc. as of January 1, 2019.



National leaders have recognized the restrictive nature of bank regulation on community banks, which are individually not a systemic financial risk, and attempted to address it within the 2018 passage of The Economic Growth, Regulatory Relief and Consumer Protection Act, or Public Law No: 115-174 (U.S. Government Publishing Office, n.d.). Even with this attempt, community banks remain heavily regulated, hindering their ability to innovate sufficiently to compete with the growing population of unregulated neo banks, non-banks, and financial technology firms. The impact of multidimensional restrictive regulation on community banks hinders them from creating a flexible culture, which has been shown to be an important attribute in firms that are able to most successfully deploy belief control systems (Heinicke et al., 2016). Due to the special nature of the banking industry, many community banks lack the resources for effective technology development and deployment to achieve explorative innovation but are able

to practice exploitation mode internally and achieve concurrent exploration through specialized partnerships with financial technology (fintech) firms (Gupta & Govindarajan, 1986).

Community bank investment in technology can improve bank efficiency if the MCS are effectively implemented (Bowman, 2020) so that technology is fully adopted in a way that process automation and digitation of services can occur, improving data analytics, allowing for enhanced communication and collaboration and improved risk management and compliance practices. Prior research suggests that firms utilizing a broad set of strategic performance measures have greater financial and non-financial success than firms not effectively utilizing performance measurement systems (Ittner et al., 2003). Technology investment has the potential to provide all these benefits in efficiency, but if MCS are not properly aligned with strategic organizational objectives the impact of the investment will be significantly impeded (Bowman, 2020).

In his study on the relationship between MCS and business strategy, Simons (1987) finds evidence of a relationship between MCS, organizational strategy, and firm performance. The literature continued to evolve around the relationship between management controls and innovation, in which Simons four levers of control are developed and innovation is described in two modes: exploration and exploitation (Barros & da Costa, 2019; Simons, 1994b). In this research study, the previous literature is synthesized to analyze the relationship between MCS strategy, and innovation in U.S. community banks. The results will provide valuable findings that can be used to assist community banks in effective utilization of MCS to remain competitive in a dynamic and rapidly evolving market.

Chapter 3: Research Hypotheses

Summary of Hypotheses

Fusing the prior literature on the association between MCS and innovation, for this study we consider the use of MCS and how they affect performance in different modes of innovation. At the most basic level, the individual levers are each tested for the single mode of innovation with which each is associated in the academic research literature. The next set of hypotheses will test the effect of simultaneous emphasis on multiple management control levers' effect on the single mode of innovation the literature associates them with. Finally, a third set of hypotheses are developed for the ambidexterity innovation mode hypotheses. The ambidexterity hypotheses revers the associations between management control levers, as well as test for the effects of the imbalance of emphasis on associated management controls.

Single Innovation Mode Hypotheses

Simons (1994b) describes diagnostic control systems as formal information systems that measure performance and identify deviations from performance standards. Simons LOC Theory explains that diagnostic controls are considered a negative lever and follow an iterative process which is similar to the exploitative innovation process(Simons, 1994b). Therefore, it is predicted that banks operating in exploitation mode will have higher performance when an emphasis is placed on diagnostic management control systems. Diagnostic controls require clearly defined goals with quantitative measurements that are not conducive to creativity and innovative behaviors present in exploration mode (Turner & Makhija, 2006). For this reason, it is indirectly predicted that firms in exploration mode with high emphasis on diagnostic controls systems will have lower performance.

H1: Banks operating in exploitation mode that place an emphasis on diagnostic management control systems will have higher performance.

Boundary control systems allow managers to establish parameters for employee actions to ensure they comply with legal and regulatory restrictions (Simons, 1994b). Simons describes boundary systems as a negative lever and limiting to explorative innovation because they impose restrictions on new opportunities. Therefore, with H2, it is predicted that banks operating in exploitation mode will have higher performance when an emphasis is placed on boundary systems. With this hypothesis it is indirectly predicted that an emphasis on boundary systems will be associated with lower performance for banks in exploration mode.

H2: Banks operating in exploitation mode, that place emphasis on boundary systems will have higher performance.

Interactive control systems facilitate communication throughout all levels of the organization and promote collaboration and learning within all levels of the bank (Simons, 1994b). Simons describes interactive control systems as a positive lever that creates a rich environment for idea generation and problem-solving. Due to the nature of interactive controls, it is hypothesized that banks operating in exploration mode will have higher performance when an emphasis is placed on interactive control systems. It is indirectly hypothesized that banks operating in exploitation mode will have lower performance when emphasis is placed on interactive controls.

H3: Banks operating in exploration mode that place an emphasis on interactive control systems will have higher performance.

Belief systems allow managers to promote the importance of innovation as a core value of the bank, as well as a strategic priority (Simons, 1994b). Simons LOC Theory explains that belief systems foster an innovation culture and allow for the establishment of shared beliefs that encourage experimentation while rewarding innovative behaviors. This leads to the hypothesis in H4 that banks operating in exploration mode will have higher performance when an emphasis is placed on belief control systems.

H4: Banks operating in exploration mode that place emphasis on belief systems will have higher performance.

Simons' framework further explains that control levers are not used in isolation and that utilizing control levers in unison at different levels of intensity will be associated with improved performance for firms in the different modes of innovation (Simons, 2000). Prior research suggests that diagnostic management control systems relate to boundary systems in that they encourage employees to seek improvements in performance within a pre-determined, monitored space, which supports exploitative innovation (Mundy, 2010). This supports H5 below.

H5: Banks operating in exploitation mode will have higher performance when emphasis on diagnostic (boundary) control systems is associated with emphasis on boundary (diagnostic) management control systems.

Belief systems and interactive management control systems also operate as complementary systems for firms in exploration mode because they encourage experimentation, risk-taking, and learning from all levels of the organization (Mundy, 2010). This supports H6 below.

H6: Banks operating in exploration mode will have higher performance when emphasis on interactive (belief) control systems is associated with emphasis on belief (interactive) management control systems.

Ambidexterity Hypotheses

Ambidextrous firms are defined as simultaneously operating in high exploration innovation mode and high exploitation innovation mode. The interaction of diagnostic and interactive controls has been identified as an important combination of data to inform managers in organizational strategy decisions (Simons, 2000). In response to inconsistent findings in the literature regarding the effect of diagnostic and interactive controls on innovation (Grabner & Moers, 2013), a study examining the relationship between interactive and diagnostic control system use integrates complexity operationalized as coordination routines as a mediator and develops two constructs to measure innovativeness, and finds evidence that interactive controls positively affect both dimensions of innovation; diagnostic control is beneficial for innovativeness; and the combined controls have a positive direct effect on innovativeness regardless of the amount of complexity (Müller-Stewens et al., 2020). Additional studies find evidence that combining diagnostic and interactive control levers creates reinforcement that enables the coexistence of innovation and standardization (Zarzycka et al., 2019). Based upon prior research findings, it is predicted that performance in ambidextrous banks will improve when emphasis on diagnostic controls is associated with emphasis on interactive controls. This leads us to the development of H7:

H7: Banks operating in ambidexterity mode will have positively correlated performance when emphasis on diagnostic (interactive) management control systems is associated with emphasis on interactive (diagnostic) management control systems.

Further, prior quantitative studies indicate that an emphasis on boundary and belief systems is a key component to differentiation strategy, which is a form of exploration (Siska, 2018). Therefore, it is predicted that ambidexterity mode will positively affect performance when emphasis on boundary controls is associated with emphasis on belief controls. This hypothesis indirectly posits that banks operating in ambidexterity mode that do not place emphasis on boundary controls associated with emphasis on belief controls will negatively impact performance.

H8: Banks operating in ambidexterity mode will have positively correlated performance when emphasis on boundary (belief) management control systems is associated with emphasis on belief (boundary) management control systems.

Further, prior case studies suggest that balance of the opposing controls is necessary to support dynamic tension (Mundy, 2010). When the competing tensions are not balanced in an ambidexterity firm, this could result in decreased performance (March, 1991). This leads us to the development of H9 and H10:

H9: Banks operating in ambidexterity mode will have negatively correlated performance when emphasis on diagnostic (interactive) management control systems is imbalanced with emphasis on interactive (diagnostic) management control systems.

H10: Banks operating in ambidexterity mode will have negatively correlated performance when emphasis on boundary (belief) management control systems is imbalanced with emphasis on belief (boundary) management control systems.

Chapter 4: Methodology

Summary of Methodology

This study is limited to community banks because they are facing unique challenges (Bowman, 2020) for which solutions can be explored through research. Compared to other small to mid-sized entities community banks are unique in that they are required to maintain high levels of capital compared to other businesses, and they are significantly constrained in innovation strategy due to burdensome regulatory oversight (Kargar & Blumenthal, 1994). This study collects data via a survey instrument that measures management control levers and innovation mode within banks and utilizes multiple regression analysis to determine the effects of management control system associations and interactions with innovation mode on firm performance as measured by the bank efficiency ratio. The methodology is described in detail in this chapter.

Data Collection

The quality and validity of MCS accounting research is heavily dependent on the proper selection of constructs and survey instruments in MCS research (Bedford & Speklé, 2018a). A West Monroe (2019) study summarized in the introduction of this paper was utilized similarly to that of an exploratory interview to identify constructs for this research project. The data for this analysis was collected via a survey administered to the senior management of community banks. A sample of banks was collected in two ways. First, a class of students at a Graduate School of Banking, which includes one member of senior management from each bank, was be surveyed. Additionally, the survey was distributed by the Independent Community Bankers Bank to member banks in the southeast U.S. region.

The survey instrument utilized in this study was chosen after identification of constructs based on the West Monroe national bank survey data (West Monroe, 2019) as well as a careful review of constructs measured in management accounting survey research (Bedford & Speklé, 2018b). The instrument can be utilized to measure the practices of management controls and innovation mode effectively and reliably within community banks to identify characteristics of firms with high performance.

The survey instrument, previously administered by Bedford (2015), is utilized to measure interactive management control structures' effect on community financial institution performance as moderated by innovation mode of the bank. The original survey in included as Appendix B. This survey is adapted for this study by extracting the survey questions about financial performance of the firm and utilizing actual financial performance data for each firm in the analysis.

The following questions intended to measure financial performance of the firm in the original survey were removed and replaced with collection of secondary data:

1. Rate the performance of your SBU on the following dimensions to that of your competitors over the past year
    a. Financial performance
    b. Sales growth of new (less than 2 years) product/service markets
    c. Sales growth of existing (older than 2 years) product/service markets
    d. Relative market share for primary products/services
    e. Overall performance

The original survey language was adapted based on feedback received from exploratory interviews with three industry experts. The first industry expert started a de novo bank before

serving as President of three different community banks, and currently serves as the market president and member of the executive management team of a $4 billion community bank. The second industry expert is a mid-level manager at a small community bank. This expert was selected because he has the perspective of a mid-level manager, to see if the questions would be appropriate from the perspective of managers at this level across all banks. The third industry expert is a CPA that works as a community bank consultant. This expert is familiar with a variety community bank types and understands the different specializations of institutions. The interviews were conducted separately instead of in a focus group setting to eliminate conversation bias.

The following comments were provided from the industry experts:

- The Diagnostic Control Systems (DIAG) questions would be a struggle for a lower-level manager. These questions must be answered by a mid to senior-level manager who is involved in the budgeting process.
- Strategic business unit is not language that is relatable to community managers. This should be replaced with a term such as bank or department.
- Subordinate is not language that is relatable to community bank managers. This should be replaced with a term such as employee.
- In the introduction, define innovation. Many community bankers perceive innovation as technology. However, this is broader than technology implementation. It encompasses innovative systems, processes, policies, and management practices. The term innovation should be defined in the introduction or respondents may misinterpret the questions.
- Bank performance data should not be used for year-end 2020 due to the impact of PPP loans. Additionally, CECL will impact 2022 performance data. It was determined by the

experts that since all community banks were operating under the same conditions, these would not actually bias the results.

- Remove asset size categories. You can ask the respondent to enter the asset size of the bank. All respondents should know this. It can be validated when the data for performance is retrieved.
- The term economies of scale may not be familiar to respondents. This should be explained in more simple language, or perhaps reworded to something like "decreasing internal expenses on new technology by increasing customer adoption of services in existing product/service offerings".
- The questions about environmental dynamism and environmental hostility are not necessary since community banks are a specialized and unique sector of the banking industry and compete in the same general environment.

The following changes were made to the survey in response to the information collected in the industry expert interviews.

1. Interactive Question #2 – changed "subordinate" to "employee"
2. Interactive Question #3: changed "subordinate" to "employee"
3. Interactive Question #5: changed "subordinate" to "employee
4. Belief Question #2: changed "subordinate" to "employee"
5. Belief Question #4: changed "subordinate" to "employee"
6. Boundary Question #3: changed "subordinate" to "employee"

   made to the survey and data collection process as a result of the industry expert feedback.
7. Belief Question #1: changed "strategic business unit" to "bank"

8. Size categories were removed and replaced with a data entry box for the respondent to enter the bank asset size
9. Exploit Question #10: re-worded question from “Increasing economies of scale in existing product/service markets” to “Decreasing internal expenses on new technology by increasing customer adoption of services in existing product/service offerings”.

The survey questions were edited to include language to validate the relevancy and terminology to U.S. community bank senior managers.

The following questions intended to measure environmental hostility in the original survey were removed:

1. How intense is the competition for your main products/services?
2. How difficult is it to obtain the necessary inputs for your business?
3. How many strategic opportunities are currently available to your business?

The original survey designed by Bedford also contained questions to measure the constructs of environmental dynamism and hostility. The following questions intended to measure environmental dynamism in the original survey were removed due to the survey in this research study focusing on a specialized sector within the banking industry that generally faces the same

1. Over the past three years how predictable or unpredictable have important actions or changes in the external environment been?
2. Over the past three years how many changes have occurred that have had a material impact on the nature of your business?
    a. Customers
    b. Suppliers

c. Competitors

d. Technological

e. Economic/Regulatory

The original instrument is further adapted with the extraction of control variables for environmental hostility and environmental dynamism because this study is conducted on one sector of an industry in which all firms face similar external environmental conditions in the market.

Finally, a description of the term "innovation" was included in the introduction of the survey that encompassed the following language:

- As community banks face a rapidly evolving competitive landscape, it is important to keep innovation in mind. Innovation comes in many forms. Banks can innovate by purchasing new technology, but also by modernizing internal controls and policies. Within this survey, the term innovation is defined as innovative practices within the bank. The final version of the survey questions utilized in this research study are included as Appendix C.

Variable Measurement

The constructs for the independent variables measured in the survey instrument are Simons four levers of control, and the innovation mode of the firm. Each of the innovation mode constructs is comprised of 5 items to measure the magnitude of each mode. The items in the survey instrument utilized to measure the independent variables are identical to those used in the Simons (2015) study.

The five items used to measure diagnostic control (DIAG) were developed based on the cybernetic control cycle (Simons, 1994a, 1995b, 2000), and were adapted by Simons from previous work by Henri (2006) and Widener (2007).

The five items are:

Diagnostic 1: To what extent does the top management team use budgets and performance measures to identify critical performance variables (i.e., factors that indicate achievement of current strategy?

Diagnostic 2: To what extend does the top management team use budgets and performance measures to set targets for critical performance variables?

Diagnostic 3: To what extend does the top management team use budgets and performance measures to monitor progress toward critical performance targets?

Diagnostic 4: To what extend does the top management team use budgets and performance measures to provide information to correct deviations from preset performance targets?

Diagnostic 5: To what extend does the top management team use budgets and performance measures to review key performance areas?

The five items used to measure interactive control (INT) are based on the five dimensions of the construct of interactive control, which include: 1) intensive use by top management; 2) intensive use by operating managers; 3) face-to-face challenge and debate; 4) focus on strategic uncertainties; and 5) non-invasive facilitating and inspirational involvement (Bisbe et al., 2007).

The five items are:

Interactive 1: To what extent does top management team use budgets and performance measures to provide a recurring and frequent agenda for top management activities?

Interactive 2: To what extent does top management team use budgets and performance measures to provide a recurring and frequent agenda for employee activities?

Interactive 3: To what extent does top management team use budgets and performance measures to enable continual challenge and debate of underlying data, assumptions and action plans with employees and peers.

Interactive 4: To what extent does top management team use budgets and performance measures to focus attention on strategic uncertainties (i.e., factors that may invalidate current strategy or provide opportunities for new strategic initiatives)?

Interactive 5: To what extent does top management team use budgets and performance measures to encourage and facilitate dialog and information sharing with employees?

The instrument measures the boundary systems (BOUND) construct with five questions developed based on prior research (Simons, 1994a, 1995b, 2000) to measure the four dimensions of boundary systems, which are: 1) they define appropriate conduct; 2) they are used to limit search and experimentation; 3) they are actively communicated by top management; and 4) sanctions are applied to subordinates engaging in activities outside the stated boundaries.

The four items are:

Boundary 1: To what extent are the codes of conduct or similar statements relied upon to define appropriate behavior?

Boundary 2: To what extent are there policies or guidelines that stipulate specific areas for, or limits on, opportunity search and experimentation?

Boundary 3: To what extent does top management actively communicate risks and activities to be avoided by employees?

Boundary 4: To what extent are actions taken to address employees who engage in risks and activities outside organizational policy, irrespective of the outcome?

The fourth lever, belief systems (BELIEF), is measured using five questions that were developed based on a prior scale (Widener, 2007), with additional items developed based on control research by Simons (Simons, 1994a, 1995b, 2000). The questions measure the attributes of belief systems: 1) they codify the core values of the firm; 2) they are actively communicated; 3) they are used to create commitment to firm objectives; and 4) they inspire and guide the search for new opportunities (Simons, 1994a, 1995b, 2000).

The four items are:

Belief 1: To what extent are the values, purpose and direction of the bank codified in formal documents? (e.g., mission/value statements, credos, statements of purpose?)

Belief 2: To what extent does top management actively communicate core values to employees?

Belief 3: To what extent are formal statements of values used to create commitment to the long-term vision of top management?

Belief 4: To what extent are formal statements of values used to motivate and guide subordinates in searching for new opportunities?

The moderating independent variable is the innovation mode of the firm, measured via the constructs of Exploration (EXPLORE) and exploitation (EXPLOIT). These items were developed in previous work (He & Wong, 2004; J. P. Jansen et al., 2006), and validated in multiple studies (Bedford, 2015; Cao et al., 2009; J. J. Jansen et al., 2009; Lubatkin et al., 2006).

The five exploration items are:

Exploration 1: Indicate the emphasis your organization places on being the first to market with new products/services.

Exploration 2: Indicate the emphasis your organization places on developing new generation product/service capabilities.

Exploration 3: Indicate the emphasis your organization places on frequent new product/service introductions.

Exploration 4: Indicate the emphasis your organization places on experimenting with new products/services.

Exploration 5: Indicate the emphasis your organization places on opening up new product/service markets.

The four exploitation items are:

Exploitation 1: Indicate the emphasis your organization places on improving quality of existing products/services.

Exploitation 2: Indicate the emphasis your organization places on frequent modifications to existing products/services.

Exploitation 3: Indicate the emphasis your organization places on improving efficiency in the provision of existing products/services.

Exploitation 4: Indicate the emphasis your organization places on increasing economies of scale in existing product/service markets.

Each question is measured using a Likert scale from 1 to 7. The performance of the firm is not measured in the survey as in Bedford's original scale (Bedford, 2015), but instead retrieved from the Federal Financial Institutions Examination Council (FFIEC) central data repository of financial data and institution characteristics collected by the Federal Reserve

System. The financial performance data was exported for the same quarter in which the survey was conducted. The survey was administered to community bank managers from community banks across the U.S. Responses were statistically analyzed using multiple regression analysis to test for hypothesized relationships (Bedford, 2015).

The dependent variable is firm performance, which is proxied by the bank's efficiency ratio. The bank efficiency ratio is calculated by comparing non-interest expense with the sum of non-interest income and net interest income (also known as net operating income) (Koch, 2014).

$$\text{Bank Efficiency Ratio} = \frac{\text{Non-interest expense}}{\text{Net interest income + Noninterest income}}$$

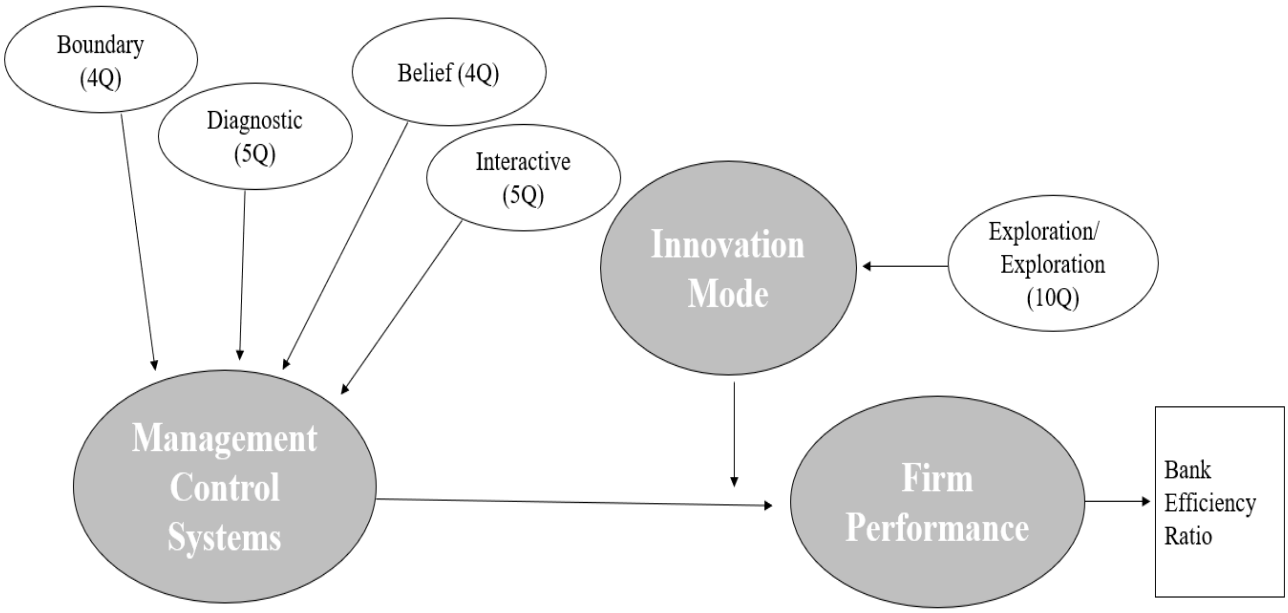
The bank efficiency ratio indicates how efficiently a bank utilizes its resources to generate revenue and control expenses (Reimink, 2018). It is the most important financial metric for analyzing productivity (West Monroe, 2019). The bank efficiency ratio is a measure of how much revenue each dollar of spending produces, and banks that operate in a more parsimonious manner will have a lower bank efficiency ratio (Milligan, 2019). A lower ratio indicates greater efficiency because it indicates that a lower unit cost was required to generate the revenue. A ratio of less than 51 indicates an efficient bank, while a ratio above 81 indicates an inefficient bank (Hays et al., 2009).

Traditional financial ratios including Return on Assets (ROA) and Return on Equity (ROE) measure profitability but do not provide insight into the efficiency of the organization. As industry leaders realized the importance of cost and productivity management in bank operations, metrics that measure operational efficiency were explored and considered. The bank efficiency ratio was developed as a measurement in a system of performance metrics used in banking to evaluate and compare the performance of banks (Hays et al., 2009). Financial

institution regulatory agencies and other experts recognize the importance in monitoring bank efficiency and include the ratio in regulatory reporting requirements (Office of the Comptroller of the Currency, 2023). Efficiency ratios are heavily impacted by management controls implemented by senior managers and directors (Hays et al., 2009). The conceptual framework for the multiple regression analysis is included as Figure 3 below.

Figure 3

Conceptual Framework



The independent variable is the use of management control systems, as operationalized by Simons four Levers of Control. The levers are measured by the survey instrument issued to financial institution senior managers. A moderating variable (Hayes, 2017) of innovation mode is included to test for interaction between the emphasis on control lever and the innovation mode the bank is operating in. The moderating variable is innovation mode, measured by the survey

instrument issued to financial institutions, which includes questions to identify whether the bank is in exploration, exploitation, or ambidexterity mode. The dependent variable is firm performance, measured by the bank efficiency ratio.

Sample selection

A national call for research on the community banking sector has been issued by the Federal Reserve, Federal Deposit Insurance Corporation, and the U.S. Conference of State Bank Supervisors. The limited research that exists primarily focuses on secondary data and is being utilized to answer the "what" questions. However, the "why" questions that survey instruments can assist us in answering are not commonly pursued in this field of study in an academic setting.

Primary data is difficult to obtain from community banks. This may be one of the reasons for the lack of existing research of this type. For this reason, industry contacts of the author were utilized to obtain a convenience sample (Schindler, 2022) was obtained in partnership with a regional Graduate School of Banking, hereinafter referred to as Organization 1, and the Independent Correspondent Bankers Bank, hereinafter referred to as Organization 2. The survey was administered electronically to 75 participants at Organization 1 and to 168 banks affiliated with the Organization 2. After data cleaning processes were completed and incomplete or irrelevant responses were removed, the Graduate School of Banking sample contained 56 responses, yielding a 74.6% response rate and the Independent Correspondent Bankers Bank group contained 54 responses, yielding a 32% response rate. The overall response rate for this research survey is 56.22%.

Method of Analysis

In previous analyses using this scale, the data was grouped using a cluster analysis to identify firms with high exploration, high exploitation, and ambidexterity, which is present in

firms with high scores in both exploration and exploitation. The previous study utilized one model for firms with emphasis on either exploration or exploitation. A separate model was used to analyze ambidexterity firms (Bedford, 2015). Instead of using the cluster analysis for this study, the data were analyzed using multiple regression analysis. This method of analysis was chosen to improve the power of the results with higher utilization of all responses, whereas cluster analysis eliminates certain responses that do not fall within each cluster being analyzed (Elliott & Woodward, 2007). One model for each hypothesis is defined below. Bank performance (PERF) is the dependent variable in every model. Each of the 10 models regresses management control levers with the presence of innovation mode as described by the individual hypotheses. The association between control systems and firm performance with the presence of innovation for firms with emphasis on either exploration or exploitation was analyzed using the following models to test H1 – H6:

H1:

$$PERF_i = \beta_0 + \beta_1 EXPLOIT_i + \beta_2 DIAG_i + \beta 3(EXPLOIT_i * DIAG_i) - \beta_4 AGE_i + \varepsilon_i \quad (1)$$

H2:

$$PERF_i = \beta_0 + \beta_1 EXPLOIT_i + \beta_2 BOUND_i + \beta 3(EXPLOIT_i * BOUND_i) - \beta_4 AGE_i + \varepsilon_i \quad (2)$$

H3:

$$PERF_i = \beta_0 + \beta_1 EXPLORE_i + \beta_2 INT_i + \beta 3(EXPLORE_i * INT_i) - \beta_4 AGE_i + \varepsilon_i \quad (3)$$

H4:

$$PERF_i = \beta_0 + \beta_1 EXPLORE_i + \beta_2 BELIEF_i + \beta_3(EXPLORE_i * BELIEF_i) - \beta_4 AGE_i + \varepsilon_i \quad (4)$$

H5:

$$PERF_i = \beta_0 + \beta_1 EXPLOIT_i + \beta_2 DIAG_i + \beta_3 BOUND_i + \beta_4 (EXPLOIT_i * DIAG_i * BOUND_i) - \beta_5 AGE_i + \varepsilon_i \quad (5)$$

H6:

$$PERF_i = \beta_0 + \beta_1 EXPLORE_i + \beta_2 INT_i + \beta_3 BELIEF_i + \beta_3 (EXPLORE_i * INT_i * BELIEF_i) - \beta_4 AGE_i + \varepsilon_i \quad (6)$$

where PERF denotes bank performance, DIAG, INT, BOUND and BELIEF denote diagnostic, interactive, boundary and belief emphasis in the management control systems within the bank. The bivariate interaction terms represent the complementary effects of control levers.

The hypothesized associations for the ambidexterity firms are tested using the opposite interaction terms for H7 and H8, and absolute values to represent the imbalance between control levers for H9 and H10. The following models are utilized for multiple regression analysis for H7 - H10:

H7:

$$PERF_i = \beta_0 + \beta_1 AMBIDEX_i + \beta_2 DIAG_i + \beta_3 INT_i + \beta_4 (AMBIDEX_i * DIAG_i * INT_i) - \beta_5 (AGE_i) + \varepsilon_i \quad (7)$$

H8:

$$PERF_i = \beta_0 - \beta_1 AMBIDEX_i - \beta_2 BELIEF_i - \beta_3 BOUND_i + \beta_7 (AMBIDEX_i * BELIEF_i * BOUND_i) - \beta_8 (AGE_i) + \varepsilon_i \quad (8)$$

H9:

$$PERF_i = \beta_0 + \beta_1 AMBIDEX_i + \beta_2 DIAG_i + \beta_3 INT_i + \beta_4 ABS[DIAG_i - INT_i] + \beta_5 (AMBIDEX_i * ABS[DIAG_i - INT_i]) - \beta_6 (AGE_i) + \varepsilon_i \quad (9)$$

H10:

$$PERF_i = \beta_0 + \beta_1 AMBIDEX_i + \beta_2 BELIEF_i + \beta_3 BOUND_i + \beta_4 ABS[BELIEF_i - BOUND_i] + \beta_5 (AMBIDEX_i * ABS[BELIEF_i - BOUND_i]) - \beta_6 (AGE_i) + \varepsilon_i \quad (10)$$

Data were collected for control variables including bank size (SIZE), bank age (AGE), and bank location (LOC). Organization size has been found to be the best organization level predictor of both explorative and exploitative innovation, and larger organizations that are specialized and decentralized were found to be the most active in adoption of technological innovation (Kimberly & Evanisko, 1981). Larger banks have more financial resources and employee expertise to purchase and successfully implement new technology for innovation purposes, and many of the small asset-size community banks have less than 40 employees resulting in disadvantages at implementing explorative technologies and strategies (Bowman, 2020). Therefore, a dummy variable was included for banks under or over $1 Billion in assets, with a value of 0 if the bank is below $1 Billion in asset size and 1 if the bank is over this threshold.

Bank age is considered from the perspective of survival. While newly formed, or "de novo" banks are known to benefit the communities they are established in, they are also more volatile and therefore subject to more stringent regulation for the first three years of existence (Jones et al., 2022). Therefore, for this study, banks that have been in existence for less than three years are excluded. Further, older firms are more likely to perform higher than younger firms (Hannan & Freeman, 1989). Research indicates that the experience of older banks results

in higher performance in exploitation but younger banks perform better in exploration (J. P. Jansen et al., 2006). In this study, bank age is included as a continuous variable.

Data were collected to use bank location as a control variable because the competitive advantage for community banks is that they are located within the communities they serve, arming them with superior knowledge of the local loan market (Hays et al., 2009). While this is a competitive advantage, it can heavily impact performance for community banks that serve slow growing markets. Community banks located in slow growing markets experience higher overhead costs relative to income due to loan growth problems, coupled with the lack of a qualified talent pool for senior managers and directors with expertise to implement effective management controls to drive bank efficiency and performance (Myers & Spong, 2003). Therefore, bank location in slow growth markets is predicted to be negatively associated with effective use of MCS as well as bank efficiency ratio. Bank location was represented with a dummy variable indicating whether the bank is headquartered in a rural or urban location.

Unfortunately, in the data normality tests, the measures of central tendency do not support the use of bank size or bank location. Therefore, these variables were eliminated as options for control variables.

Chapter 5: Results

Overview of Results

The results of this research project are briefly summarized below, then described in detail later in this section. The data were analyzed using a robust process to ensure the reliability and validity of the results. First, the normality of data was assessed to ensure it was appropriate for regression analysis, using visual inspection methods including histogram, boxplot and Q-Q Plot, as well as statistical tests including the Kolmogorov-Smirnov test and the Shapiro-Wilk test. Some of the variables required winsorization to meet the requirements of data normality. The two control variables representing bank location and bank size were eliminated due to non-normal data distribution. Confirming normality of data ensured the data met the conditions to move on to the next step of analysis.

Second, the reliability of the survey instrument was assessed using Cronbach's Alpha reliability test on each measurement item. Each of the six measurement items presented a score of above the threshold for data reliability. The results are presented in Table 1, confirming reliability of the survey instrument.

Third, descriptive statistics of the data were summarized, including the means and standard deviations of each variable for n = 100 responses. The data was summarized for DIAG, INT, BELIEF, BOUND, EXPLORE, EXPLOIT, AGE. The results are presented in Table 2. Additional data on the 15 states in which the bank respondents are located is included in Table 3**.**

Fourth, the correlation of variables was assessed using the Pearson correlation matrix. Variables with high correlation were identified. There are four instances of high correlation, all explained in the variable relationships, except for the correlation between BELIEF and INT. High correlation (r = 0.7142) is noted between BELIEF and INT. This is a violation of

assumptions for regression testing and directly impacts H6. The Pearson correlation matrix is presented in Table 4.

Fifth, confirmatory factor analysis using varimax rotation with Kaiser Normalization was conducted to measure the fit of the data to the model. The results are presented in Table 6. The factor loadings indicate that the data fits into six factors: Factor 1 – Diagnostic Controls; Factor 2 – Interactive Controls; Factor 3 – Boundary Controls; Factor 4 – Belief Controls; Factor 5 – Exploration Innovation Mode; and Factor 6 – Exploitation Innovation Mode. Each item loads onto the factor it was intended to measure. One item in Factor 6 did not load properly. However, since this study is utilizing an established scale, the item was retained so that the results can be compared to prior and future research.

Sixth, an ordinary least squares regression model was used to analyze the data. The findings support H1 and H3. Although other hypotheses were not fully supported, statistically significant findings with H4, H5, H6, and H7. The results are reported in Table 8 - Table 14.

Finally, robustness testing was conducted.

Data Normality

Data normality must be examined as the validity of parametric tests such as regression analysis depends upon normality of the data being analyzed (Altman & Bland, 1995). Normality of data was examined in this study using a combination of visual inspection of graphical presentation of the data, as well as data normality significance tests. The visual portion of the normality assessment includes frequency distribution (the histogram), stem-and-leaf plot, boxplot, Probability-Probability Plot (P-P Plot) and Quantile-Quantile Plot (Q-Q Plot). The statistical significance tests utilized in this study are the Kolmogorov-Smirnov (K-S) test, Lilliefors corrected K-S test, and the Shapiro-Wilk test. Each test is described below, followed

by a summary of the results of data normality testing for each variable individually. In some instances, winsorization was performed to adjust for outliers, as described within the summary of normality testing for each variable.

The histogram provides a visual of the observed values in the data with their frequency and provides a visual comparison of the data to the bell curve while providing information about data gaps and outliers (Field, 2018). The stem-and-leaf plot is similar to the histogram, however, instead of presenting a visual bar chart of the data, it provides actual data values (Elliott & Woodward, 2007). The P-P Plot presents the cumulative probability of a variable compared to the cumulative probability of a normal distribution. The z-scores of the data are plotted along with the expected z-scores for normal distribution. If normal distribution is present, the plotted values will follow a straight diagonal line (Field, 2018). The Q-Q Plot is similar to the P-P Plot, differing in that it plots the data in quantiles instead of plotting each individual number in the data (Field, 2018). The boxplot presents a visual that includes a horizontal line inside a box, which represents the median of the data. The length of the box itself represents the interquartile range from the 25^{th} to the 75^{th} percentile of data, while the lines that extend from the top and the bottom of the box, called whiskers, represent the minimum and maximum values if they are within 1.5 times the interquartile range. If there are scores greater than 1.5 times the interquartile range, they are considered outliers, while scores greater than 3 time the interquartile range are extreme outliers. The outliers and extreme outliers are represented as circles and stars situated past the end of the whiskers (Barton & Peat, 2014). A boxplot indicates normally distributed data when the box is symmetric around the median line and the median line is located at the center of the box, with whiskers that are symmetric and the top whisker and bottom whisker are

slightly longer than the top subsection and bottom subsection of the box (Elliott & Woodward, 2007).

The first of the normality tests is the K-S test, which compares the empirical distribution of the data to the expected normal distribution of the data. If the resulting p-value is greater than 0.05 then it can be assumed the data is normally distributed. The Shapiro-Wilk test is also used, and considered the most powerful test for data with symmetric short-tailed distributions, symmetric long-tailed distributions and symmetric distributions (Yap & Sim, 2011).

The second statistical test utilized to assess data normality is the Kolmogorov-Smirnov test. This method tests whether a continuous variable follows a normal distribution, with the null hypothesis stating that the variable is normally distributed and the alternative hypothesis stating that the variable is not normally distributed. Therefore, when $p > .05$, normally distributed data is indicated and when $p < .05$ non-normal distribution of data is indicated.

The variables are considered individually for data distribution normality. For Bank Age (AGE), the histogram, Q-Q Plot, and box plot show normal distribution while the K-S and Shapiro-Wilk tests do not show statistically significant p-values. Since statistical tests of normality are supplementary to the visual assessment of graphical normality, we consider this data to be slightly skewed but overall normally distributed (Elliott & Woodward, 2007).

Figure 4

Histogram for Variable Bank Age (AGE)

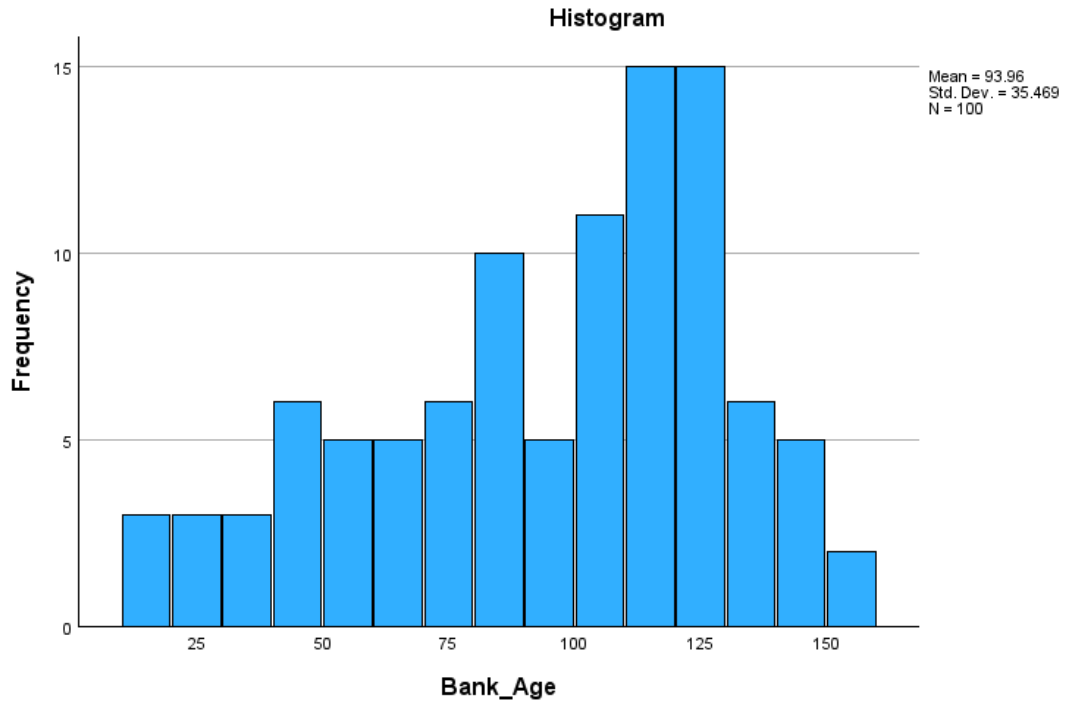


Figure 5

Q-Q Plot for Variable Bank Age (AGE)

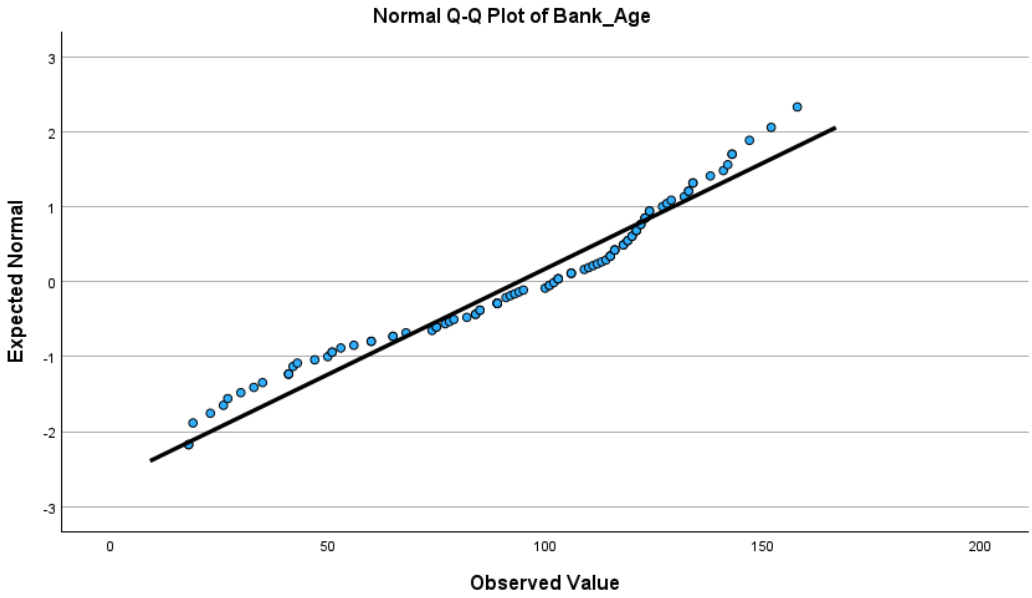
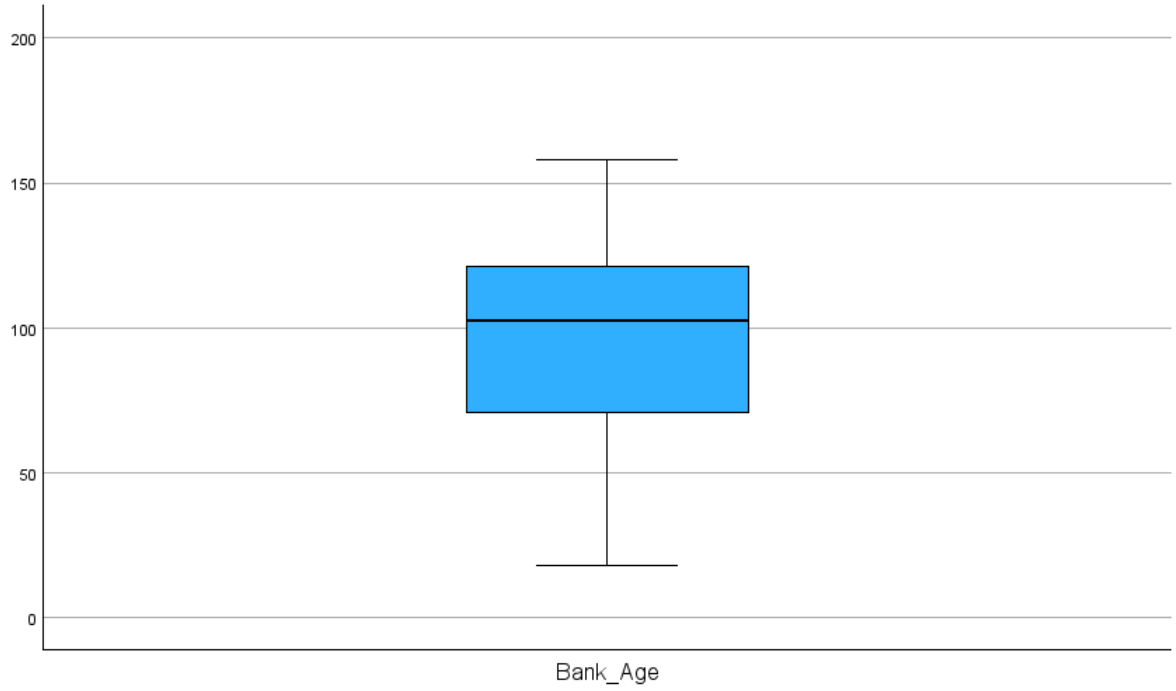


Figure 6

Boxplot for Variable Bank Age (AGE)



For Bank Efficiency Ratio (PERF), the histogram shows positively skewed distribution, and the Q-Q Plot and boxplot indicate two outliers above 1.5 times the interquartile range, and one extreme outlier at over 3 times the interquartile range. The K-S and Shapiro-Wilk tests do not present statistically significant p-values. Therefore, the data is not normally distributed. The cause of the non-normal data appears to be the outliers. Several methods can be performed to reduce the influence of outliers on a data set. Winsorization was chosen for this variable instead of trimming because it is more robust to outliers (Barnett & Lewis, 1984; Tukey, 1962). The difference between winsorization and trimming is that trimming excludes the outlier data, whereas winsorization replaces the data with the winsorized mean of data for the specified percentile. Therefore, winsorization was the chosen method to process the outlier data. After winsorization was performed for the top 5% and bottom 5% of data, the winsorized variable

resulted in a normally distributed Q-Q Plot, boxplot, and presented a statistically significant Shapiro-Wilk p-value, p = .20. Therefore, the winsorized Bank Efficiency Ratio (PERF) variable is considered normally distributed.

Figure 7

Q-Q Plot of Efficiency Ratio (PERF) Winsorized at 5%

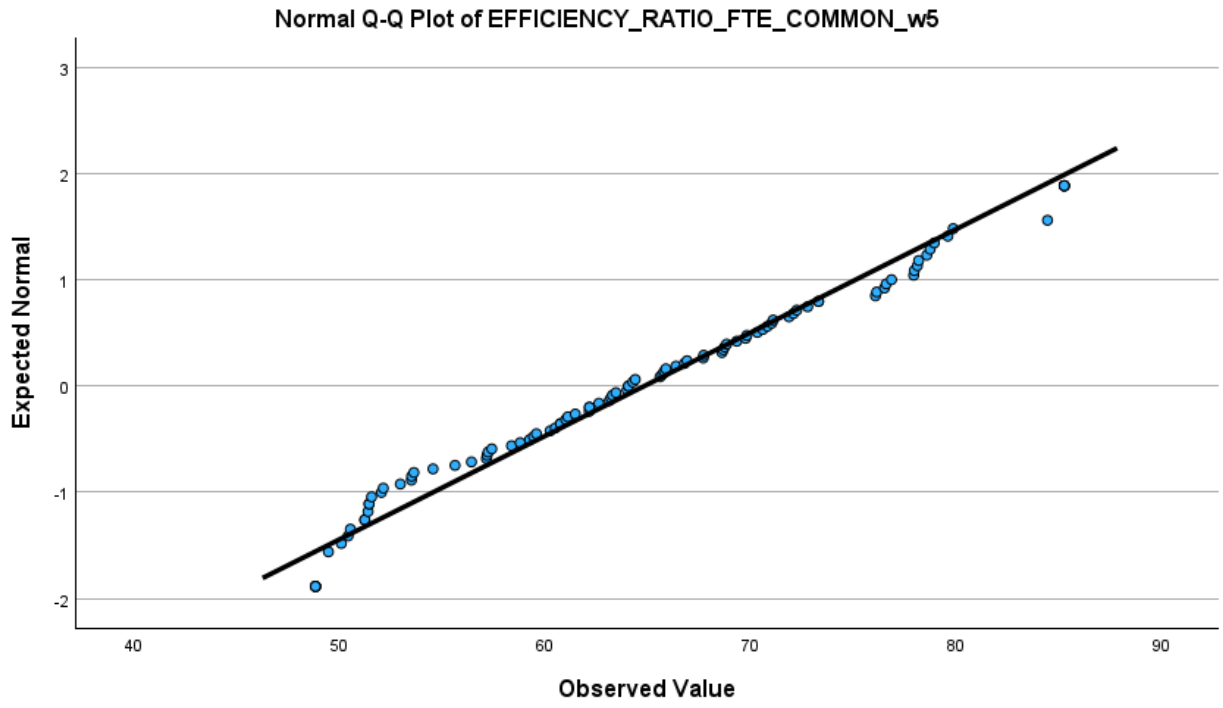
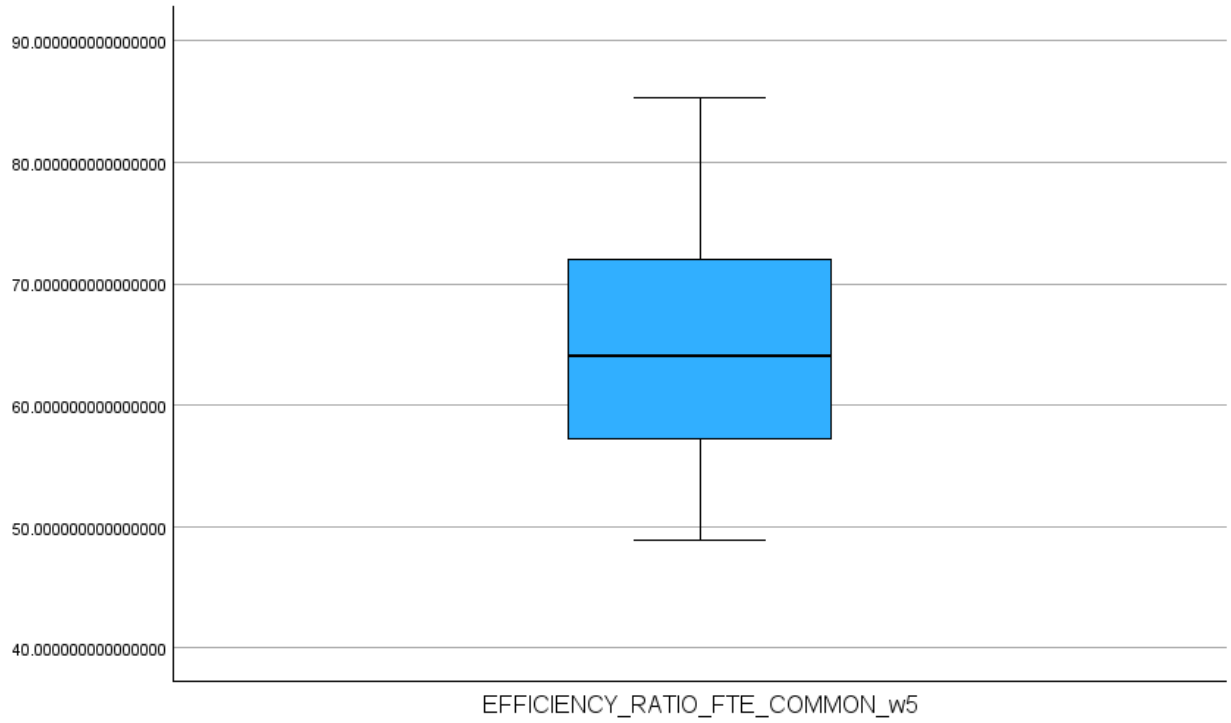


Figure 8

Boxplot of Efficiency Ratio (PERF) Winsorized at 5%



For the Diagnostic Management Control Systems mean variable (DIAG), the histogram, Q-Q Plot, and the boxplot indicate normality. Therefore, the data is considered normally distributed.

Figure 9

Histogram for Diagnostic Management Control Systems Variable (DIAG)

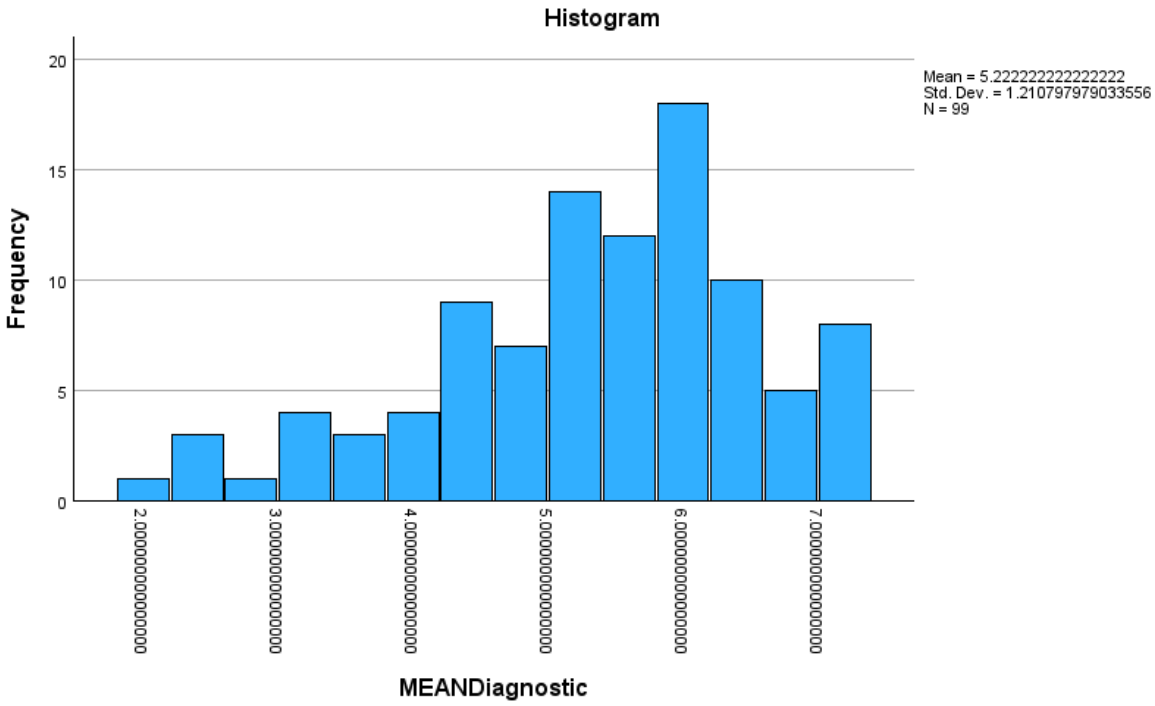
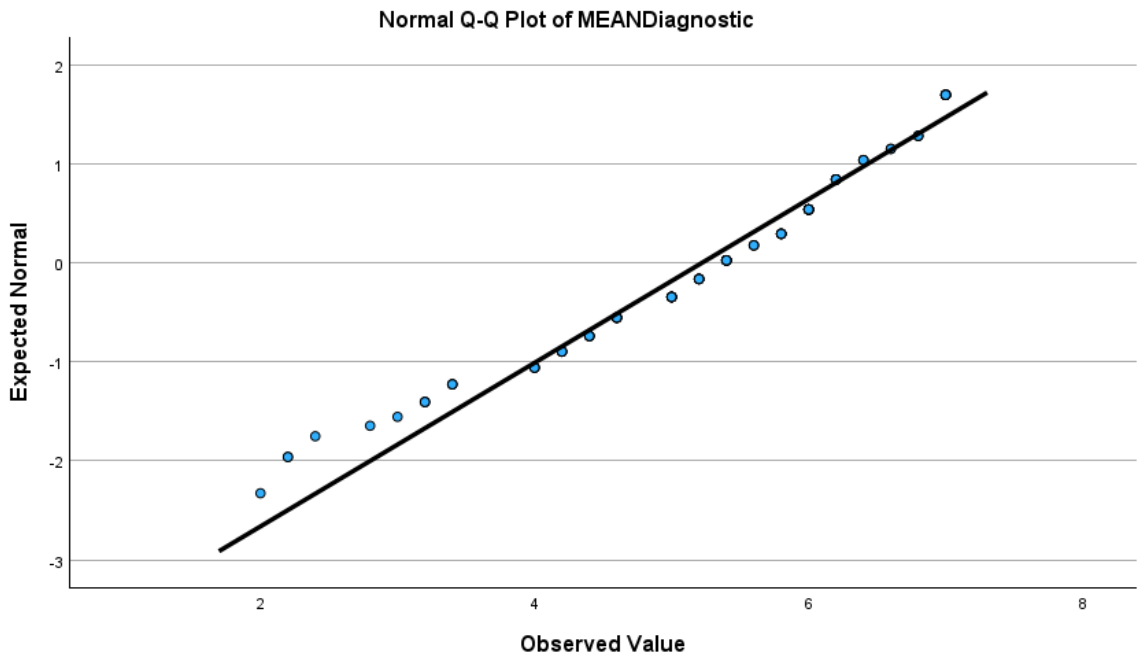


Figure 10

Q-Q Plot for Diagnostic Management Control Systems Variable (DIAG)



For the Interactive Management Control Systems mean variable (INT), the histogram and Q-Q Plot indicate normal distribution and the Lilliefors corrected K-S Test (p = .053) and Shapiro-Wilk (p = .321) both present a statistically significantly p-value. Therefore, the data is considered normally distributed.

Figure 11

Histogram for Interactive Management Control Systems Variable (INT)

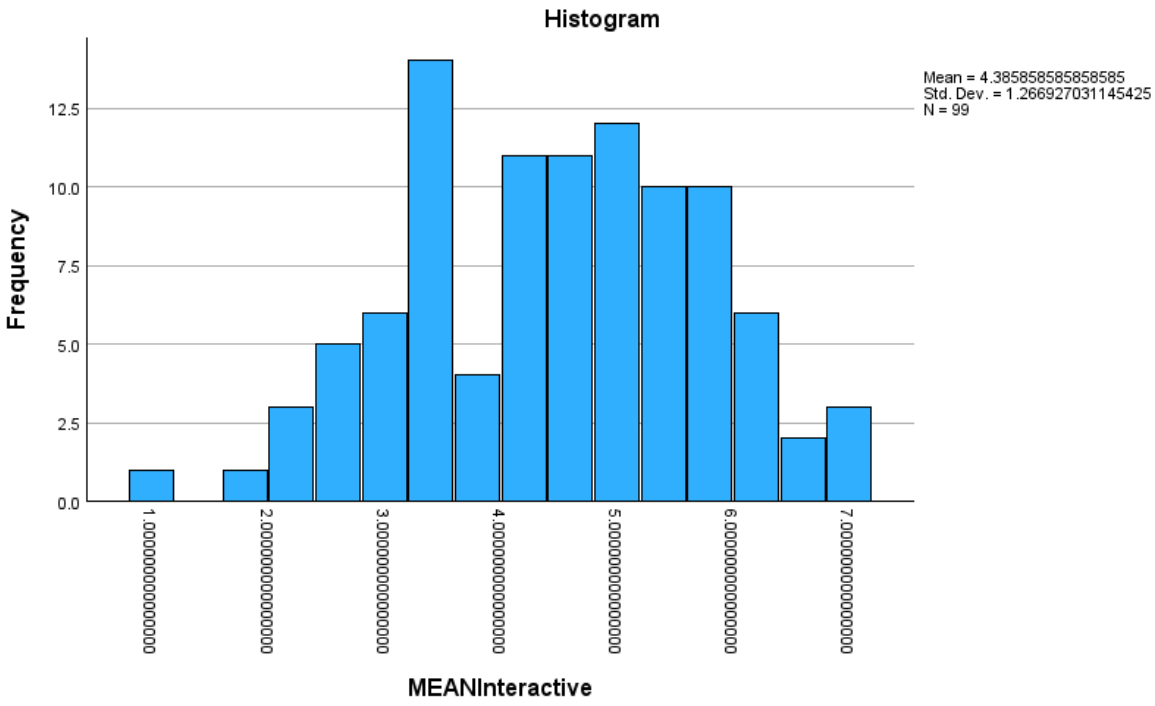


Figure 12

Q-Q Plot for Interactive Management Control Systems Variable (INT)

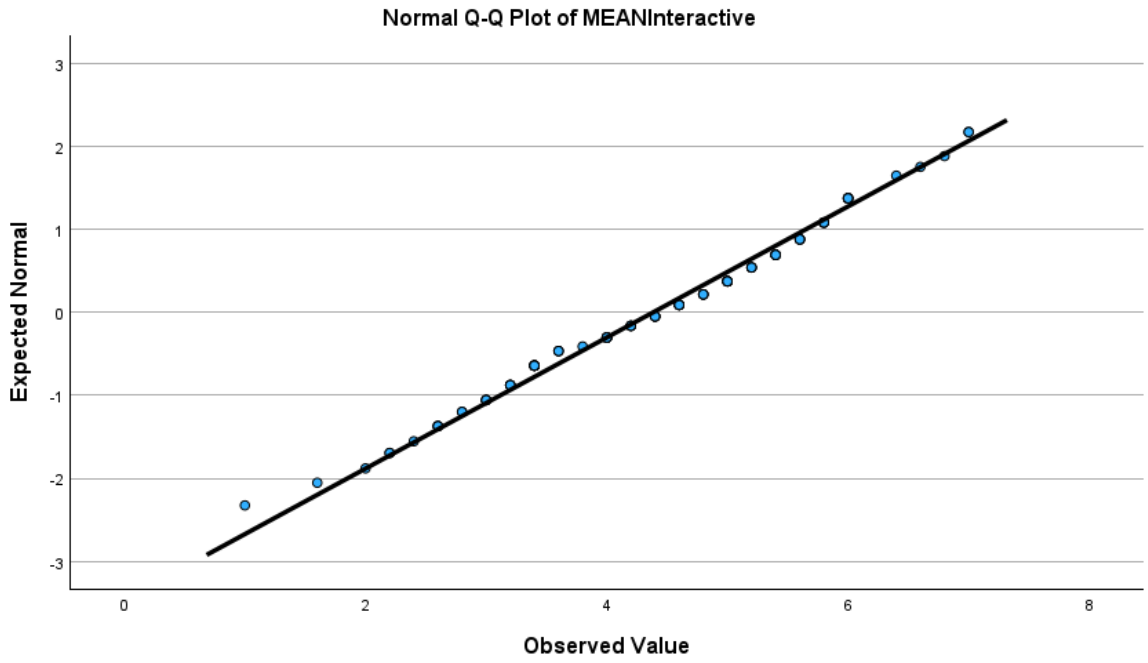
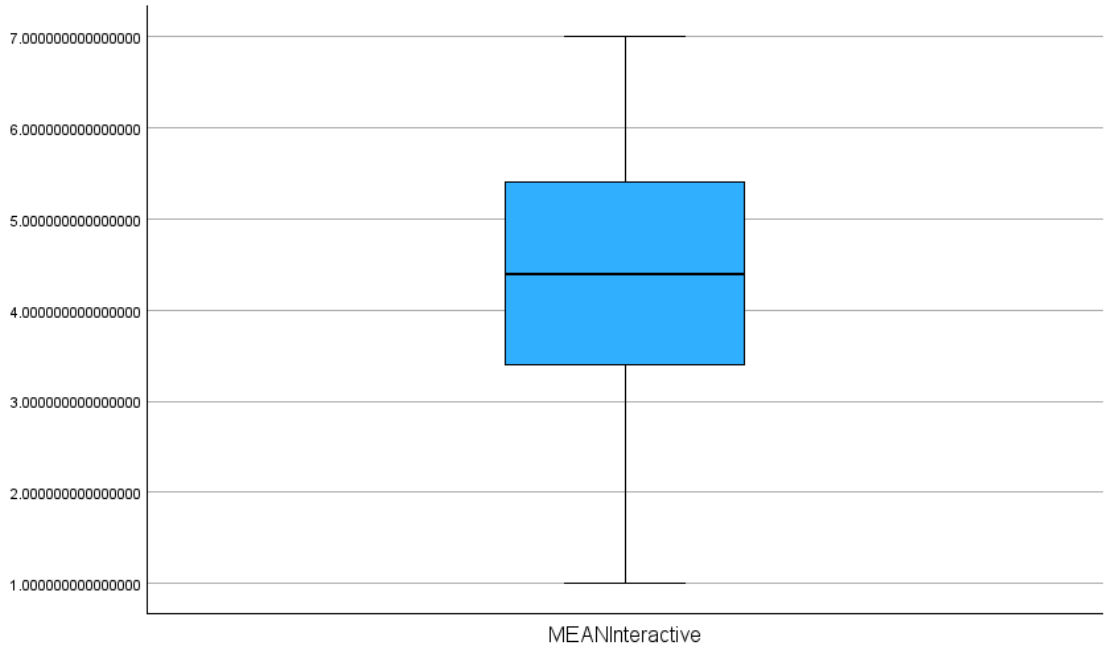


Figure 13

Boxplot for Interactive Management Control Systems Variable (INT)



For the Belief Management Control Systems mean variable (BELIEF), the histogram, Q-Q Plot, and boxplot appear normally distributed, and the Lilliefor adjusted K-S test presents a statistically significant p-value, p = .108. Therefore, the data is considered normally distributed.

Figure 14

Q-Q Plot for Belief Control Systems Mean Variable (BELIEF)

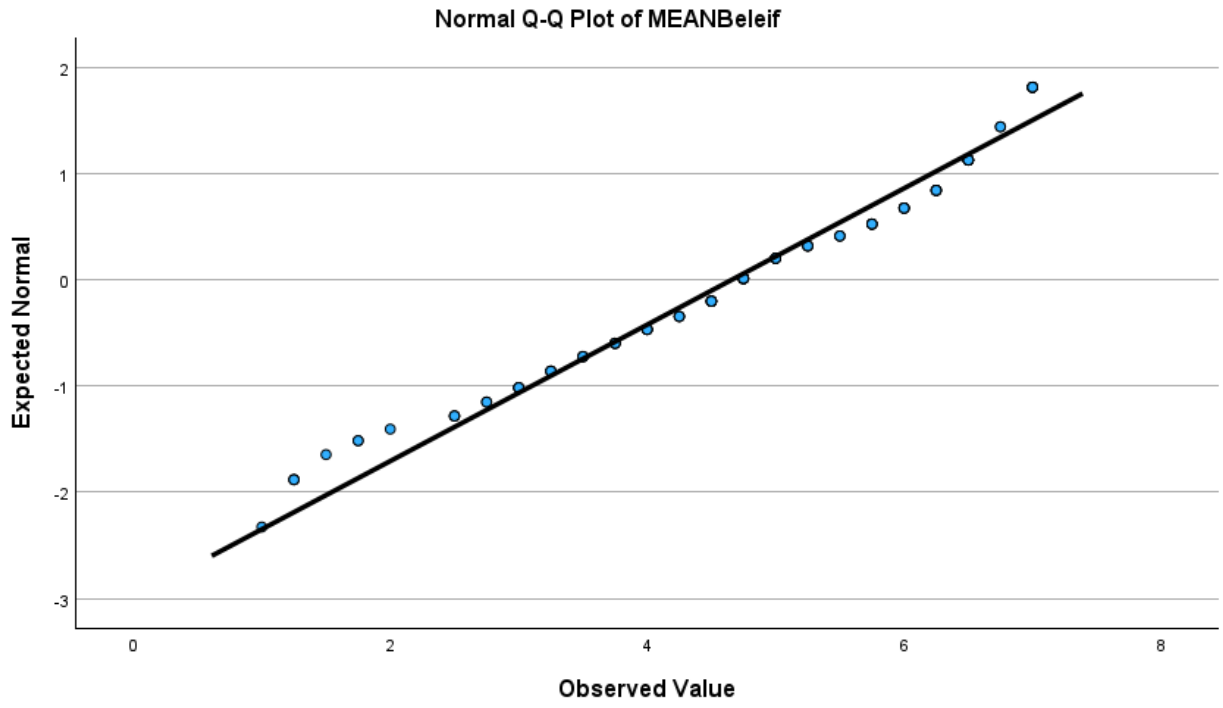
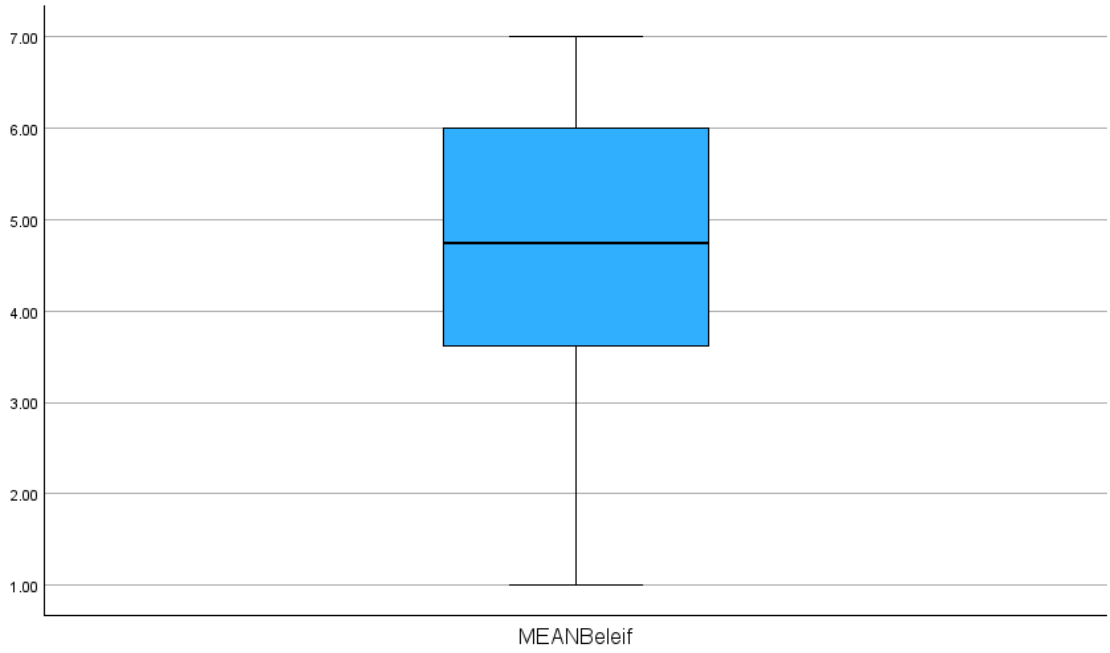


Figure 15

Boxplot for Belief Control Systems Mean Variable (BELIEF)



For the Boundary Management Control Systems mean variable (BOUND), histogram, Q-Q Plot and boxplot indicate normality, while the Lilliefor adjusted K-S test presents a p-value of .043, and the Shapiro-Wilk test presents a statistically significant p-value. Therefore, the data is considered normally distributed.

Figure 16

Q-Q Plot for Boundary Control Systems Variable (BOUND)

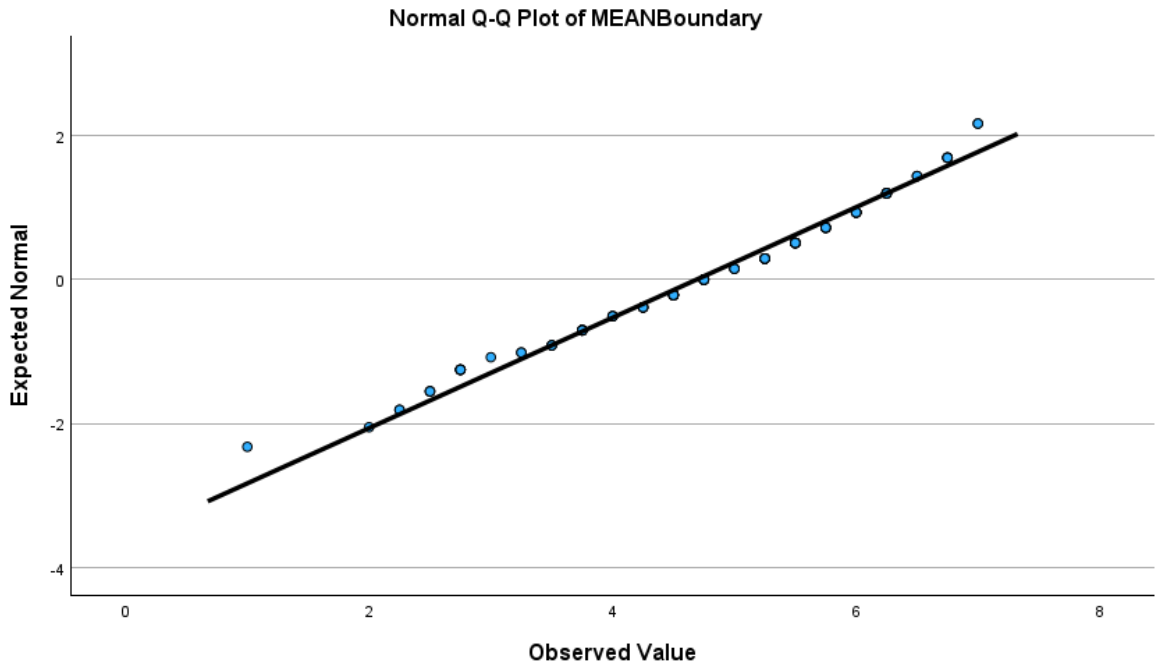
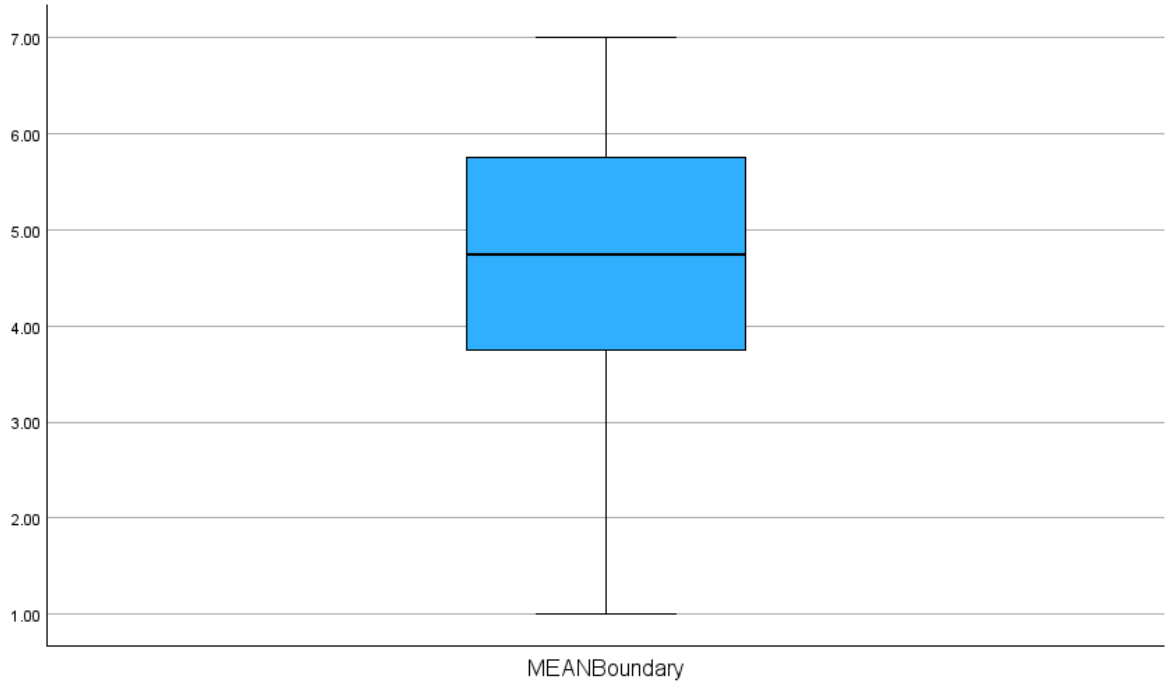


Figure 17

Boxplot for Boundary Control Systems Variable (BOUND)



For the Exploitation Innovation mode mean variable (EXPLOIT), the histogram, Q-Q plot, and boxplot indicate normal distribution. Therefore, the data is considered normally distributed.

Figure 18

Q-Q Plot for Exploitation Innovation Mode Variable (EXPLOIT)

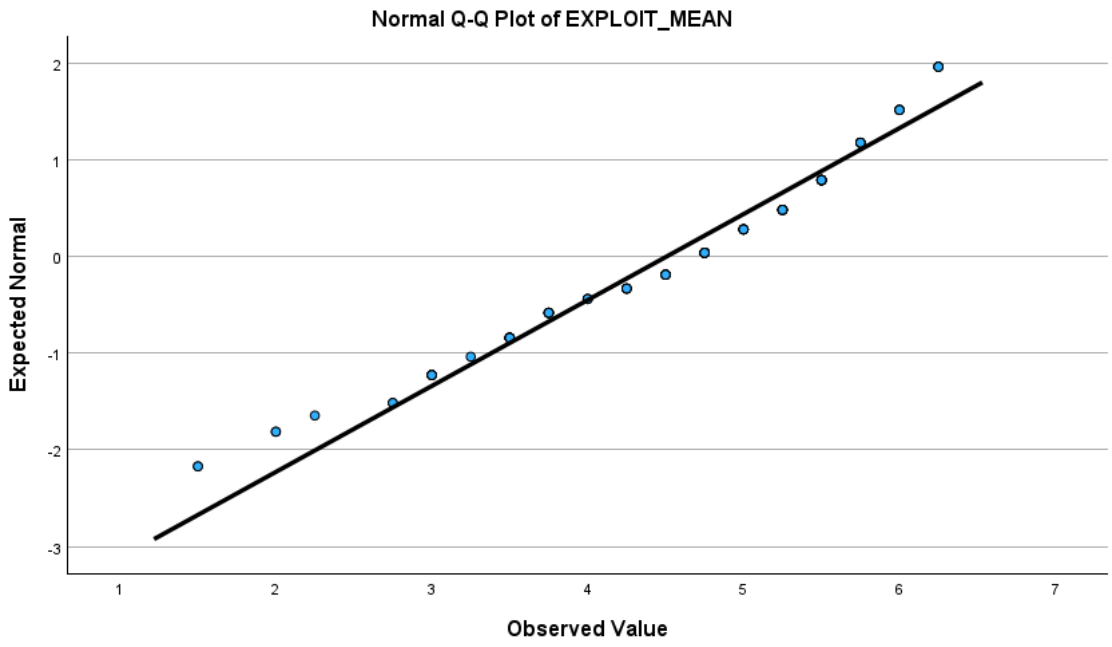
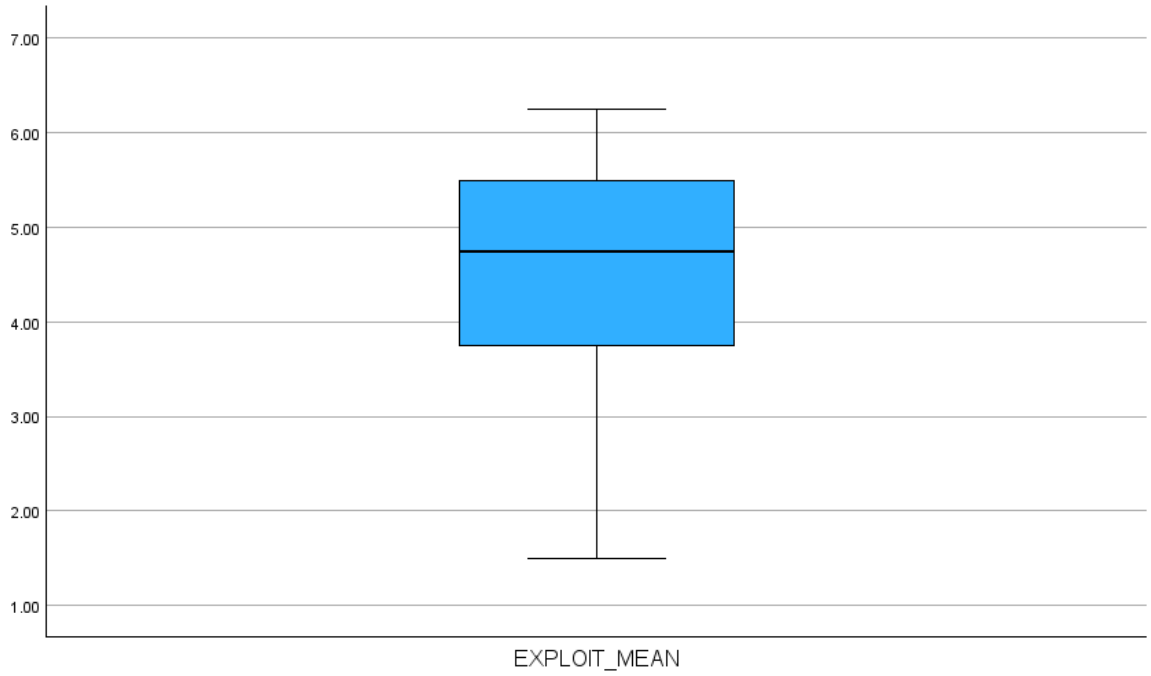


Figure 19

Boxplot for Exploitation Innovation Mode Variable (EXPLOIT)



For the Exploration Innovation Mode mean variable (EXPLORE), the histogram and boxplot indicate normality while the Shapiro-Wilk test presents a statistically significant p-value, p = .315. Therefore, this data is considered normally distributed.

Figure 20

Histogram for Exploration Innovation Mode Variable (EXPLORE)

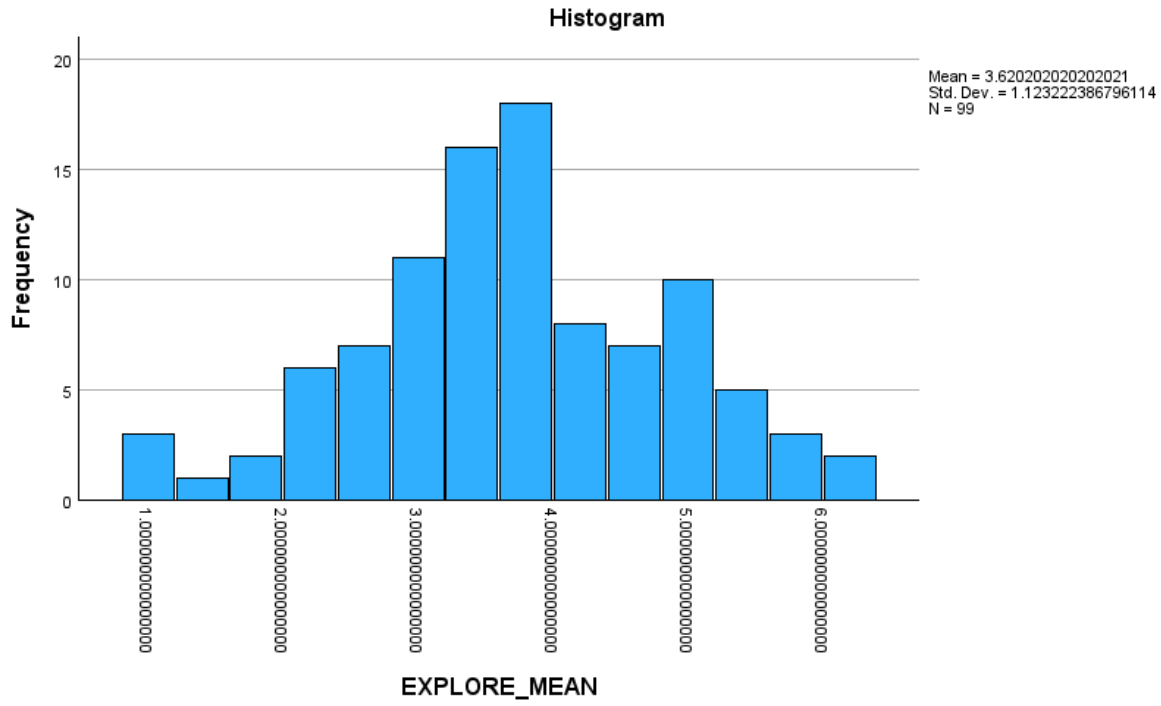
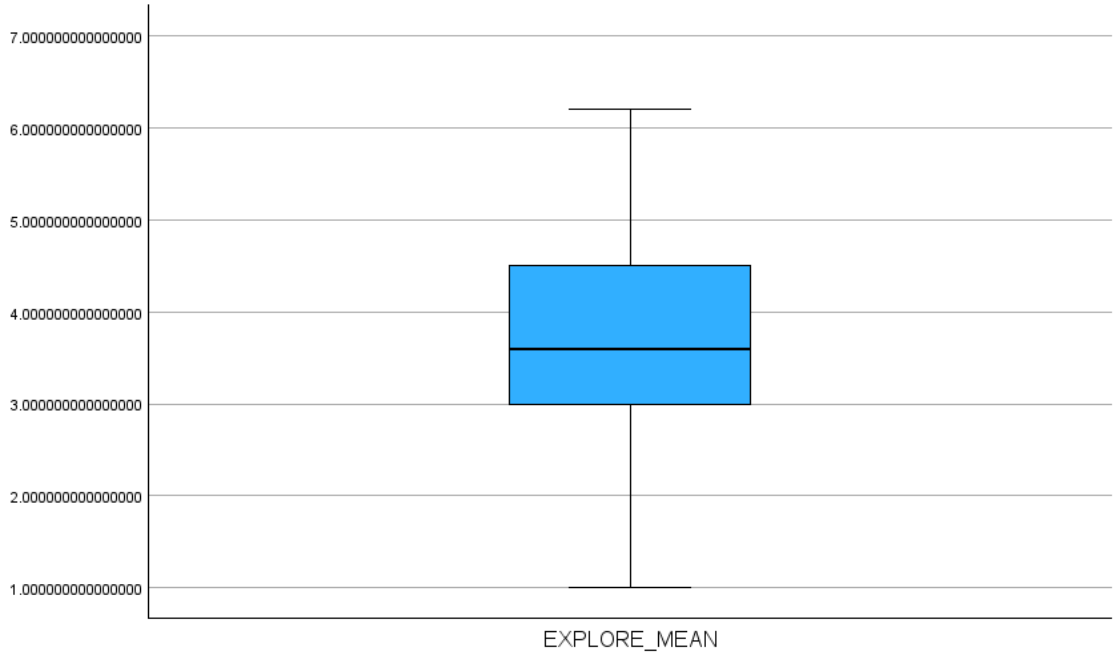


Figure 21

Boxplot for Exploration Innovation Mode Variable (EXPLORE)



For the Bank Size and Bank Location, the data is significantly skewed and abnormal in every visual assessment of normality, and they do not present a statistically significant p-value for either the K-S test or the Shapiro-Wilk tests. The measures of central tendency do not support using either of these variables, as the data are severely skewed with no feasible options for smoothing. Therefore, these two control variables were eliminated from the study.

Reliability Statistics

Reliability is a fundamental element in the evaluation of a survey instrument (Schindler, 2022). Reliability of scale items must be assessed to ensure that the survey instrument measures the intended elements consistently (Tavakol & Dennick, 2011). Lee Cronbach's Alpha (1951) is the most commonly utilized objective measure for testing the reliability of a set of scale items (Tavakol & Dennick, 2011). Cronbach's Alpha test measures the reliability of a scale item within a range of 0 to 1, with a value above .7 considered acceptable. Cronbach's Alpha was measured for each of the scale measurement items: Diagnostic (DIAG), Interactive (INT), Belief (BELIEF), Boundary (BOUND), Exploration Mode (EXPLORE), and Exploitation Mode (EXPLOIT).

Cronbach's Alpha for the five items measuring DIAG was $\alpha = .9228$, for the five items measuring INT was $\alpha = .8976$, for the four items measuring BELIEF was $\alpha = .9201$, for the four items measuring BOUND was $\alpha = .8569$, for the five items measuring EXPLORE was $\alpha = .8649$, and for the four items measuring EXPLOIT was $\alpha = .8215$. Therefore, the measurement scales for each of the variables in this study meet the requirements of reliability. The results are presented below in Table 1.

Table 1

Scale Reliability Coefficient

	Items	Cronbach's Alpha
Diagnostic	5	0.9228
Interactive	5	0.8976
Belief	4	0.9201
Boundary	4	0.8569
Explore	5	0.8649
Exploit	4	0.8215

The descriptive statistics for the variables measured in this study are presented in Table 2 below. For each respondent (n = 100), the variables of DIAG, INT, BELIEF, BOUND, EXPLORE, AND EXPLOIT were measured using a 7-point Likert scale. The data for the variables of Efficiency Ratio, Bank Age, and Bank Size were not collected via the survey, but from a secondary data source, the Federal Financial Institutions Financial Institution Data Repository. The descriptive statistics reveal that the banks sampled are placing a heavier emphasis on Diagnostic Control Systems (DIAG) than any of the other levers of control (M = 5.23; SD = 1.21). Further, the banks surveyed are operating at a higher level of Exploitative Innovation (M = 4.49, SD = 1.14) than EXPLORATIVE Innovation (M = 3.6; SD = 1.14). The average bank size of the respondent was $1.3 Billion (M = 1,302,321,000; SD = 2,208,373,403). The average age of the banks responding to the survey is 93 (M = 93.96; SD = 35.47).

Table 2

Descriptive Statistics

	M	SD	Min	Max	N
Efficiency Ratio	64.86	10.28	48.86	85.29	100
Diagnostic (DIAG)	5.23	1.21	2	7	100
Interactive (INT)	4.37	1.27	1	7	100
Belief (BELIEF)	4.65	1.55	1	7	100
Boundary (BOUND)	4.68	1.3	1	7	100
Explore (EXPLORE)	3.6	1.14	1	6.2	100
Exploit (EXPLOIT)	4.49	1.14	1.5	6.25	100
Bank Age (AGE)	93.96	35.47	18	158	100
Bank Size (in billions)	1,302,320	2,208,373	38,000	10,000,000	100

Banks from 15 states participated in the survey, with the following number of banks from each state: Arkansas: 5; California: 1; Colorado: 8; Iowa: 1; Kansas: 10; Kentucky: 46; Maine: 1; Minnesota: 3; Missouri: 3; Nebraska: 8; North Dakota: 2; Oklahoma: 8; South Dakota: 2; Wisconsin: 1; Wyoming: 1. Nearly half of the bank respondents were located in Kentucky due to location of the firm that provided access to the population surveyed. The remaining bank respondents were concentrated in the Midwest U.S. due to the location of the second firm that provided access to the population surveyed.

Table 3

States Represented in Sample Data

State	Number of Respondents	State	Number of Respondents
Arkansas	5	Missouri	3
California	1	Nebraska	8
Colorado	8	North Dakota	2
Iowa	1	Oklahoma	8
Kansas	10	South Dakota	2
Kentucky	46	Wisconsin	1
Maine	1	Wyoming	1
Minnesota	3		

Data Correlation

The Pearson correlation matrix presented in Table 4 below contains each variable discussed in the analysis and displays the level of correlation between that variable and every other variable being analyzed. The top number displayed for each item is the correlation coefficient, and the bottom number for each item is the p-value for the statistical significance of the correlation coefficient calculation, showing the confidence in the coefficient. Pearson correlation is considered high when the correlation coefficient r-value is higher than 0.7. The instances where the correlation coefficient is above 0.7 are ROA/ROE (r = 0.7573), ROA/EFFICIENCY (r = -0.7679) EXPLORE/EXPLOIT (r = 0.07), and BELIEF/INT (r = 0.7142).

The correlation matrix reveals that Bank Efficiency Ratio (EFFICIENCY) is negatively correlated with every variable, which is expected because a lower bank efficiency ratio means better performance. For the other two bank performance measures, ROA and ROE, a higher value means higher performance. The highly negative correlation between EFFICIENCY and ROA (r = -0.7679) is consistent with bank research and theory in that a high efficiency ratio indicates that a bank has trouble controlling non-interest expense, which would have a similar and opposite impact on ROA (Kupiec & Lee, 2012). ROA and ROE are both measures of financial performance, so it is expected that these two variables will be highly correlated. Similarly, ROA and EFFICIENCY are measures of bank performance, so it is again expected that these two variables are highly negatively correlated. The data in this dataset is consistent with bank theory in that ROE and EFFICIENCY are less correlated than ROA and EFFICIENCY, confirming that bank efficiency is more correlated with return per dollar of assets than return per dollar of equity.

A moderate correlation was found between ROE and EFFICIENCY (r = -0.5748), BELIEF and DIAG (r = 0.6087), BOUND and INT (R = 0.5378), BOUND and BELIEF (r = 0.4945), EXPLOIT and DIAG (r = 0.5687), EXPLOIT and INT (R = 0.5983), EXPLORE and BELIEF (r = 0.5414), EXPLORE and BOUND (r = .4107).

A low correlation was found between DIAG and EFFICIENCY (r = -0.2328), DIAG and ROA (r = 0.1306), DIAG and ROE (r = 0.253), INT and EFFICIENCY (r = -0.048), INT and ROA (r = -0.0466), INT and ROE (r = 0.1116), BELIEF and EFFICIENCY (r = -0.1633), BELIEF and ROA (0.0786), BOUND and EFFICIENCY (r = -0.0239), BOUND and ROA (r = -0.0833), BOUND and ROE (r = 0.0027), BOUND and DIAG (r = 0.3813), EXPLOIT and EFFICIENCY (r = -0.056), EXPLOIT and ROA (r = 0.0719), EXPLORE and EFFICIENCY (r =

-0.0642), EXPLORE and ROA (r = -0.0434), EXPLORE and ROE (r = 0.0691), EXPLORE and DIAG (r = 0.3767). AGE has a low correlation with all variables, with EFFICIENCY (r = -0.1685), ROA (r = 0.1939), ROE (r = 0.2389), DIAG (r = -0.0923), INT (r = -0.1786), BELIEF (r = -0.1797), BOUND (r = -0.0755).

EXPLORE and EXPLOIT are the two innovation modes that a firm can be operating in. The correlation between the two modes is an interesting dynamic in the data. Banks can be both explorative and exploitative simultaneously, and they can be both ambidextrous in the two modes, as well as ambisinister.

Belief Systems (BELIEF) and Interactive Management Controls (INT) are management control systems that are both supportive of innovation initiatives (see Figure 1), so the higher correlation between these variables is consistent with the MCS theory. This high correlation between these two variables is noted in testing H6, as both variables are included in one regression model. The results of that test should be analyzed with caution and awareness of this collinearity, which is a violation of regression assumptions (Elliott & Woodward, 2007). It is interesting that Boundary Control Systems (BOUND) and Diagnostic Control Systems (DIAG), the two control systems that are associated as restrictive to innovative activities have a much lower correlation.

Other interesting correlation coefficients include the negative correlation between ROA and INT, BOUND, EXPLOIT, and EXPLORE. However, it is difficult to pontificate on the reason for this since the correlation coefficient is barely negative and the p-value for each of these correlations is not statistically significant. Additionally, EXPLORE has approximately the same correlation with all 4 of the management control levers. EXPLOIT has approximately the same correlation with the 4 management control levers.

Consistent with historical bank data, bank age (AGE) is negatively correlated with EFFICIENCY and positively correlated with ROA and ROE, meaning that the older and more established a bank is, the higher its performance is (Hannan & Freeman, 1989).

Table 4

Panel A: Pearson Correlation Matrix

Variable	EFFICIENCY	ROA	ROE	DIAG	INT	BELIEF	BOUND
EFFICIENCY	-						
ROA	-0.7679 0.0000***	-					
ROE	-0.5748 0.0000***	0.7573 0.0000***	-				
DIAG	-0.2328 0.0198*	0.1306 0.1953	0.253 0.0111*	-			
INT	-0.048 0.6353	-0.0466 0.6452	0.1116 0.2691	0.6087 0.0000***	-		
BELIEF	-0.1633 0.1046	0.0269 0.7904	0.0786 0.4372	0.5648 0.0000***	0.7142 0.0000***	-	
BOUND	-0.0239 0.5802	-0.0833 0.5093	0.0027 0.477	0.3813 0.0000***	0.5378 0.0000***	0.4945 0.0000***	-
EXPLOIT	-0.056 0.5802	-0.0668 0.5093	0.0719 0.477	0.5687 0.0000***	0.5983 0.0000***	0.6001 0.0000***	0.6007 0.0000***
EXPLORE	-0.0642 0.5259	-0.0434 0.6684	0.0691 0.4946	0.3767 0.0001***	0.4671 0.0000***	0.5414 0.0000***	0.4107 0.0000***
AGE	-0.1685 0.0937	0.1939 0.0532	0.2389 0.0167	-0.0923 0.361	-0.1786 0.0755	-0.1797 0.0735	-0.0755 0.4552

*p < 0.05. **p < 0.01

Panel B: Pearson Correlation Matrix, continued

Variable	EXPLOIT	EXPLORE	AGE
EXPLOIT	-		
EXPLORE	0.7 0.0000***	-	
AGE	-0.1113 0.2702	-0.0476 0.6378	-

*p < 0.05. **p < 0.01

Factor Analysis

Prior to conducting factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was used to test the adequacy of the sample size (Shrestha, 2021). KMO values range from 0 to 1, where values between .8 and 1.0 indicate adequate sampling, values between .7 and .79 are mid-range, and values between .6 and .69 are mediocre, and values lower than .6 indicate inadequate sampling (Shrestha, 2021). Values of the results are presented in Table 5 below. The KMO value for this sample is .889, well within the highest range of an adequate sample. Bartlett's Test of Sphericity was then utilized to confirm the data is not orthogonal, and whether the data is suitable for factor analysis. A value < 0.05 indicates that the data set is suitable for factor analysis (Shrestha, 2021). The Bartlett's Sphericity Test resulted in a significance level of <.001, indicating the data is suitable for factor analysis. Values of the results are presented in Table 5 below.

Table 5

KMO and Bartlett's Test of Sphericity Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.889
Bartlett's Test of Sphericity	Approx. Chi-Square	2005.58
	df	351
	Sig.	<.001

Confirmatory Factor Analysis using Varimax rotation with Kaiser Normalization was performed to assess the data fit to the model. The factor loadings indicate that the data fits into six factors: Factor 1 – Diagnostic Controls; Factor 2 – Interactive Controls; Factor 3 – Boundary Controls; Factor 4 – Belief Controls; Factor 5 – Exploration Innovation Mode; and Factor 6 – Exploitation Innovation Mode. Each item loads onto the factor it was intended to measure.

Research indicates differing opinions on the recommended threshold for factor loadings. This study follows the work of Guadagnoli & Velicer (1988) which suggests that a factor is reliable regardless of sample size if it has more than 4 loadings of at least 0.6. All factors included in this analysis meet these criteria with one exception. The average of the items in Factor 1 = .8162; Factor 2 = .6838; Factor 3 = .7745; Factor 4 = .7505; Factor 5 = .795. The exception is Factor 6 - Exploitation Innovation Mode. The last item in this factor loaded on all factors in the matrix, indicating that the data in that factor does not fit the model as well as the other items. However, since this study is utilizing a scale that has been previously validated in the literature by Bedford (2015), the items were not eliminated.

The results are presented below in Table 6.

Table 6

Confirmatory Factor Analysis Component Matrix

Factor Loadings	1	2	3	4	5	6
Factor 1: Diagnostic Controls						
To what extent does the top management team use budgets and performance measures to:						
Identify critical performance variables (i.e. factors that indicate achievement of current strategy)	0.785					
Set targets for critical performance variables	0.827					
Monitor progress toward critical performance targets	0.865					
Provide information to correct deviations from preset performance targets	0.751					
Review key areas of performance	0.853					
Factor 2: Interactive Controls						
Provide a recurring and frequent agenda for top management activities		0.587				
Provide a recurring and frequent agenda for employee activities		0.843				
Enable continual challenge and debate of underlying data, assumptions and action plans with employees and peers		0.66				
Focus attention on strategic uncertainties (i.e. factors that may invalidate current strategy or provide opportunities for new strategic initiatives)		0.677				
Encourage and facilitate dialog and information sharing with employees		0.652				
Factor 3: Boundary Controls						
Indicate the extent the statement below is present at your organization:						
Are codes of conduct or similar statements relied upon to define appropriate behavior?			0.785			
Are there policies or guidelines that stipulate specific areas for, or limits on, opportunity search and experimentation?			0.773			
Does top management actively communicate risks and activities to be avoided by employees?			0.788			
Are actions taken to address employees who engage in risks and activities outside organizational policy, irrespective of the outcome?			0.752			

Factor 4: Belief Controls			
Are the values, purpose and direction of the bank codified in formal documents? (e.g. mission/value statements, credos, statements of purpose?)	0.826		
Does top management actively communicate core values to employees?	0.748		
Are formal statements of values used to create commitment to the long-term vision of top management?	0.74		
Are formal statements of values used to motivate and guide subordinates in searching for new opportunities?	0.688		
Factor 5: Exploration Innovation Mode			
Indicate the emphasis your organization places on the following strategic priorities relative to your competitors:			
Being first to market with new products/services		0.826	
Developing new generation product/service capabilities		0.78	
Frequent new product/service introductions		0.772	
Experimenting with new products/services		0.722	
Opening new product/service markets		0.695	
Factor 6: Exploitation Innovation Mode			
Indicate the emphasis your organization places on the following strategic priorities relative to your competitors:			
Improving quality of existing products/services			0.619
Frequent, but incremental, modifications to existing products/services			0.539
Improving efficiency in the provision of existing products/services			0.435
Increasing economies of scale in existing product/service markets			0.222

With regard to sample size in confirmatory factor analysis, MacCallum (1999) advocates that with small sample sizes, all items should have communalities of over 0.60 to justify the small sample size. The results presented below in Table 7 show that all items in this study have communalities greater than 0.60, supporting the justification of the smaller sample size factor analysis.

Table 7

Confirmatory Factor Analysis: Communalities

	Initial	Extraction		Initial	Extraction
Diagnostic1_1	1.000	0.823	Boundary1_1	1.000	0.718
Diagnostic2_1	1.000	0.818	Boundary2_1	1.000	0.752
Diagnostic3_1	1.000	0.814	Boundary3_1	1.000	0.776
Diagnostic4_1	1.000	0.737	Boundary4_1	1.000	0.73
Diagnostic5_1	1.000	0.791	Explore - EE2_1	1.000	0.766
Interactive1_1	1.000	0.706	Explore - EE3_1	1.000	0.73
Interactive2_1	1.000	0.801	Explore - EE4_1	1.000	0.709
Interactive3_1	1.000	0.729	Explore - EE5_1	1.000	0.72
Interactive4_1	1.000	0.728	Explore - EE9_1	1.000	0.603
Interactive5_1	1.000	0.762	Exploit - EE6_1	1.000	0.774
Belief1_1	1.000	0.8	Exploit - EE7_1	1.000	0.723
Belief2_1	1.000	0.809	Exploit - EE8_1	1.000	0.723
Belief3_1	1.000	0.819	Exploit - EE10_1	1.000	0.618
Belief4_1	1.000	0.826			

Statistical Analysis

The results of the statistical analysis are reported in Table 8 – Table 14 below. Hypothesis 1 states that banks operating in EXPLOIT mode that place an emphasis on diagnostic management control systems (DIAG) will have higher performance. The regression results display a p-value that is significant at the $p < .05$ (two-tailed) level for the interaction term for the interaction of EXPLOIT and DIAG, a positive coefficient and a confidence interval that does not overlap zero. The results indicate that banks operating in Exploitation Innovation Mode have higher performance when emphasis is placed on diagnostic control systems within the management control systems structure of the organization. Therefore, Hypothesis 1 is supported.

Table 8

Model 1 Regression Results

	Coefficient	t-statistic	p value	95% Confidence Interval	
Exploit	-6.228617	-2.39	0.019	-11.397030	-1.060201
DIAG	-8.5438	-3.64	0.000	-13.205910	-3.881686
Interaction_EXPLOIT_DIAG	**1.429028**	**2.61**	**0.011**	**0.340266**	**2.517789**
AGE	-0.0412097	-1.29	0.201	-0.104695	0.022275
Constant	106.724200	11.51	0.000	88.315790	125.132600
R-squared	0.1377				

Hypothesis 2 states that banks operating in EXPLOIT mode that place an emphasis on boundary systems (BOUND) will have higher performance (PERF). The regression results for H2 did not contain any statistically significant findings. Therefore, Hypothesis 2 is not supported.

Hypothesis 3 states that banks operating in EXPLORE mode that place an emphasis on interactive management control systems (INT) will have higher performance. The regression results reveal a p-value that is significant at the $p < .05$ (two-tailed) level for the interaction term for the interaction of EXPLORE and INT, a positive coefficient and a confidence interval that does not overlap zero. The results indicate that banks operating in Exploration Innovation Mode (EXPLORE) have higher performance when they are emphasizing Diagnostic Control Systems (DIAG) within the management control systems structure of the organization. Therefore, Hypothesis 3 is supported.

Table 9

Model 3 Regression Results

	Coefficient	t-statistic	p value	95% Confidence Interval	
EXPLORE	-6.628167	-2.55	0.021	-11.786190	-1.470145
INT	-5.793137	-0.245	0.016	-10.490850	-1.095421
Interaction_EXPLORE_INT	**1.486803**	**2.37**	**0.020**	**0.239297**	**2.734309**
AGE	-0.0321267	-0.99	0.325	-0.096610	0.032357
Constant	92.677380	10.28	0.000	74.778440	110.576300
R-squared	0.0894				

Hypothesis 4 states that banks operating in EXPLORE mode that place an emphasis on Belief Systems (BELIEF) will have higher performance (PERF). The regression results for H2 contained statistically significant results at the $p < .05$ level with 95% confidence for the BELIEF variable. The findings provide evidence that BELIEF plays a more important role in improving bank efficiency (PERF) than the other variables. While this finding that BELIEF has a statistically significant relationship with PERF is interesting to note, the other variables in the model did not have statistical significance. Therefore, Hypothesis 4 is not supported.

Table 10

Model 4 Regression Results

	Coefficient	t-statistic	p value	95% Confidence Interval	
EXPLORE	-3.320848	-1.38	0.172	-8.109399	1.467704
BELIEF	**-4.2175**	**-2.3**	**0.024**	**-7.855776**	**-0.579225**
Interaction_EXPLORE_BELIEF	0.8384927	1.57	0.119	-0.218442	1.895427
AGE	-0.0437611	0.03306	0.189	-0.109402	0.021880
Constant	85.710110	11.21	0.000	70.536300	100.883900
R-squared	0.0950				

Hypotheses 5 and 6 hypothesize on the association of emphasis on two compatible control systems as moderated by innovation mode. Specifically, Hypothesis 5 states that banks operating in EXPLOIT mode will have higher performance when emphasis on Diagnostic Control Systems (DIAG) is associated with emphasis on Boundary Control Systems (BOUND). The results presented in Table 11 contain statistically significant results for the interaction between Diagnostic Control Systems (DIAG) and Boundary Controls (BOUND) for banks operating in exploitation mode (EXPLOIT) at the $p < .01$ level with 95% confidence. This provides evidence that banks operating in EXPLOIT mode that place simultaneous emphasis on DIAG and BOUND have higher PERF than other banks. Therefore, H5 is supported.

Table 11

Model 5 Regression Results

	Coefficient	t-statistic	p value	95% Confidence Interval	
Constant	104.257400	7.42	0.000	76.362990	132.151900
EXPLOIT	-1.798346	-1.02	0.312	-5.314374	1.717682
BOUND	-3.371053	-1.62	0.108	-7.496599	0.754492
DIAG	-5.380876	-3.11	0.002	-8.811235	-1.950516
Interact_EXPLOIT_BOUND_DIAG	**0.1361717**	**1.96**	**0.053**	**-0.001660**	**0.274003**
AGE	-0.0405519	-1.41	0.163	-0.097798	0.016694
R-squared	0.1330				

Hypothesis 6 states that banks operating in Exploration Innovation Mode (EXPLORE) will have higher performance when emphasis on Interactive Control Systems (INT) is associated with emphasis on Belief Control Systems (BELIEF). It is important to note that both Pearson's correlation table and Spearman's Rho indicate a high correlation ($r = .7$; significant at the $p < .01$ level) between INT and BELIEF. This indicates the need for further investigation of the effects of collinearity. This was investigated by running the Variance Inflation Factor (VIF) command in Stata to assess the effect on the model. The VIF values for all variables are below 10. This indicates that the correlation between INT and BELIEF does not negatively affect the regression model results (Neter et al., 2004). The results presented in Table 12 contain statistically significant results for the interaction term for Exploitation Innovation Mode (EXPLOIT), Boundary Controls (BOUND), and Belief Controls (BELIEF) at the $p < .01$ level with 95% confidence and for the BELIEF. This means that banks operating in EXPLOIT mode that place

emphasis on BOUND associated with emphasis on BELIEF have higher PERF than other banks. Therefore, H6 is supported.

Table 12

Model 6 Regression Results

	Coefficient	t-statistic	p value	95% Confidence Interval	
Constant	86.875100	11.35	0.000	71.679420	102.070800
EXPLORE	-2.005797	-1.35	0.181	-4.963715	0.952121
BELIEF	-3.232222	-2.87	0.005	-5.470579	-0.993865
INT	-1.436515	-0.92	0.359	-4.529114	1.656084
Interact_EXPLORE_BELIEF_INT	**0.1142277**	**2.21**	**0.03**	**0.011572**	**0.216884**
AGE	-0.0338908	-1.11	0.272	-0.094780	0.026999
R-squared	0.1206				

Hypotheses 7 and 8 hypothesize on banks operating in Ambidexterity Innovation Mode (AMBIDEX), meaning that they score high simultaneously in Exploration Mode (EXPLORE) and Exploitation Mode (EXPLOIT). Specifically, Hypothesis 7 states that banks operating in Ambidexterity Innovation Mode (AMBIDEX) will have higher performance when emphasis on Diagnostic Control Systems (DIAG) is associated with emphasis with emphasis on Interactive Control Systems (INT). The results presented in Table 13 contain statistically significant results at the $p < .05$ level with 95% confidence and for the interaction term for Ambidexterity Innovation Mode (AMBIDEX), Diagnostic Controls (DIAG), and Interactive Controls (INT) at the $p < .05$ level with 95% confidence. These results indicate that banks operating as AMBIDEX

that place emphasis on DIAG associated with emphasis on INT have higher performance than other banks in the sample. Therefore, H7 is supported.

Table 13

Model 7 Regression Results

	Coefficient	t-statistic	p value	95% Confidence Interval	
AMBIDEX	-2.768109	-2.29	0.024	-5.166437	-0.369782
DIAG	-4.842673	-3.64	0.000	-7.487173	-2.198173
INT	-2.863637	-1.67	0.098	-6.264290	0.537016
Interact_AMBIDEX_DIAG_INT	**0.153338**	**2.53**	**0.013**	**0.032784**	**0.273892**
AGE	-0.321071	-1	0.322	-0.096164	0.031950
Constant	101.183800	12.79	0.000	85.478850	116.888700
R-squared	0.1478				

Hypothesis 8 states that banks operating in Ambidexterity Innovation Mode (AMBIDEX) will have higher performance when emphasis on Belief Control Systems (BELIEF) is associated with Boundary Control Systems (BOUND). The results presented in Table 14 contain statistically significant results for Belief Controls (BELIEF) at the $p < .05$ level with 95% confidence and for the BELIEF variable. This is an interesting result. However, H8 is not supported because the other variables are not statistically significant.

Table 14

Model 8 Regression Results

	Coefficient	t-statistic	p value	95% Confidence Interval	
AMBIDEX	-1.073086	-0.7	0.483	-4.100867	1.954695
BELIEF	**-3.30661**	**-2.43**	**0.017**	**-6.009972**	**-0.603248**
BOUND	-1.279412	-0.83	0.411	-4.355956	1.797132
Interact_AMBIDEX_BEL_BOUN	0.0884226	1.43	0.157	-0.034503	0.211349
AGE	-0.0469695	-1.41	0.161	-0.112966	0.019028
Constant	86.165860	9.15	0.000	67.475890	104.855800
R-squared	0.0933				

The regression results for H9, which hypothesized that the imbalance between DIAG and INT would have a negative effect on the bank efficiency ratio (PERF) and H10, which hypothesized that the imbalance between BOUND and BELIEF would have a negative effect on bank efficiency ratio (PERF) did not contain statistically significant findings. Therefore, H9 and H10 are not supported.

Robustness Testing

Robustness testing was performed to control for the potential of measurement errors by bifurcating the dependent variable into an indicator variable where 1 is above the median and zero is below the median. A probit regression model was utilized to analyze the data containing a binary dependent variable. The robustness test reproduced the results of the original test for H1 and H3. The results are displayed in Table 15 and Table 16 below.

Table 15

Model 1 Robustness Testing: Binary Dependent Variable Bank Efficiency Ratio

	Coefficient	t-statistic	p value	95% Confidence Interval	
Exploit	-1.090511	-2.78	0.005	-1.859077	-0.321945
DIAG	-0.9786374	-2.5	0.012	-1.745639	-0.211636
Interaction_EXPLOIT_DIAG	**0.1785042**	**2**	**0.045**	**0.003600**	**0.353408**
AGE	-0.0030038	-0.79	0.43	-0.010462	0.004455
Constant	4.652140	2.59	0.010	1.135248	8.215180
Pseudo R-squared	0.0519				

Table 16

Model 3 Robustness Testing: Binary Dependent Variable Bank Efficiency Ratio

	Coefficient	t-statistic	p value	95% Confidence Interval	
EXPLORE	-1.090511	-2.78	0.005	-1.859077	-0.321945
INT	-0.8534907	-2.53	0.011	-1.151362	-0.193366
Interaction_EXPLORE_INT	**0.2373445**	**2.73**	**0.006**	**0.067002**	**0.407687**
AGE	-0.0014161	-0.37	0.711	-0.008896	0.006064
Constant	3.887401	2.89	0.004	1.248004	6.526797
Psuedo R-squared	0.0634				

Additional robustness testing was performed using ROA as measure of bank performance (PERF) instead of Bank Efficiency Ratio. The robustness test using a different proxy for PERF

reproduced support for H1, H3, H5, and H6. The results are presented below in Table 17 – Table 20.

Table 17

Model 1Robustness Testing: Dependent Variable ROA

	Coefficient	t-statistic	p value	95% Confidence Interval	
Constant	-0.295500	-0.49	0.628	-1.503989	0.912989
EXPLOIT	0.1877612	1.23	0.222	-0.115460	0.490982
DIAG	0.3135511	-1.8	0.075	0.056719	0.570383
Interaction_EXPLOIT_DIAG	**-0.0527132**	**-1.8**	**0.075**	**-0.110930**	**0.005503**
AGE	0.0019761	1.6	0.114	-0.000480	0.004433
R-squared	0.1146				

Table 18

Model 3 Robustness Testing: Dependent Variable ROA

	Coefficient	t-statistic	p value	95% Confidence Interval	
Constant	0.3356211	0.42224	0.79	-0.502627	1.173869
EXPLORE	0.1716913	0.12298	0.166	-0.0724551	0.4158378
INT	0.1604368	0.10591	0.133	-0.049824	0.3706977
Interaction_EXPLORE_INT	**-0.04427**	**0.02748**	**0.109**	**-0.0989855**	**0.0101315**
AGE	0.0017922	0.00131	0.175	-0.0008117	0.0043961
R-squared	0.0645				

Table 19

Model 5 Robustness Testing: Dependent Variable ROA

	Coefficient	t-statistic	p value	95% Confidence Interval	
Constant	-0.499584	-0.83	0.409	-1.695085	0.695918
EXPLOIT	0.0684845	0.9	0.369	-0.082206	0.219175
BOUND	0.152596	1.71	0.09	-0.024217	0.329409
DIAG	0.2336324	3.16	0.002	0.086614	0.380651
EXPLOIT_BOUND_DIAG	**-0.0067744**	**-2.28**	**0.025**	**-0.012682**	**-0.000867**
AGE	0.0017765	1.44	0.154	-0.000677	0.004230
R-squared	0.1363				

Table 20

Model 6 Robustness Testing: Dependent Variable ROA

	Coefficient	t-statistic	p value	95% Confidence Interval	
Constant	0.437516	1.31	0.195	-0.228149	1.103182
EXPLORE	0.0504869	0.77	0.441	-0.079088	0.180062
BELIEF	0.0962178	1.95	0.054	-0.001836	0.194272
INT	0.0500413	0.73	0.465	-0.085434	0.185516
EXPLORE_BELIEF_INT	**-0.0041014**	**-1.81**	**0.073**	**-0.008598**	**0.000396**
AGE	0.001677	1.31	0.195	-0.000990	0.004344
R-squared	0.1327				

Chapter 6: Discussion

Contribution

One of the goals of this research study is to connect an industry problem to the academic literature to examine possible factors that contribute to the problem. This research study has identified an important association between constructs currently being assessed in industry surveys, and constructs developed through theory in the academic literature and connected them with community banking in response to the national call for research on community financial institutions. The problem identified in industry, which was validated by deriving constructs from recent industry surveys (West Monroe, 2019), is that U.S. community banks are making significant investments in technology that are not resulting in the expected improvements in bank efficiency. This study connects the industry problem to Simons Levers of Control Theory (Simons, 1995b) and Bedford's work on the interplay of management control systems and organizational innovation mode (2015), which have been shown to have a direct impact on the innovative capabilities of organizations (Chenhall et al., 2011).

The findings of this research study contribute to management accounting literature examining the role of management controls in innovation settings, as well as to practice. For contribution to the literature, the findings of this research mimic some of the findings of Bedford's (2015) study utilizing the same survey instrument with firms from multiple industries. Bedford's work found support for H1, H2, H3, H7, and H9. As explained in the preceding paragraph, the findings of this research study provide support for H1, H3, H5, H6, and H7 along with interesting statistical significance on certain variables in the results for H4 and H8.

The results of this study suggest that U.S. community banks operating in exploitation innovation mode that emphasize diagnostic management controls have higher efficiency ratio than peer banks, as hypothesized in H1. Diagnostic management controls are feedback systems that include the use of performance measures, the balanced scorecard (Kaplan & Norton, 2005), budgets, goals, and metrics to monitor and evaluate the progression toward strategic goals. Turner and Makhija note that role of diagnostic controls can be considered restrictive to the innovation process due to the quantitative measurement of performance (2006). However Kaplan and Norton identify the utilization of diagnostic controls to act as reassurance for managers when decisioning innovation opportunities because it provides a method to evaluate the innovation projects to identify a flight from strategic objectives (2005). These arguments support the reason for hypothesizing that exploitative innovation would be a moderating variable for the effect of diagnostic management controls on bank efficiency. The results of this study suggest that banks operating in EXPLOIT mode should emphasize the use of the balanced scorecard, budgets, goals, and metrics to monitor the progression of strategic goals to increase bank efficiency. This is consistent with Bedford's (2015) findings.

The support for H3 provides evidence that U.S. community banks operating in exploration innovation mode that emphasize interactive management control systems have higher performance. The findings build upon the previous findings in the literature. Interactive management controls are considered a supportive control lever to innovation and include tools such as interactive budgets that allow real-time editing capabilities for employees at all levels of the bank. Additionally, interactive controls are characterized by frequent communication from the highest levels of management to the front line and vice versa so that leaders can make informed decisions around strategic opportunities. This is possibly the most substantial finding

in this research study. Simons emphasizes the importance of the proper utilization of interactive control systems for firms that are dependent on technology and firms that are incur a high degree of government regulation (Simons, 1995b). These are both environmental dynamics that U.S. community banks are currently facing. The attributes of interactive controls provide banks with 'intelligence systems' that can be utilized for understanding and possibly influencing the complex political and technological environment that U.S. community banks must endure to remain relevant.

The support for H5 suggests that U.S. community banks operating in exploitation innovation mode that are simultaneously emphasizing diagnostic controls and boundary systems have higher performance than peer banks. These findings build upon previous findings in the literature. Diagnostic controls include the use of regular performance measures against targets and frequent formal meetings to discuss remediate deviations from targets. Boundary systems constrain the opportunities explored by employees through formal rules restricting certain behaviors. Diagnostic controls and boundary systems compliment each other in a firm because diagnostic controls encourage employees to search for new opportunities to meet targets, while boundary systems provide boundaries for actions (Simons, 2000). Banks that have diagnostic controls and boundary systems acting in tandem create an environment that encourages employees to explore opportunities to maximize internal capabilities while remaining within the boundaries of regulatory oversight, leading to higher performance.

The support for H6 provides evidence that U.S. community banks operating in exploration innovation mode that simultaneously emphasize interactive controls and belief systems have higher performance than peer banks. Interactive controls require frequent real-time communication among employees at all levels of the organization. Tools such as interactive

budgets support this process. Belief systems provide employees with direction and purpose in every action through communication of the mission, vision and values of the organization. Belief systems compliment interactive controls in explorative firms as emergent opportunities are explored by employees (Simons, 2000). Therefore, the results of this study suggest that U.S. community banks that are externally innovative, entering new markets, and developing new products and services are more likely to have higher performance when the belief systems of the bank are emphasized simultaneously with the use of powerful diagnostic control tools such as interactive budgets.

The statistically significant results for H7 suggest that U.S. community banks operating in ambidexterity innovation mode that place simultaneous emphasis on diagnostic controls and interactive controls have higher performance than peer banks. Firms operating in the dynamic tension of ambidexterity mode benefit from the interaction of diagnostic and interactive controls to motivate employees within the firm to seek new and different methods of operating (Simons, 2000). Therefore, the results provide evidence that ambidextrous banks that place simultaneous emphasis on diagnostic controls such as the balanced scorecard, and interactive controls such as interactive budgets, will have higher performance than peers.

Due to the relatively small size of community banks, as well as the nature of the community banking business model, U.S. community banks should be capable of strategically emphasizing interactive controls. However, as the descriptive statistics reveal, interactive controls have the lowest mean of the four control levers. This is an interesting finding. It offers the potential for further investigation for the identification a possible opportunity for industry education and consulting.

The results presented in this paper respond to the national call for research specific to the community banking sector. As U.S. community banks face increased competition and rapid technological developments that require innovation to remain competitive (Dobbeck, 2022), they are simultaneously burdened with overwhelming regulatory oversight (*Agencies That Set or Enforce Rules Applicable to Kentucky Bancshares, Inc.*, 2019). In order to remain competitive, community banks must be innovative (Crossan & Apaydin, 2010) and efficient (Hays et al., 2009).

Much of the current research and discussion among community banking leaders focuses on secondary data and the impact of regulatory oversight on bank performance. There is a need for more research and attention to innovative thinking and innovative culture in the community banking sector. This research study aims to contribute to the gap in both research and industry discussion to assist U.S. community banks in increasing the impact of technology investments on bank efficiency. U.S. community banks in practice can utilize the findings in this study to assess the applicability of these results to their individual institutions.

During the industry expert interviews, feedback was shared that the act of responding to this the survey leads the manager to assess the use of different management control systems that are currently utilized within the institution. One industry expert commented that he identified multiple opportunities for improvement within his institution as he considered answers to the questions presented in the survey. If the results of this research study are shared at industry conferences, not only will the results be beneficial to practitioners, but the discussion and consideration of each of the items included in the scale will assist practitioners in identifying opportunities for improvement in diagnostic, interactive, boundary and belief control systems as well as the innovation mode of the institution.

Study Limitations

Criticisms of Simons Levers of Control Theory claim that there is ambiguity in the definitions of the controls causing difficulty in building a coherent body of knowledge (Tessier & Otley, 2012). This is outside the scope of the current study and will be addressed in future research that will increase the value of this study as the literature evolves. More specifically, the balance of the levers of control is an important and developing area of study that continues to evolve in the literature (Kruis et al., 2016). This study focuses on its unique contribution to the stream of literature supporting Simons Levers of Control theory. The limitations mentioned above will continue to be addressed as the literature evolves outside the scope of this study. The value of this study will be improved as the understanding of balance of controls and the definitions of controls evolves in the literature over time.

This study utilized the bank efficiency ratio as a proxy for bank efficiency performance. Koch (2014) explains that one criticism of the bank efficiency ratio is that it does not consider future return on investment. Banks that make an investment in technology this year may negatively impact efficiency due to the expense of the technology, but after the technology is implemented and adopted by users, the efficiency will improve over time as a result of the investment (Koch, 2014). For this reason, this study averages the bank efficiency ratio over a period of three years instead of utilizing the ratio at one point in time.

This study utilized convenience sampling. The results may not be indicative of the general population of community banks in the U.S. However, the use of convenience sampling was justified in this study because it was the only way to access the population. Due to the nature of the community banking industry, it is possible that this convenience sample is in fact representative of the general population of community banks in the U.S. (Schindler, 2022).

One of the limitations of this study is the low number of viable control variables. While data was collected for multiple control variables, the data set for all control variables except bank age (AGE) violated the assumption of normal distribution of data for regression analysis and had to be removed from the research study. Future research in community banking should consider this issue in the research design process to ensure sufficient control variables are included in the regression model.

An additional limitation of the study is that the survey utilizes the responses of one senior level manager from each bank. The perception of one employee does not necessarily represent the actions of the firm accurately. While many other research studies with substantial literature contributions have conducted surveys of similar structure (Hermawan et al., 2021), future studies could improve upon this limitation by conducting case studies that survey multiple employees from each bank. This would allow for additional probing for information to allow for a deeper understanding of the complexities of the implementation of management control systems within the organization (Schindler, 2022).

In the data collection process of this research study, data was collected to include three control variables in the analysis: bank location, bank size, and bank age. The data collected for bank location and bank size did not meet the requirements of normality and therefore were unable to be included in the parametric testing. For this reason, the regression analysis only contained one control variable. The results would have been improved and possibly included a greater number of supported hypotheses if additional control variables were included in the regression analyses. Future research in community banking should consider this issue in the research design process to ensure sufficient control variables are included if regression analysis will be conducted.

Future Research

This research study has identified an important association between constructs currently being assessed in industry surveys, and constructs developed through theory in the academic literature and connected them with community banking in response to the national call for research on community financial institutions. The findings in this study provide evidence that U.S. community banks operating in exploitation innovation mode that emphasize diagnostic management controls have higher performance than peer banks. Additionally, the findings indicate that U.S. community banks operating in exploration innovation mode that emphasize interactive management controls have higher efficiency performance than peer banks. Further findings indicate that banks operating in exploitation mode that have associated simultaneous emphasis on diagnostic controls and boundary systems have higher performance than peer banks, while banks operating in exploration innovation mode that place associated simultaneous emphasis on interactive controls and belief systems have higher performance than peers. Additionally, the findings indicate that the banks in this study operating in ambidextrous innovation mode that place simultaneous emphasis on diagnostic and interactive controls have higher performance than peers. These findings are consistent with the existing literature (Bedford, 2015; Sakka et al., 2013).

The other hypotheses in this study that were not fully supported should continue to be explored in research to identify factors that could further contribute to practitioner understanding of the use of management control levers and contribute to the academic body of knowledge. This research study did not find statistically significant results to fully support H2 and H4 that involved individual levers, H8 that involved associated control levers, or H9 and H10 that

involved balanced control levers and ambidextrous innovation modes. This could be due to the specialized nature of U.S. community banks, and should be further explored.

As the research and theory development in management control systems and innovation continues to evolve in the literature (Alharbi et al., 2023; Barros & Ferreira, 2022, 2023; Bernd & Beuren, 2022; Berraies et al., 2021; Kruis et al., 2016), there are opportunities to conduct a deeper examination of community bank innovation and efficiency to improve the understanding on the more complex levels of associated and balanced levers and their moderation by organizational innovation mode.

This research study utilized multiple regression analysis to analyze the relationships between the dependent and independent variables. Previous studies using this survey instrument have utilized cluster analysis with ordinary least squares regression. Future studies could explore alternative data analysis techniques, including structural equation modeling if a larger sample could be obtained.

This research study adapted the previously validated survey to delete the subjective and somewhat ambiguous measurement of firm performance and replaced it with objective secondary data that can be compared across multiple studies. While this adaptation somewhat weakens the connection between previous findings and the findings in this research study, it will strengthen the power of comparison between this research study and future studies.

This research study was the first to investigate the role of management control systems and innovation mode on bank efficiency performance in U.S. community banks. It would be valuable to continue this study using mixed methods qualitative research (Schindler, 2022). Specifically, bank case studies like Barros et al. (Barros & Ferreira, 2023) on the in-depth use of management control systems within one U.S. community bank, particularly an innovative bank

with success at efficiently implementing technology, would provide a deeper investigation into the use of MCS in community banking.

The results of this study suggest that U.S. community banks operating in exploitation innovation mode that place an emphasis on interactive management control systems have higher efficiency performance than peer banks. This finding is important because interactive control systems have a substantial influence in organizations heavily dependent on technology utilized within the organization, with a high degree of government regulation. Especially for organizations with high levels of regulation, interactive controls can be utilized as 'intelligence systems' to gather data and understand and influence the complex social, political and technological environment their business operates in (Simons, 1994b). For these reasons, there is significant opportunity to utilize mixed methods qualitative research to examine the use of interactive control systems in U.S. community banks.

The results of this study suggest that belief systems play a more important role in improving bank efficiency than interactive management controls. This is an important finding to note because prior research indicates that effective implementation of belief systems is positively associated with management performance, regardless of the influence of the other three levers of control (Hermawan et al., 2021). Belief systems are so powerful that it could be beneficial to use research to independently examine the role of belief systems in U.S. community banks.

Additionally, there is significant opportunity to examine the situated rationalities within community banks to determine how management control practices are used in tandem with innovation (Barros & Ferreira, 2023). A deeper investigation that could be valuable to the issues that U.S. community banks face is the impact of transformational leadership on organizational innovation through management controls systems (Alharbi et al., 2023).

Chapter 7: Conclusions

The purpose of this research study was to examine whether effective alignment of management controls, which provides a more supportive path for strategy implementation, provides resolve for community banks in achieving improved efficiency in different modes of innovation. The specific research question explored in this study is:

> Do U.S. community banks that align management control system emphasis appropriately with the innovation mode of the bank achieve greater efficiency?

Simons Levers of Control Theory (Simons, 1994b) provides the framework to examine the use of management controls in different modes of innovation through a previously utilized scale (Bedford, 2015). Simons' (1995) constructs of management control are defined as four levers of control – diagnostic, interactive, boundary, and belief; and the innovation of the firm is defined by two modes of innovation—exploitation and exploration.

The efficiency performance of the bank is measured by the industry standard bank efficiency ratio (Koch, 2014), as recommended by previous research that suggests that the bank efficiency ratio is heavily impacted by management controls implemented by senior managers and directors (Hays et al., 2009). The Bank Efficiency Ratio is calculated by dividing non-interest expense by net revenues. The bank performance data was extracted from the Federal Financial Institutions Examination Council (FFIEC) central data repository of financial data and institution characteristics collected by the Federal Reserve System.

The control variables chosen to be utilized in the study are bank age, bank location, and bank size. With regard to bank age, Hannan and Freeman suggest that older firms are more likely to perform higher than younger firms (1989), and Jansens findings that suggest that younger banks will have higher performance in explorative innovation mode while older banks

will have higher performance in exploitation innovation mode (2006). Bank location was chosen as a control variable because banks located within the communities they serve have a competitive advantage due to superior knowledge of the local loan market (Hays et al., 2009). Bank size was selected as a control variable because organizational size has been found to be the best predictor of both explorative and exploitative organizations, with larger organizations found to be the most effective in adoption of technological innovation (Kimberly & Evanisko, 1981).

The theory-based hypotheses predicted that banks operating in exploitation innovation mode while emphasizing diagnostic control levers or boundary control levers would have higher performance (H1 and H2); that banks operating in exploration innovation mode while emphasizing interactive control levers or belief control levers will have higher performance (H3 and H4); that banks operating in exploitation innovation mode while emphasizing on diagnostic control levers is associated with boundary control levers will have higher performance (H5); that banks operating in exploration mode while emphasizing interactive control levers is associated with belief control levers will have higher performance (H6); that banks operating in both exploitation and exploration mode simultaneously, referred to as ambidexterity mode will have higher performance when emphasis on diagnostic control levers is associated with interactive control levers; that banks operating ambidexterity mode will have higher performance emphasis on boundary control levers is associated with belief control levers (H7 and H8); that banks operating in ambidexterity mode will have decreased performance when emphasis on diagnostic control levers is not balanced with emphasis on interactive control levers (H9); and that banks operating in ambidexterity mode will have decreased performance when emphasis on boundary control levers is not balanced with belief control levers (H10).

The survey instrument utilized in this study was selected after identification of constructs based on the West Monroe national bank survey data (West Monroe, 2019) as well as a careful review of constructs presented in management accounting survey research (Bedford & Speklé, 2018b). Data was collected via a previously validated survey instrument (Bedford, 2015). The instrument can be utilized to measure the innovation operation mode as well as the utilization of management control levers in community banks effectively and reliably. The survey instrument utilized in this research study is included as Appendix C.

Due to the difficulties presented in accessing a sample of banks in a highly regulated industry sector, data was collected by administering a survey to two convenience samples of community bank senior managers (Schindler, 2022). After a thorough data cleaning process, the study was conducted with n = 100 observations.

The data was analyzed utilizing a robust process to ensure reliability and validity of the results. The analysis process initiated with data normality testing to ensure it was appropriate for parametric testing. Both visual inspection methods including histogram, boxplot, and Q-Q Plot, as well as statistical tests including the Kolmogorov-Smirnov test and the Shapiro-Wilk test were utilized to assess data normality. All primary variables (DIAG, INT, BOUND, BELIEF, EXPLOIT, EXLORE) passed at least three of the data normality tests. Bank efficiency ratio (PERF) data was found to be non-normal with outliers. Winsorization was performed to remediate outliers and the bank efficiency ratio was then within the parameters of normally distributed data. The control variables bank size and bank location were both severely skewed unable to be remediated. The measures of central tendency do not support using either of these variables. Therefore, the two control variables bank size and bank location were eliminated from the study.

Reliability testing was conducted to ensure the survey instrument measures the intended elements consistently (Tavakol & Dennick, 2011). Cronbach's alpha test was utilized to assess scale measurement items. Five items measuring diagnostic controls (DIAG), five items measuring interactive controls, four items measuring belief controls (BELIEF), four items measuring boundary controls (BOUND), five items measuring exploration innovation mode (EXPLORE), and four items measuring exploitation innovation mode (EXPLOIT) were assessed using Cronbach's alpha. All measurement scales presented an alpha score well above the recommended $\alpha = 0.7$ threshold. The results are presented in Table 1.

The descriptive statistics of the data were then analyzed to summarize the data collected. The descriptive statistics reveal that the banks sampled are placing a heavier emphasis on Diagnostic Control Systems (DIAG) than any of the other levers of control ($M = 5.23$; $SD = 1.21$). Further, the banks surveyed are operating at a higher level of Exploitative Innovation ($M = 4.49$, $SD = 1.14$) than EXPLORATIVE Innovation ($M = 3.6$; $SD = 1.14$). The average bank size of the respondents was $1.3 Billion ($M = 1,302,321,000$; $SD = 2,208,373,403$). The average age of the banks responding to the survey is 93 ($M = 93.96$; $SD = 35.47$).

The correlation of the data was analyzed using a Pearson correlation matrix, presented in Table 4. There were only four instances in which the correlation coefficient is above 0.7 and statistically significant: ROA/ROE ($r = 0.7573$; significant at the p , .01 level), ROA/EFFICIENCY ($r = -0.7679$, significant at the $p < .01$ level), EXPLORE/EXPLOIT ($r = 0.07$; significant at the $p < .01$ level), and BELIEF/INT ($r = 0.7142$; significant at the $p < .01$ level). Each of the instances was explained by the nature of the variables and not considered a hinderance to proceeding with the preparation of data for analysis.

The correlation matrix reveals that Bank Efficiency Ratio (EFFICIENCY) is negatively correlated with every variable, which is expected because a lower bank efficiency ratio means better performance. For the other two bank performance measures, ROA and ROE, a higher value means higher performance. The highly negative correlation between EFFICIENCY and ROA ($r = -0.7679$) is consistent with bank research and theory in that a high efficiency ratio indicates that a bank has trouble controlling non-interest expense, which would have a similar and opposite impact on ROA (Kupiec & Lee, 2012). ROA and ROE are both measures of financial performance, so it is expected that these two variables will be highly correlated. Similarly, ROA and EFFICIENCY are measures of bank performance, so it is again expected that these two variables are highly negatively correlated. The data in this dataset is consistent with bank theory in that ROE and EFFICIENCY are less correlated than ROA and EFFICIENCY, confirming that bank efficiency is more correlated with return per dollar of assets than return per dollar of equity. The variables for interactive management controls (INT) and belief management controls (BELIEF) are highly correlated ($r = 0.7142$, significant at the $p < .01$ level). Due to this violation of assumption for regression analysis, caution was used in the testing and interpretation of H6 due to concerns of validity.

Confirmatory factor analysis was conducted instead of exploratory factor analysis since this study utilizes an established scale. Prior to conducting factor analysis, sampling adequacy was assessed using the Kaiser-Meyer-Olkin (KMO) measure to test the adequacy of the sample size (Shrestha, 2021). The KMO value for this sample is .889, well within the highest range of an adequate sample. Bartlett's Test of Sphericity was then utilized to confirm the data is not orthogonal, and whether the data is suitable for factor analysis. A value < 0.05 indicates that the data set is suitable for factor analysis (Shrestha, 2021). The Bartlett's Sphericity Test resulted in

a significance level of <.001, indicating the data is suitable for factor analysis. Values of the results are presented in Table 5.

Confirmatory Factor Analysis using Varimax rotation with Kaiser Normalization was performed to assess the data fit to the model. The factor loadings indicate that the data fits into six factors: Factor 1 – Diagnostic Controls; Factor 2 – Interactive Controls; Factor 3 – Boundary Controls; Factor 4 – Belief Controls; Factor 5 – Exploration Innovation Mode; and Factor 6 – Exploitation Innovation Mode. Each item loads onto the factor it was intended to measure. The results are presented in Table 6**,** with communalities presented in Table 7.

After completing all preliminary data operations, the regression analysis was conducted. Hypotheses 1, 3, 5, 6, and 7 were supported. Hypothesis 1 states that banks operating in EXPLOIT mode that place an emphasis on diagnostic management control systems (DIAG) will have higher performance. The regression results show a p-value that is significant at the $p < .05$ (two-tailed) level for the interaction term for the interaction of EXPLOIT and DIAG, a positive coefficient and a confidence interval that does not overlap zero ($\beta = 1.43$, $p = .011$, 95% CI [.034, 2.51]). The negative coefficient is expected for EXPLOIT and DIAG because the Bank Efficiency Ratio, used as a proxy for bank performance (PERF), indicates higher performance with a lower number. The results indicate that banks operating in Exploitation Innovation Mode (EXPLOIT) have higher performance when they emphasize diagnostic control systems (DIAG). The results are presented in Table 8.

Hypothesis 2 was not supported. However, hypothesis 3 was supported. Hypothesis 3 states that banks operating in EXPLORE mode that place an emphasis on interactive management control systems (INT) will have higher performance. The regression results reveal a p-value that is significant at the $p < .05$ (two-tailed) level for the interaction term for the

interaction of EXPLORE and INT, a positive coefficient and a confidence interval that does not overlap zero (β = 1.49, p = .020, 95% CI [.239, 2.73]). The results indicate that banks operating in Exploration Innovation Mode (EXPLORE) have higher performance when they are emphasizing Diagnostic Control Systems (DIAG) within the management control systems structure of the organization. The results are presented in Table 9. The support for H1 and H3 are consistent with findings in previous studies utilizing this scale in industries other than banking (Bedford, 2015), and contribute to the academic literature.

Hypothesis 4 was not supported. However, hypotheses 5 and 6 were supported. Hypothesis 5 states that banks operating in EXPLOIT mode that place an associated emphasis on diagnostic management controls (DIAG) and boundary systems (BOUND) will have higher performance than peers. The results are reported in Table 11. The regression results reveal a p-value that is statistically significant at the $p < .10$ (two-tailed) level for EXPLOIT, a positive coefficient, and a confidence interval that only slightly overlaps zero (β = 0.13, p = 1.96, 95% CI [-0.001660, 0.274003]).

Hypothesis 6 states that banks operating in EXPLORE mode that associate emphasis on interactive controls (INT) and belief systems (BELIEF) will have higher performance than peers. The results are reported in Table 12.The regression results reveal a p-value that is statistically significant at the $p < .01$ (two-tailed) level for EXPLOIT, a positive coefficient, and a confidence interval does not overlap zero (β = 0.11, p = 0.03, 95% CI [0.011572, 0.216884]).

Hypothesis 7 was supported, but hypotheses 8, 9, and 10 were not. Hypothesis 7 states that banks operating in AMBIDEX innovation mode that place an associated emphasis on diagnostic controls (DIAG) and interactive controls (INT) will have higher performance (PERF). The results are reported in Table 13. The regression results reveal a p-value that is statistically

significant at the $p < .05$ (two-tailed) level for the interaction term between AMBIDEX, DIAG and INT, a positive coefficient, and a confidence interval that does not overlap zero ($\beta = 0.153$, $p = 0.013$, 95% CI [0.032784, 0.273892]).

Although other hypotheses were not fully supported, interesting statistically significant results were noted in H4 and H8. The results are presented in Table 10 and Table 14. H4 states that banks operating in EXPLORE mode that place an emphasis on belief systems (BELIEF) will have higher efficiency performance (PERF). The results indicate that BELIEF plays a more important role in improving bank efficiency than INT. This is an important statistically significant finding to note because prior research indicates that effective implementation of belief systems is positively associated with management performance, regardless of the influence of the other three levers of control (Hermawan et al., 2021). Belief systems are so powerful that it could be beneficial to use research to specifically examine belief systems in U.S. community banks.

While the results for H8 do not provide evidence supporting the hypothesis, the statistical significance of belief systems (BELIEF) suggests that BELIEF plays a more important role in improving bank efficiency ratio than ambidexterity innovation mode (AMBIDEX), boundary systems (BOUND), or the interaction of ambidexterity innovation mode, boundary systems and belief systems (Interact_AMBIDEX_BELEIF_BOUND).

The results of this research study contribute to the academic literature by utilizing a survey instrument previously used to examine a wide range of industries and narrowing its use to the community banking sector of the U.S banking industry. The results of this study were not expected to perfectly mirror the results of previous research due to the uniqueness of the business environment of community banks. U.S. community banks face significant government regulatory

oversight as well as increased competition in the technology space that are unique to this sector. Therefore, the findings in this study are unique to community banks. This research study contributes to the literature by extending the Bedford (2105) study. The findings in this research study support Bedford's findings that firms operating in exploitation innovation mode that emphasize diagnostic management control systems have higher performance; and that firms operating in exploration innovation mode that emphasize interactive management control systems have higher performance.

This study also contributes to the literature by addressing the gap in the management control systems literature on the study of management control systems in banks.

Traditional financial ratios including Return on Assets (ROA) and Return on Equity (ROE) are the most common financial ratios used to measure firm performance in research studies. However, for the nature of this research study, a measure performance was needed that could provide insight into the efficiency of the organization. The bank efficiency ratio was developed as a measurement in a system of performance metrics used in banking to evaluate and compare the performance of banks (Hays et al., 2009). Financial institution regulatory agencies and other experts recognize the importance in monitoring bank efficiency and include the ratio in regulatory reporting requirements (Office of the Comptroller of the Currency, 2023). Efficiency ratios are heavily impacted by management controls implemented by senior managers and directors (Hays et al., 2009). In the robustness testing for this study, attempts were made to reproduce the results using other performance metrics. The results were not reproduced using either ROA or ROE. This, in addition to the correlation analysis of the variables, is an indication that efficiency ratio is more sensitive to changes in management control levers and innovation mode than ROA or ROE.

The industry implications that can be derived from the findings in this study can contribute to practitioner understating of the impact of management control system effectiveness in improving the bank efficiency ratio in U.S. community banks. Managers of community banks with a focus on internal innovation that are operating in exploitation mode may see increased efficiency performance by placing emphasis diagnostic management control systems. This can be accomplished by requiring clearly defined goals with quantitative measurements (Turner & Makhija, 2006). Diagnostic management control systems include feedback systems that involve the use of performance measures, such as the balanced scorecard (Kaplan & Norton, 2005). The use of diagnostic controls such as the balanced scorecard as a diagnostic management control tool in community banks have been found to benefit the community bank through mapping relationships from nonfinancial measures of performance, including employee education, internal operations processes, and customer focus to financial measures of performance and efficiency (Albright et al., 2009).

Additionally, managers operating community banks with a focus on external innovation, or operating in exploration mode, may realize an increase in bank efficiency performance by placing emphasis on interactive management control systems. This can be accomplished by ensuring frequent communication of information from the highest levels of management to the front line and vice versa. The key to emphasizing interactive controls is holding regular meetings across the organization that include informants from all levels of the organization so that knowledge is frequently communicated and incorporated into action plans (Simons, 1995b). The features of an organization's interactive control system should be determined by factors including the technology utilized within the organization, the degree of government regulation imposed upon the organization. Especially for organizations with high levels of regulation,

interactive controls can be utilized as ‘intelligence systems’ to gather data and understand and influence the complex social, political and technological environment their business operates in (Simons, 1994b).

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Appendix A: IRB Approval Letter

MARSHALL UNIVERSITY
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Office of Research Integrity
Institutional Review Board
One John Marshall Drive
Huntington, WV 25755

FWA 00002704

IRB1 #00002205
IRB2 #00003206

July 26, 2022

Timothy Bryan, DBA
Accounting and Legal Environment Department

RE: IRBNet ID# 1936340-1
At: Marshall University Institutional Review Board #2 (Social/Behavioral)

Dear Dr. Bryan:

Protocol Title: [1936340-1] Exploring Innovation Culture and Management Control Systems in U.S. Community Banks

Site Location: MUGC
Submission Type: New Project APPROVED
Review Type:

In accordance with 45CFR46.104(d)(2), the above study was granted Exempted approval today by the Marshall University Institutional Review Board #2 (Social/Behavioral) Designee. No further submission (or closure) is required for an Exempt study **unless** there is an amendment to the study. All amendments must be submitted and approved by the IRB Chair/Designee.

This study is for student Marjorie Abney.

If you have any questions, please contact the Marshall University Institutional Review Board #2 (Social/ Behavioral) Coordinator Lindsey Taylor at (304) 696-6322 or l.taylor@marshall.edu. Please include your study title and reference number in all correspondence with this office.

Sincerely,

Bruce F. Day, ThD, CIP
Director, Office of Research Integrity

Appendix B: Survey Instrument

Management Control Systems and Innovation Mode Survey Instrument

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Diagnostic

Directions: **To what extent does the top management team use budgets and performance measures to: (Extent ranges from Very low extent=1 to very high extent=7)**

Diagnostic1 Identify critical performance variables (i.e. factors that indicate achievement of current strategy)

Diagnostic2 Set targets for critical performance variables

Diagnostic3 Monitor progress toward critical performance targets

Diagnostic4 Provide information to correct deviations from preset performance targets

Diagnostic5 Review key areas of performance

Interactive

To what extent does the top management team use budgets and performance measures to: (Extent ranges from Very low extent=1 to very high extent=7)

Interactive1 Provide a recurring and frequent agenda for top management activities

Interactive2 Provide a recurring and frequent agenda for employee activities

Interactive3 Enable continual challenge and debate of underlying data, assumptions and action plans with employees and peers

Interactive4 Focus attention on strategic uncertainties (i.e. factors that may invalidate current strategy or provide opportunities for new strategic initiatives)

Interactive5 Encourage and facilitate dialog and information sharing with employees

Belief

Drag the slider to indicate what extent the statement below is present at your organization. (Extent ranges from Very low extent=1 to very high extent=7)

Belief1 Are the values, purpose and direction of the bank codified in formal documents? (e.g. mission/value statements, credos, statements of purpose?)

Belief2 Does top management actively communicate core values to employees?

Belief3 Are formal statements of values used to create commitment to the long-term vision of top management?

Belief4 Are formal statements of values used to motivate and guide subordinates in searching for new opportunities?

Boundary

Drag the slider to indicate what extent the statement below is present at your organization. (Extent ranges from Very low extent=1 to very high extent=7)

Boundary1 Are codes of conduct or similar statements relied upon to define appropriate behavior?

Boundary2 Are there policies or guidelines that stipulate specific areas for, or limits on, opportunity search and experimentation?

Boundary3 Does top management actively communicate risks and activities to be avoided by employees?

Boundary4 Are actions taken to address employees who engage in risks and activities outside organizational policy, irrespective of the outcome?

Exploitation and Exploration

Indicate the <u>emphasis your organization places on the following strategic priorities relative to your competitors</u>, from 1 being very low emphasis to 7 being very high emphasis.

EE1R Low cost products/services

EE2 Being first to market with new products/services

EE3 Developing new generation product/service capabilities

EE4 Frequent new product/service introductions

EE5 Experimenting with new products/services

EE6 Improving quality of existing products/services

EE7 Frequent, but incremental, modifications to existing products/services

EE8 Improving efficiency in the provision of existing products/services

EE9 Opening up new product/service markets

EE10 Increasing economies of scale in existing product/service markets

Appendix C: Original Survey Instrument

Original Survey Instrument (Bedford, 2015)

1. Diagnostic Control Systems To what extent does the top management team use budgets and performance measures for the following Very low extent / Very high extent

1.1 Identify critical performance variables (i.e. factors that indicate achievement of current strategy)

1.2 Set targets for critical performance variables

1.3 Monitor progress towards critical performance targets

1.4 Provide information to correct deviations from preset performance targets

1.5 Review key areas of performance

2. Interactive Control Systems To what extent does the top management team use budgets and performance measures for the following Very low extent / Very high extent

2.1 Provide a recurring and frequent agenda for top management activities

2.2 Provide a recurring and frequent agenda for subordinate activities

2.3 Enable continual challenge and debate of underlying data, assumptions and action plans with subordinates and peers

2.4 Focus attention on strategic uncertainties (i.e. factors that may invalidate current strategy or provide opportunities for new strategic initiatives)

2.5 Encourage and facilitate dialogue and information sharing with subordinates

3. Boundary Control Systems To what extent... Very low extent / Very high extent

3.1 Are codes of conduct or similar statements relied upon to define appropriate behaviour?

3.2 Are there policies or guidelines that stipulate specific areas for, or limits on, opportunity search and experimentation?

3.3 Does top management actively communicate risks and activities to be avoided by subordinates?

3.4 Are sanctions or punishments applied to subordinates who engage in risks and activities outside organisational policy, irrespective of the outcome?

4. Belief Control Systems To what extent... Very low extent / Very high extent

4.1 Are the values, purpose and direction of the SBU codified in formal documents? (e.g. mission/value statements, credos, statements of purpose?)

4.2 Does top management actively communicate core values to subordinates?

4.3 Are formal statements of values used to create commitment to the long-term vision of top management?

4.4 Are formal statements of values used to motivate and guide subordinates in searching for new opportunities?

5. Exploitation and Exploration Indicate the emphasis your SBU places on the following strategic priorities relative to your competitors Very low emphasis / Very high emphasis

5.1 Low cost products / services *

5.2 Being first to market with new products / services

5.3 Developing new generation product / service capabilities

5.4 Frequent new product / service introductions

5.5 Experimenting with new products / services

5.6 Improving quality of existing products / services

5.7 Frequent, but incremental, modifications to existing products / services

5.8 Improving efficiency in the provision of existing products / services

5.9 Opening up new product / service markets

5.10 Increasing economies of scale in existing product / service markets * This item is dropped from the analysis

6. Firm Performance Rate the performance of your SBU on the following dimensions to that of your competitors over the past year Significantly below average / Significantly above average

6.1 Financial performance

6.2 Sales growth of new (less than 2 years) product / service markets

6.3 Sales growth of existing (older than 2 years) product / service markets

6.4 Relative market share for primary products / services

6.5 Overall performance

7. Environmental Hostility

7.1 How intense is the competition for your main products/services? Very low intensity / Very high intensity

7.2 How difficult is it to obtain the necessary inputs for your business? Very low difficulty / Very high difficulty

7.3 How many strategic opportunities are currently available to your business? Very few / Very many

8. Environmental Dynamism Over the past three years how predictable or unpredictable have important actions or changes in the external environment been? Very predictable / Very unpredictable Over the past three years how many changes have occurred that have had a material impact on the nature of your business? Very few changes / Very many changes

8.1 Customers (e.g. Level of demand, customer requirements)

8.2 Suppliers (e.g. Markets for key inputs, quality of resources)

8.3 Competitors (e.g. Competitors entering or leaving, tactics/strategies)

8.4 Technological (e.g. R&D advances, process innovations)

8.5 Economic / Regulatory