IJARBM – International Journal of Applied Research in Business and Management
Vol. 05 / Issue 02, July 2024
ISSN: 2700-8983 | an Open Access Journal by Wohllebe & Ross Publishing

This paper is available online at
www.ijarbm.org

Does managerial commitment mediate budgeting practices and financial performance relationships in 3D printing SMMEs?

Edinam Agbemava
eagbemava@htu.edu.gh
Ho Technical University, Ho, Volta Region, Ghana.

Agbanu Gameli Prosper
pagbanu@htu.edu.gh
Ho Technical University, Ho, Volta Region, Ghana.

Afrifa Sampson Junior
profafrifa21@gmail.com
Ikern Institute for Tax Policy and Research, Accra, Ghana.

Mathew Opoku Agyemang-Duah
magyemanduah@htu.edu.gh
Ho Technical University, Ho, Volta Region, Ghana.

Stanley Nelvis Glate
sglate@htu.edu.gh
Ho Technical University, Ho, Volta Region, Ghana.

https://doi.org/10.51137/wrp.ijarbm.2024.eadt.45622

Abstract – This study examined the mediating effect of managerial commitment on the relationships between budgeting practices and financial performance among 3D printing SMMEs in South Africa. The study used the stratified and purposive sampling techniques to select 250 managers and employees of 3D printing SMMEs in South Africa. The results of the study showed that a significant negative relationship exists between budget planning and financial performance, while a non-significant positive relationship exists between budget participation and financial performance. Significant positive relationships exist between budget planning and managerial commitment, budget participation and managerial commitment and also managerial commitment and financial performance. Managerial commitment mediates the relationship between budget planning and financial performance as well as budget participation and financial performance. The study recommends that 3D printing SMMEs must leverage on managerial commitment to enhance their budgeting practices and financial performance.

Keywords – Budgeting, Management, Budget Planning, Quantitative, Validity, Financial Performance

Submitted: 2024-11-18. Revised: 2024-11-23. Accepted: 2024-11-26.

1 Introduction

Budgeting is a pertinent managerial tool that is responsible for organizing and formulating the planning activities of organizations (Siziba & Hall, 2021). Budgeting is also described as a financial tool that is used for the financial planning and control of costs and expenditures in the organization in order to achieve value for money in organizational operations (Keshvari Ljubić & Papier, 2022). In as much as budgeting is beneficial to organization's managerial functions, it is also essential for achieving organization's financial performance (Rashidov, Leonodovna & Azlarkhan, 2023). According to Mohajan and Mohajan (2023), budgeting enables managers and employees to evaluate the firm's financial performance by comparing financial forecasts with financial allocations for operational activities in the firm. Within the context of SMMEs, budgeting is important for the facilitation of effective monitoring and control of firm expenditures in order to achieve improved financial performance (Mbogo, Jimmy & Olando, 2021). SMMEs use budgeting as a managerial and financial mechanism to distinguish between expenditures that have been budgeted for and those that were not included in the budget and thereby control firm spending in order to avoid any kind of overspending (Hamdan, Chen & Anshari, 2020). Budget planning and budget participation are important practices that enhance the financial performance of organizations (Mujennah, Artinah & Safriansyah, 2019; Mulyanah & Puspanita, 2021). Maisaroh, Ph and Hadi (2019) contend that budget planning involves the process of constructing a budget for the purposes of controlling the operations of a business. Budget participation, on the other hand, is characterized by employees and superiors making inputs in the formulation of organizational budgets (Jatmiko, Laras & Rohmawati, 2020). Studies have shown that significant positive relationships exist between budget participation and the financial performance of firms (Bandiyono, 2020; Wafiroh, Abdani & Nurdin, 2020).

There are also a number of studies that have shown that budget planning and financial performance are positively correlated (Dakurah, 2020; Ali, 2022). That notwithstanding, a few studies have indicated that managerial commitment to budgetary allocations is important for achieving the financial performance of firms (Manafe & Setyorini, 2019). Such scholars have argued that managerial commitment to budgetary allocations ensures the effective implementation of budgets in organizations to achieve the desired results in financial performance (Manafe & Setyorini, 2019).

Despite the recognition of the importance of managerial commitment in effective budgeting implementation and financial performance (Manafe & Setyorini, 2019), there remains a significant gap in the literature concerning its mediating effects, particularly in the 3D printing industry. This is because, while existing research emphasize the critical roles that managerial commitment plays in general industrial and business settings (Manafe & Setyorini, 2019), the specific dynamics within the 3D printing industry have not been thoroughly explored.

We contend that, the 3D printing industry, known for its rapid technological advancements and unique production processes, presents distinct challenges

IJARBM – International Journal of Applied Research in Business and Management
Vol. 05 / Issue 02, July 2024
ISSN: 2700-8983 | an Open Access Journal by Wohllebe & Ross Publishing

and opportunities that could influence how budgeting practices impact financial performance. Managerial commitment in this context involves not only a dedication to strategic financial planning but also an understanding of the technological intricacies and innovation cycles inherent in 3D printing (Ref). In spite of the relevance of managerial commitment in enhancing financial performance in 3D printing industry, studies explicitly examining how managerial commitment mediate the relationship between budgeting practices and financial performance in the 3D printing industry are scarce, creating a knowledge gap (Dzogbewu et al.,2023) .This lack of targeted studies means that industry-specific insights into how effective budgeting practices such as budget planning and budget participation can enhance financial performancethrough improved managerial commitment in the 3D printing industry are not well understood.

Studies have reported that SMMEs are often confronted with several challenges in financial management such as budget planning and budget participation, which have negative implications on their financial performance (Folajinmi & Peter, 2020). Therefore, as an evolving industry in South Africa, 3D printing SMMEs are also confronted with financial challenges that negatively affect their operations and financial performance (Serumaga-Zake & Van der Poll, 2021).

In this regard, the crux of our argument therefore is that, as the 3D printing industry continues to gain momentum in South Africa's SMME sector, issues about their budgeting practices, managerial commitment, and financial performance are worth investigating. This is because, doing so would reveal what should be done to enable these 3D printing SMMEs to remain financially sound, survive, and be competitive in a globalized economy characterized by intense competition and technological advancement. Coherently, the problem that necessitates the current study is the observed lack of research on the direct and indirect (mediating) relationships between budgeting practices, managerial commitment, and financial performance among 3D printing SMMEs in South Africa. This study is therefore guided by the following objectives:

To determine the direct relationship between budget planning and budget participation on the financial performance of 3D printing SMMEs in South Africa.

To determine the effect of managerial commitment on financial performance among 3D printing SMMEs in South Africa.

To investigate the mediating effect of managerial commitment on the relationship between budgeting practices and financial performance among 3D printing SMMEs in South Africa.

2 Literature Review

2.1 Concept of Budget

Budgeting is a multifaceted concept that encompasses various perspectives and viewpoints, each shedding light on different aspects of its significance and implementation within organizations. From a financial standpoint, Li and Guo (2022) attests that a budget serves as a formal declaration, quantifying a firm's short-term or long-term plan by detailing expected outcomes and the strategies to achieve them. Based on the definition by Li and Guo (2022), we argue that the financial perspective of budgeting emphasizes the strategic aspect of budgeting, highlighting its role in setting targets and guiding resource allocation to achieve organizational objectives. On the other hand, budgeting also holds importance in terms of financial transparency and accountability. According to Cuadrado-Ballesteros and Bisogno (2023) budgeting involves the preparation and presentation of verifiable financial information about a firm's revenues and expenditures. From the financial transparency and accountability perspective of budgeting, we argue that, this perspective underscores the role of budgeting in legitimizing accountability within organizations, as budgets provide a structured framework for tracking financial performance and ensuring resources are used efficiently. Furthermore, from a managerial perspective, Tzenios, Frsph and Fwams (2022) argue that budgeting plays a crucial role in decision-making and resource management. According to Tzenios et al. (2022), managers utilize budgets as tools for planning, controlling, and evaluating performance, enabling them to make informed decisions about resource allocation, investment priorities, and operational strategies. From the managerial perspective, we contend that, the managerial perspective of budgeting highlights the operational and strategic implications of budgeting, emphasizing its role in aligning organizational activities with overarching goals and objectives.

2.2 Budget planning

Budget planning can be viewed from strategic and operational perspectives. From the strategic perspective, Nasri, Nurman, Azwirman, Zainal and Riauan (2022) contends that budget planning involves aligning an organization’s financial resources with its long-term goals and objectives, setting financial targets, and developing plans to allocate resources that support the strategic vision and ensure sustainable growth. Based on the definition from Nasri et al. (2022), we argue that the strategic perspective in budget planning is vital for aligning financial resources with long-term goals as it helps organizations to invest in growth initiatives and maintain focus on strategic priorities, ensuring sustainable success. From the operational perspective, Shawe (2023) attests that budget planning entails detailed forecasting and managing the day-to-day financial needs of the organization, creating specific budgets for departments, monitoring actual spending against budgets, and making necessary adjustments to ensure efficiency. From the operational perspective, we

IJARBM – International Journal of Applied Research in Business and Management
Vol. 05 / Issue 02, July 2024
ISSN: 2700-8983 | an Open Access Journal by Wohllebe & Ross Publishing

This paper is available online at
www.ijarbm.org

argue that, the operational perspective ensures efficient day-to-day functioning of budgets by focusing on detailed financial forecasting and managing short-term needs.

2.3 Budget participation

Generally, budget participation involves top management initiating the budgeting process and setting general guidelines, while lower-level managers and employees handle detailed budget preparation (Jatmiko, Kinanti & Laras, 2024). However, definitions of budget participation are deduced from operational and collaborative perspectives. Operationally, Egbide, Agi-Ilochi, Madugba, Taiwo & Ayomide (2022) asserts that budget participation includes input from representatives of various units, providing insights into their specific activities and needs. We argue that the operational perspective of budget participation displays a bottom-up approach which ensures that the budget reflects practical realities and operational requirements in organizations. According to de Azevedo, Cardoso, da Cunha & Wampler (2022), the collaborative perspective regards budget participation as a democratic process with managers and subordinates actively involved in all stages of budget preparation. We are of the opinion that, the collaborative perspective of budget participation is relevant for ensuring transparency in budget preparation process and also enhancing collective decision making during budget preparation in organization.

2.4 Financial Performance

Financial performance was defined from the accounting and operational perspective. From an accounting perspective, Olayinka (2022) attests that financial performance is measured by analyzing financial statements such as income statements, balance sheets, and cash flow statements using key metrics such as net profit, revenue growth, return on assets (ROA), and return on equity (ROE). We are of the view that the accounting perspective provides a clear and quantifiable measure of financial performance, making it easy to compare across periods and against industry benchmarks. From an operational perspective however, Rahiminezhad and Mokhatab (2022) contends that financial performance is assessed by examining the efficiency and effectiveness of an organization's operations by using key metrics such as operational efficiency ratios, cost management, and productivity indicators. We are of the opinion that the operational perspective highlights the link between operational efficiency and financial success, emphasizing the importance of effective resource management and process optimization.

2.5 Managerial Commitment

Managerial commitment is defined as engaging in and maintaining behaviors that help subordinates to achieve organizational goals (Gonzalez, Agrawal, Johansen & Hooker, 2022). Managerial commitment, as defined by Gonzalez et al. (2022) involves actively engaging in and sustaining behaviors that support subordinates in achieving organizational goals. This definition emphasizes the role of managers in fostering a supportive and goal-oriented work environment, where their actions and decisions contribute to the success of the organization. Management commitment implies the direct participation by the highest level management (top management) in all specific and critically important aspects such as safety, quality, environment, security, or programmes of an organization to ensure organizational growth and development (Wei, Abbas, Alarifi, Zhang, Adam & de Queiroz, 2023). Furthermore, Wei et al. (2023) describe management commitment as the direct involvement of top management in all critical aspects of organizational operations, including safety, quality, environment, security, and various programs. This perspective highlights the importance of leadership involvement at the highest level to ensure the overall growth and development of the organization. In essence, managerial commitment encompasses both the behavioral aspect of supporting subordinates in goal attainment and the proactive involvement of top management in key organizational functions. Together, these elements contribute to a culture of leadership engagement and organizational excellence, fostering a conducive environment for achieving strategic objectives and sustainable growth.

3 Hypotheses Development

3.1 Effect of budget planning on financial performance

Kiiru et al., (2018) conducted a study to determine the impact of budget planning on the financial performance of small and medium-sized enterprises (SMMEs) in Kenya. Results of the study, which was conducted using a quantitative survey research design as part of its methodology, revealed that there is a statistically significant positive association between budget planning and financial performance of SMMEs in Kenya. The purpose of a study conducted by Dakurah, (2020) explored the effects of budgeting and budgetary management efficacy of credit unions in Ghana's Upper West Region. According to the findings of the study, which used a correlational and descriptive research design, budget planning was one of the budgeting and budgetary management methods that enhanced the financial performance of credit unions in Ghana's Upper West Region, as well as other activities. In another study, Ali (2022) examined the effect of budgeting processes on organizational performance among selected firms in Mogadishu, Somalia. From the results of the study, a significant positive relationship was found between budget planning and organizational performance.

Based on results from the studies, we hypothesize that:

H1: A significant positive relationship exists between budget planning and financial performance.

3.2 Effect of budget participation on financial performance

A study conducted by Karimi and Makokha, (2021) in Kenya in 2021 examined the impact of budgetary processes on the financial performance of public sector enterprises in the country. The results of the quantitative descriptive research design revealed that there is a statistically significant positive association between budget participation and the financial performance of public sector enterprises in Kenya, as demonstrated by the findings. Wafiroh et al., (2020) conducted another study in which they examined the mediating role of autonomous budget motivation on the correlations between budget participation and budgeting slack. Nonetheless, the findings revealed that increased engagement in budget development by managers from a variety of departments resulted in a reduction in budgetary slack. Another study was conducted by Machmud, Hamzah, Nurfadila, Saffanah and Akmalia (2022) assessed the effect of budget participation on managerial performance with locus of control as a moderating variable. The result of the study indicated that a significant positive relationship exists between budget participation and managerial performance. The study that was conducted by Ali (2022) also found that a significant positive relationship exists between budget participation and organizational performance among selected firms in Somalia. Based on the results from these studies, we hypothesize that:

H2: A significant positive relationship exists between budget participation and financial performance.

3.3 Mediating role of managerial commitment on budget planning, budget participation and financial performance relationships

Managerial commitment plays an important role in budgeting within the context of organizations (Manafe & Setyorini, 2019). According to Manafe and Setyorini, (2019) managerial commitment ensures complete oversight of the budget planning process and also enhances efficient budget participation. Due to the oversight role played by managerial commitment to the budget planning process, we are of the view that improved managerial commitment in organizations will enhance efficiency of budget planning. Novlina and Indriani, (2020) also argue that managerial commitment makes managers act as supervisors in the implementation of the budget. As a result of managerial commitment, managers ensure that budgets are approved after going through all necessary laid-down procedures specifically by the organization

(Djalil et al., 2017; Novlina & Indriani, 2020). In this regard, we argue that, managerial commitment has a relevant role in enhancing budget participation by ensuring the due processes are followed in the preparation of budgets.

Researchers also argue that, managerial commitment in organizations has positive implications for a firm's financial performance (Yu et al., 2019). According to Yu et al., (2019) when managers are committed they make sure that organizational spending is done in line with the budgetary allocations in order to achieve value for money and also enhance financial performance. Based on the literature, we argue that managerial commitment could mediate the relationships between budget planning and financial performance as well as budget participation and financial performance because of its positive linkages with these variables. Based on the literature we hypothesize as follows:

H3: A significant positive relationship exists between budget planning and managerial commitment

H4: A significant positive relationship exists between budget participation and managerial commitment.

H5: A significant positive relationship exists between managerial commitment and financial performance

H6: Managerial commitment mediates the relationship between budget planning and financial performance

H7: Managerial commitment mediates the relationship between budget participation and financial performance.

3.4 Theoretical and Conceptual Framework

The Resource-Based View (RBV) theory is a managerial framework used to determine the strategic resources a firm can exploit to achieve sustainable competitive advantage (Dubey, Gunasearan, Childe, Blome & Papadopoulos, 2019). RBV posits that resources and capabilities that are valuable, rare, inimitable, and non-substitutable (often referred to as VRIN characteristics) are critical to a firm's long-term success (Nason & Wiklund, 2018). These resources can be tangible, such as capital and equipment, or intangible, such as patents, brand reputation, and organizational culture (Barney, 2018). By effectively identifying, managing, and leveraging these resources, firms can create unique value and achieve superior performance compared to their competitors (Barney, 2018). The resource based view theory was adopted for our study because, the RBV theory is appropriate for analyzing how internal resources, such as budgeting practices and managerial commitment, contribute to the financial performance of 3D printing SMMEs in South Africa. Through the applicability of the RBV theory, we contend that budget planning and participation, as internal resources, are valuable for ensuring effective financial management and strategic decision-making, thus driving financial performance. In this regard, involving employees in budget planning leverages their expertise and fosters a sense of ownership, enhancing the quality and implementation of financial plans.

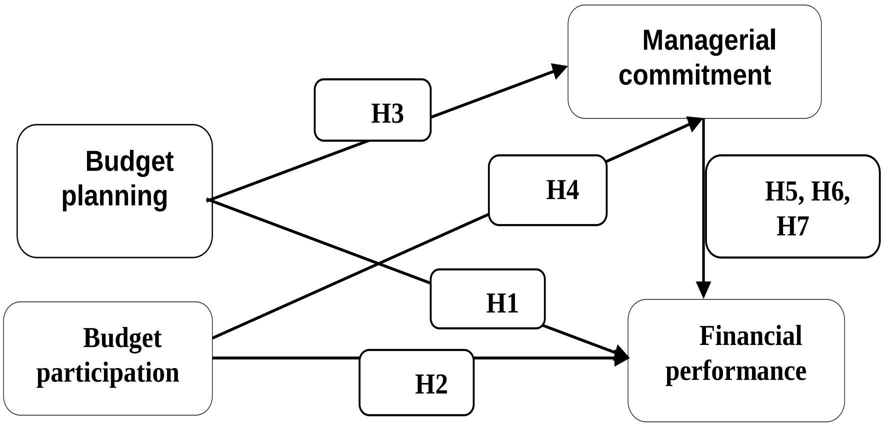

Figure 1: Conceptual Framework

The conceptual framework posits that the Resource-Based View (RBV) theory provides a theoretical lens to understand how budget planning and budget participation influence financial performance directly, while also exploring the mediating role of managerial commitment among 3D printing Small, Medium, and Micro Enterprises (SMMEs) in South Africa. Budget planning and participation are expected to directly impact financial performance by enhancing strategic resource allocation and decision-making. Additionally, managerial commitment acts as a mediator, influencing how effectively budget planning and participation translate into improved financial outcomes. This framework is supported by empirical evidence suggesting that strong managerial commitment enhances the implementation and effectiveness of budgetary processes, thereby linking these factors to enhanced financial performance in the context of 3D printing SMMEs in South Africa.

4 Methodology

4.1 Population, Sampling Technique and Sample

A total of one hundred and twenty (120) 3D printing SMMEs in South Africa formed the accessible population of the study. The stratified sampling technique was used to select a total of fifty (50) 3D printing SMMEs. The use of stratified sampling for selecting 3D printing SMMEs was justified on the premise that, their selection was based on different stratas such as 3D design and tool making, 3D software and related technologies and 3D material supplier and reseller sectors. For each of the fifty (50) 3D printing SMMEs, five employees and managers were selected using the purposive sampling technique. The use of the purposive sampling technique ensured that only employees and managers who are directly involved in budget planning and budget preparation were chosen for the study. In this regard, a total of two

IJARBM – International Journal of Applied Research in Business and Management
Vol. 05 / Issue 02, July 2024
ISSN: 2700-8983 | an Open Access Journal by Wohllebe & Ross Publishing

hundred and fifty (250) managers and employees of 3D printing SMMEs formed the sample size of the study.

4.2 Data Collection

Questionnaires were self-administered by the researchers in the workplace of 3D printing SMMEs that participated in the study. The answering of questionnaires by respondents took a maximum of twenty (20) minutes. The entire data collection process took a period of two months. Ethical considerations such as informed consent, anonymity and confidentiality were adhered to during the data collection process.

4.3 Measures

Questionnaires served as the data collection instruments of the study. The questionnaires were designed based on the objectives of the study. During the questionnaire design process, we dwelled on relevant literature as shown in table 1 to construct the items of the questionnaire for measuring each of the constructs under investigation. From table 1, budget planning was measured with four (4) items and adopted from Kiirru et al. (2018). Budget participation was measured with four (4) items and adopted from a study conducted by Karimi and Makokha (2021). However, managerial commitment was measured using four (4) items and adopted from a study conducted by Vento et al. (2016) while financial performance was measured using four (4) items and adopted from a study conducted by Gartenberg et al. (2019).

Table 1: Constructs and sources

+Construct	Number of Items	Source
Budget Planning	4	Kiirru et al., (2018)
Budget Participation	4	Karimi and Makokha (2021)
Managerial Commitment	4	Vento et al., (2016)
Financial Performance	4	Gartenberg et al., (2019)

4.4 Data Analysis

The Statistical Package for Social Sciences (SPSS) version 26 and Smart PLS 4 were used for data analysis. The SPSS software was used to enter data gathered from questionnaires. Descriptive statistics was conducted to check for any missing values in the dataset before we proceeded to any other analysis. With the absence of any missing values, we proceeded to transform items into composite variables using SPSS. Next, the researchers checked for normality of all the variables to ensure that there were no extreme values or outliers that could affect the structural equation model. The SPSS data was then imported to Smart PLS 4 for structural equation modelling analysis in order to test for the seven (7) hypotheses that examined the direct and mediating relationships among the variables.

5 Results

5.1 Validity and reliability statistics

In this section, our study present results on construct validity, convergent validity, discriminant validity and reliability statistics using Smart PLS 4 software.

5.2 Construct validity

Construct validity refers to the extent to which the measurement model accurately reflects the measured construct (Flake, Davidson, Wong & Pek, 2022). Piedmont (2024) attests that factor loadings greater than 0.5 indicates a good construct validity for variables used in a study.

In this study, results from table 2, indicates that factor loadings for each of the items used for measuring the variables (budget planning, budget participation, managerial commitment, financial performance), were greater than 0.5. This gives the indication that construct validity was achieved for each of the variables used for the study.

Table 2: Construct validity

Variable codes	Variable Items	Factor loadings
BPA1 <- Budget Participation	In my firm, employees are involved in the budget participation process	0.861
BPA2 <- Budget Participation	There is departmental involvement in the process of budgeting	0.911
BPA3 <- Budget Participation	Throughout the budget process, leadership and support is given to employees	0.887
BPA4 <- Budget Participation	Approved budgets are shared with all departments in my firm	0.793
BPL1 <- Budget Planning	My firm's budgets have clear goals and objectives	0.701
BPL2 <- Budget Planning	The budget of my firm covers all aspects of our mission	0.755
BPL3 <- Budget Planning	In my firm, all departments prepare budget plans prior to the budget year	0.778

BPL4 <- Budget Planning	My firm set priorities for the coming year at budget committee meetings	0.852
FP1 <- Financial Performance	Within the past three years, my SMME has reported stable sales growth	0.832
FP2 <- Financial Performance	Within the past three years my SMME has achieved profitability growth targets	0.824
FP3 <- Financial Performance	Within the past three years, my SMME has achieved desirable return on assets	0.586
FP4 <- Financial Performance	Within the past three years, my SMME has increased competitive market share	0.773
MC1 <- Managerial commitment	I am committed to the coordination of business activities in my SMME	0.687
MC2 <- Managerial commitment	I am committed to actively participate in decision making in my SMME	0.716
MC3 <- Managerial commitment	I am committed to achieving targets set for my SMME	0.840
MC4 <- Managerial commitment	I am committed to making sure that my SMME;s finance is well managed	0.712

5.3 Convergent validity

Convergent validity is a type of validity that examines the extent to which multiple measures of the same construct are positively related to each other (Swami, Barron, Weis, Voracek, Stieger & Furnham, 2017). According to Ahmad, Zulkurnain and Khairushalimi (2016), the Average Variance Extracted (AVE) score that is greater than 0.5 depicts convergent validity. In this study, results from table 3 shows that AVE values for budget planning (AVE=0.598), budget participation (AVE=0.747), managerial commitment (AVE=0.549) and financial performance (AVE=0.578) were greater than 0.5, which therefore depicts convergent validity.

Table 3: Convergent Validity

Variables	**Average Variance Extracted (AVE) Score**
Budget Planning	0.598
Budget participation	0.747
Financial Performance	0.578
Managerial commitment	0.549

5.4 Discriminant validity

Discriminant validity is a type of construct validity that assesses the degree to which a measure is distinct from other unrelated measures (Cheung & Wang, 2017). Fornell-Larcker criterion is a method for assessing discriminant validity in structural equation modelling, which assesses discriminant validity by comparing the square root of the AVE for each construct to the correlation among the constructs. According to Voorhees, Brady, Calantone and Ramirez (2016), discriminant validity is achieved if the square root of AVE for each construct is greater than the correlation between that construct and any other construct. From table 4, discriminant validity was achieved because, the square root of the AVE for each variable (budget planning, budget participation, managerial commitment and financial performance) was greater than the correlation between each construct and any other construct.

Table 4: Discriminant validity using Fornell-Larcker Criterion

	Budget Participation	Budget Planning	Financial Performance	Managerial commitment
Budget Participation	0.864			
Budget Planning	0.692	0.774		
Financial Performance	0.557	0.468	0.760	
Managerial commitment	0.803	0.825	0.651	0.741

IJARBM – International Journal of Applied Research in Business and Management
Vol. 05 / Issue 02, July 2024
ISSN: 2700-8983 | an Open Access Journal by Wohllebe & Ross Publishing This paper is available online at
www.ijarbm.org

5.5 Reliability statistics

Cronbach's alpha and composite reliability (rho_A), and composite reliability (rho_C) are all reliability of a scale or set of items, commonly used to assess the internal consistency of a measure. According to Chan and Idris (2017), cronbach alpha values greater than 0.7 indicate a good measure of internal consistency or reliability of items used for measuring the constructs. From Table 5, cronbach alpha values attained were greater than 0.7 showing strong internal consistency of the items used for measuring budget planning (Cronbach alpha=0.776; Composite reliability=0.796), budget participation (Cronbach alpha=0.887; Composite reliability=0.906), Managerial commitment (Cronbach alpha=0.728; Composite reliability=0.743) and financial performance (Cronbach alpha=0.750; Composite reliability=0.758).

Table 5: Reliability statistics

	Cronbach's alpha	Composite reliability (rho_a)
Budget Participation	0.887	0.906
Budget Planning	0.776	0.796
Financial Performance	0.750	0.758
Managerial commitment	0.728	0.743

5.6 R-Square statistics

R-square statistics shows that variation in the dependent variable explained by an independent variable in a study. From table 6, the r-square value of 0.442, shows that 44.2% of the variation in financial performance was explained by budget planning and budget participation. The r-square value of 0.680 also shows that 68% of the variation in managerial commitment was explained by budget planning and budget participation among 3D printing firms in South Africa.

Table 6: R-Square Statistics

	R-square
Financial Performance	0.442
Managerial commitment	0.680

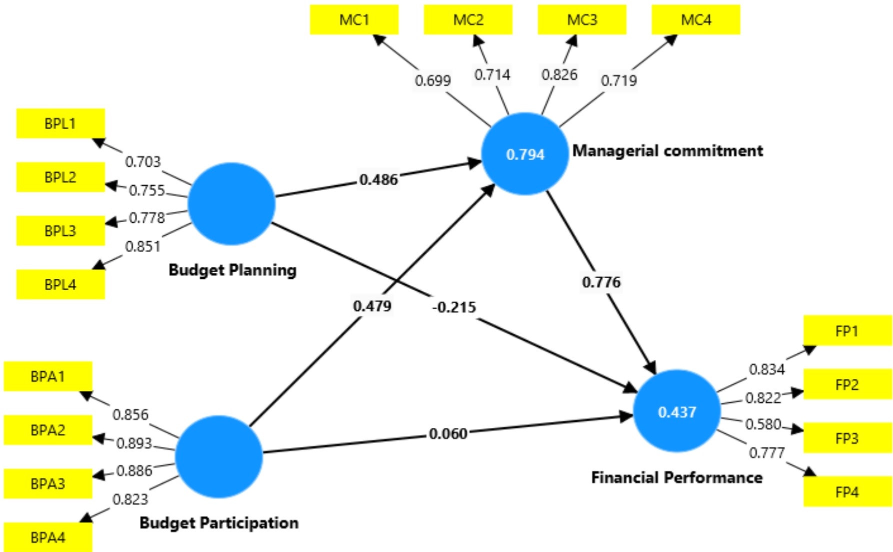

Figure 2: Structural Equation Model for direct and mediating relationships between budgeting practices, managerial commitment and financial performance

5.7 Hypotheses testing for direct and mediating relationships

According to results from Table 7, a significant negative relationship exists between budget planning and financial performance among 3D printing SMMEs in South Africa (B=-0.215, p=0.025). Hypothesis 1 was therefore not supported. The result also indicated that a non-significant relationship exists between budget participation and financial performance (B=0.060, p=0.569). Hypothesis 2 was therefore not supported. A significant positive relationship was found to exist between budget planning and managerial commitment (B=0.486, p=0.000), budget participation and managerial commitment (B=0.479, p=0.000) and also managerial commitment and financial performance (B=0.776, p=0.000). The study also showed that managerial commitment mediates the relationship between budget planning and financial performance (B=0.377, p=0.000) and also budget participation and financial performance (B=0.372, p=0.000).

Table 7: Hypotheses testing for direct and mediating relationships

Hypotheses	B-value	t-statistics	p-values
H1: Budget Planning -> Financial Performance	-0.215	2.244	0.025
H2: Budget Participation -> Financial Performance	0.060	0.570	0.569
H3: Budget Planning -> Managerial commitment	0.486	11.345	0.000
H4: Budget Participation -> Managerial commitment	0.479	11.248	0.000

H5: Managerial commitment -> Financial Performance	0.776	9.957	0.000
H6: Budget Planning -> Managerial commitment -> Financial Performance	0.377	6.684	0.000
H7: Budget Participation -> Managerial commitment -> Financial Performance	0.372	8.758	0.000

6 Discussion of results

This section discussed the results of the study in line with relevant literature. The first hypothesis, which predicted that a significant positive relationship exists between budget planning and financial performance, was not supported. This is because the results showed that a significant negative relationship exists between budget planning and financial performance among 3D printing SMMEs in South Africa. This has the implication that planning costs and expenditures through budgets among 3D printing SMMEs in South Africa do not contribute positively to their financial performance. This finding was not consistent with the literature, because previous studies had found that a significant positive association existed between budget planning and financial performance (Dakurah, 2020; Ali, 2022). This result might also reflect the digital nature of the 3D printing process where software is used for topology optimization to dematerialize the manufacturing process reducing the cost of production and estimating the price of the end-products directly (Dzogbewu et al., 2022b).

The second hypothesis, which stated that a significant positive relationship exists between budget participation and financial performance, was not supported. This is because the results of the study showed that a significant negative relationship exists between budget participation and the financial performance of 3D printing SMMEs in South Africa. This finding was not in congruence with relevant literature, as previous studies have shown that a significant positive relationship exists between budget participation and financial performance (Karimi & Makokha, 2021.; Wafiroh et al., 2020).

The result of the third hypothesis was supported, as a significant positive relationship was found to exist between budget planning and managerial commitment. This gives the indication that budget planning increases managerial commitment toward the budget and vice versa. The finding of the study was consistent with the literature. Manafe & Setyorini, (2019) for instance, argue that budget planning enhances managerial commitment as managers ensure that cost and expenditure forecasts of the organization are strictly followed. The alignment with the current result with the literature could be due to the automated nature of 3D printing that builds a synergy between artificial intelligence and the 3D printing process making sure data is collected accurately to ensure expenditure forecasts and managerial activities are within the expected budget.

The fourth hypothesis was supported since a significant positive relationship exists between budget participation and managerial commitment. The

IJARBM – International Journal of Applied Research in Business and Management
Vol. 05 / Issue 02, July 2024
ISSN: 2700-8983 | an Open Access Journal by Wohllebe & Ross Publishing

implication is that budget participation positively enhances managerial commitment among 3D printing SMMEs in South Africa. This finding was consistent with literature, as Novlina and Indriani, (2020) argue that the engagement of both employees and managers in the budget preparation process makes management more committed to the budget as they put in the right measures to ensure the effective implementation of the budget.

The fifth hypothesis was also supported, as it found that managerial commitment and financial performance are positively correlated. This finding was consistent with literature as Yu et al., (2019) contend that the commitment of management to budgets in the organization helps them to have optimum control over operational costs and expenditures which improves financial performance in terms of profits.

Again, hypothesis 6 was supported since managerial commitment mediated the relationship between budget planning and financial performance. Hypothesis 7 was also supported, as managerial commitment mediated the relationship between budget participation and financial performance. This gives the implication that budget planning and budget participation, through managerial commitment, contributed positively to the financial performance of 3D printing SMMEs in South Africa.

The result on the mediating effects of managerial commitment on the relationships between budget planning, budget participation, and financial performance was novel and has managerial implications. This is because, from the direct effects both budget planning and budget participation had significant negative relationships with financial performance. Thus, the introduction of managerial commitment enhanced positive relationships between budget planning, budget participation, and the financial performance of 3D printing SMMEs in South Africa. This has the implication that managers of 3D printing SMMEs in South Africa need to consider managerial commitment as a critical factor as they seek to achieve improved financial performance. Thus, budget planning and budget participation cannot independently contribute positively to financial performance unless there is managerial commitment in 3D printing SMMEs in South Africa.

7 Conclusion

The focus of this study was to examine the mediating effects of managerial commitment on the relationship between budgeting practices (budget planning and budget participation) and financial performance among 3D printing SMMEs in South Africa. Based on the findings of the study, it could be concluded that managerial commitment is a key managerial indicator that must be given the utmost attention in 3D printing SMMEs in South Africa in order to improve their financial performance. It comes to light that the implementation of budgeting practices such as budget planning and budget participation in 3D printing SMMEs is not enough to achieve financial performance unless managerial commitment is given the utmost attention in 3D printing SMMEs in South Africa.

Based on the Resource-Based View (RBV) theory, the study on the mediating effects of managerial commitment on the relationship between budgeting practices (budget planning, budget participation) and financial performance among 3D printing SMMEs in South Africa presents several theoretical implications. Firstly, the study reinforces the RBV theory by highlighting the critical role of managerial commitment as a valuable, rare, inimitable, and non-substitutable (VRIN) resource. Managerial commitment as demonstrated in the study, is not merely an outcome but a strategic resource that mediates the impact of other resources (budgeting practices) on financial performance. This finding underscores the importance of managerial commitment as a key internal capability that firms must cultivate to leverage their financial management practices effectively among 3D printing firms in South Africa. Secondly, the research extends the RBV framework by integrating it with the concept of budget participation. Involving employees in budgeting processes can be seen as leveraging human capital as a valuable and rare resource, enhancing overall organizational capabilities. This alignment with RBV theory suggests that participative budgeting practices can be a strategic resource that improves decision-making and commitment, thereby contributing indirectly to financial performance through enhanced operational efficiency.

Based on the findings of the study, several practical implications can be drawn for 3D printing SMMEs in South Africa. Firstly, managers of 3D printing SMMEs should reassess their budget planning processes and consider improving the flexibility and adaptability of their budget planning processes. This is because, adopting more flexible and adaptive budget strategies can better respond to market changes and internal dynamics, ensuring that budget planning aligns more closely with the company's needs and external environment. Secondly, given the strong link between managerial commitment and financial performance, fostering a culture of commitment and ownership among leadership is crucial. This can be achieved through leadership development programs, clear communication of organizational goals, and involving managers in both the planning and execution stages. Thirdly, managers of 3D printing SMMEs should be actively involved in the budgeting process to enhance their sense of responsibility and commitment. This is because, by encouraging greater budget participation, managers can indirectly boost financial performance through increased engagement and ownership. Finally, recognizing managerial commitment as a key mediator in translating budgeting activities into financial outcomes is essential. Aligning budgetary goals with managerial incentives, providing adequate support and resources, and recognizing managerial efforts can maximize the positive impact of budget planning and participation on financial performance. This approach ensures that the benefits of effective budget planning and participation are fully realized through committed and motivated management teams.

The study's focus on a niche industry and geographical region may limit the applicability of its conclusions to other industries or countries. Future research could broaden the scope to explore diverse sectors and global contexts, providing a more comprehensive understanding of how managerial commitment influences financial performance across different organizational settings. Finally, the cross-sectional nature of the study restricts the ability to establish causal relationships definitively. While the study explores the mediating role of managerial commitment, it cannot conclusively determine the directionality of effects between budgeting practices, and financial performance outcomes. To address this limitation, future research could adopt longitudinal designs. These approaches would allow for a more robust assessment of causal pathways, offering clearer insights into how interventions in budgeting and managerial commitment impact financial performance over time.

8 Authors

Dr. Edinam Agbemava, Lecturer at the Department of Accounting and Finance, HTU Business school, Ho Technical University, Ho, Volta Region, Ghana.

Dr. Sampson Afrifa Jnr, Research Expert at Ikern Institute for Tax Policy and Research, Accra, Ghana.

Dr. Prosper Gameli Agbanu, Lecturer Department of management scienc-es, HTU Business School. Ho Technical University, Ho Volta Region, Ghana

Dr. Matthew Opoku Agyemang-Duah, Lecturer at the Department of Marketing, HTU Business School, Ho Technical University, Ho, Volta Region, Ghana

Dr. Stanley Nelvis Glate, Lecturer at the Department of Marketing, HTU Business School, Ho Technical University, Ho, Volta Region, Ghana.

9 References

Aghimien, D., Aigbavboa, C., Aghimien, L., Thwala, W. D., & Ndlovu, L. (2020). Making a case for 3D printing for housing delivery in South Africa. *International Journal of Housing Markets and Analysis*, 13(4), 565–581. https://doi.org/10.1108/IJHMA-11-2019-0111

Ahmad, S., Zulkurnain, N., & Khairushalimi, F. (2016). Assessing the validity and reliability of a measurement model in Structural Equation Modeling (SEM). *British Journal of Mathematics & Computer Science*, *15*(3), 1-8.

Amir, A., Ridwan, R., Din, M., Yamin, N., Zahra, F., & Firman, M. (2021). The role of budget participation in improving managerial performance. *Accounting*, 269–280. https://doi.org/10.5267/j.ac.2020.12.004

Azad, A. M. S., Raza, A., & Zaidi, S. S. Z. (2018). Empirical relationship between operational efficiency and profitability (Evidence from Pakistan Exploration Sector). *Journal of Accounting, Business and Finance Research,* 2(1), 7–11.

Bandiyono, A. (2020). Budget Participation and Internal Control for Better Quality Financial Statements. *Jurnal Akuntansi*, 24(2), 313–327.

Cheng, Q., Goh, B. W., & Kim, J. B. (2018). Internal Control and Operational Efficiency. *Contemporary Accounting Research*, 35(2), 1102–1139. https://doi.org/10.1111/1911-3846.12409

Cheung, G. W., & Wang, C. (2017). Current approaches for assessing convergent and discriminant validity with SEM: Issues and solutions. In *Academy* *of management proceedings* (Vol. 2017, No. 1, p. 12706). Briarcliff Manor, NY 10510: Academy of Management.

Cuadrado-Ballesteros, B., & Bisogno, M. (2023). The relevance of budget transparency for development. *International Review of Administrative Sciences*, *89*(1), 239-256.

Dakurah, A. A. (2020). Assessing budgeting and budgetary control effectiveness of Credit Unions in the Upper West Region of Ghana. *Research Journal of Finance and Accounting*, 11 (12), 1, 14.

de Azevedo, R. R., Cardoso, R. L., da Cunha, A. S. M., & Wampler, B. (2022). Participatory budgeting and budget dynamics in the public sector. *Revista de Contabilidade e Organizações*, *16*.

Djalil, M. A., Indriani, M., & Muttaqin, M. (2017). The influence of organizational commitment and motivation in the relationship between budget participation and managerial performance (empirical study on provincial government agencies (SKPA) of Aceh province, Indonesia). BRAND. *Broad Research in Accounting, Negotiation, and Distribution*, 8(1), 12–24.

Dzogbewu, T. C., Amoah, N., Afrifa Jnr, S., Fianko, S. K., & de Beer, D. J. (2023). Multi-material 3D printing of electronics components: A bibliometric analysis. *Results in Engineering,* 19, 101318. https://doi.org/10.1016/j.rineng.2023.101318

Dzogbewu, T. C., Amoah, N., Fianko, S. K., Afrifa, S., & de Beer, D. (2022a). 3D printing towards product production: A bibliometric analysis. *Manufacturing Review*, 9, 1.

Dzogbewu, T. C., Fianko, S. K., Amoah, N., Afrifa Jnr, S., & de Beer, D. (2022b). 3D printing in South Africa: Critical success factors. *Heliyon,* 8(11), e11852. https://doi.org/10.1016/j.heliyon.2022.e11852

Dzogbewu, T. C., Jnr, S. A., Amoah, N., Fianko, S. K., & Beer, D. de. (2022c). 3D printing Interventions during the COVID-19 Pandemic: South Africa. *Applied Sciences*, 12(1). https://doi.org/10.3390/app12010295

Egbide, B. C., Agi-Ilochi, M., Madugba, J., Taiwo, A., & Ayomide, I. (2022). Budgeting approaches and employee motivation in the hospitality industry. *Problems and Perspectives in Management*, *20*(4), 602â.

Flake, J. K., Davidson, I. J., Wong, O., & Pek, J. (2022). Construct validity and the validity of replication studies: A systematic review. *American Psychologist*, *77*(4), 576.

Folajinmi, A. F., & Peter, A. O. (2020). Financial management practices and performance of small and medium scale poultry industry in Ogun State, Nigeria. *Journal of Finance and Accounting,* 8(2), 90.

Gonzalez, C., Agrawal, V., Johansen, D., & Hooker, R. (2022). Green supply chain practices: The role of institutional pressure, market orientation, and managerial commitment. *Cleaner Logistics and Supply Chain*, *5*, 100067.

Hamdan, M., Chen, C. K., & Anshari, M. (2020). Decision Aid in Budgeting Systems for Small & Medium Enterprises. *2020 International Conference on Decision Aid Sciences and Application* (DASA), 253–257. https://doi.org/10.1109/DASA51403.2020.9317018

Jatmiko, B., Kinanti, K. D., & Laras, T. (2024). Impact of Budget Participation on Managerial Performance with Locus of Control and Cost Management

Knowledge as Moderating Variables. *EKOMA: Jurnal Ekonomi, Manajemen, Akuntansi*, *3*(4), 1189-1203.

Jatmiko, B., Laras, T., & Rohmawati, A. (2020). Budgetary Participation, Organizational Commitment, and Performance of Local Government Apparatuses. *The Journal of Asian Finance, Economics and Business,* 7 (7), 379–390. https://doi.org/10.13106/JAFEB.2020.VOL7.NO7.379

Kamau, J. K., Rotich, G., & Anyango, W. (2017). Effect of budgeting process on budget performance of state corporations in Kenya: A case of Kenyatta National Hospital. International Academic *Journal of Human Resource and Business Administration*, 2(3), 255–281.

Karimi, N. B., & Makokha, E. N. (2021). Effect of budgetary process on performance of county governments in Kenya: A case of Migori County. *International Journal of Recent Research in Social Sciences and Humanities*, 8 (1), 40-54.

Keshvari Fard, M., Ljubić, I., & Papier, F. (2022). Budgeting in international humanitarian organizations. *Manufacturing & Service Operations Management*, *24*(3), 1562-1577.

Kiiru, S. M., Kamau, J. G., & Nzioki, P. M. (2018). Effect of budget planning on financial performance of small and medium enterprises in Nakuru Town Central Business District. *International Journal of Recent Research in Social Sciences and Humanities*, 8 (1), 40-54.

Kolasani, S. (2023). Innovations in digital, enterprise, cloud, data transformation, and organizational change management using agile, lean, and data-driven methodologies. *International Journal of Machine Learning and Artificial Intelligence*, *4*(4), 1-18.

Li, H., & Guo, Y. (2022). Performance management of university financial budget execution relying on comprehensive budget management strengthening model. *Advances in Multimedia*, *2022*, 1-11.

Madanhire, I., & Mbohwa, C. (2016). Enterprise Resource Planning (ERP) in Improving Operational Efficiency: Case Study. *Procedia CIRP*, 40, 225–229. https://doi.org/10.1016/j.procir.2016.01.108

Maisaroh, S., Ph, S., & Hadi, S. (2019). The Budget Planning Determinant Factors at State Primary Schools in Yogyakarta Province. *International Journal of Instruction*, 12(2), 353–368.

Manafe, J. D., & Setyorini, T. (2019). The impact of organizational commitment as mediator and moderator relationship between budgeting participation on managerial performance: Evidence from Indonesia. *The International Journal of Social Sciences World* (TIJOSSW), 1(1), Article 1.

Mbogo, M., Jimmy, M., & Olando, C. (2021). Effect of Budgeting Practices on Financial Performance of Manufacturing Small and Medium Enterprises in Nairobi County, Kenya. *Journal of Language, Technology & Entrepreneurship in Africa*, 12(1), https://doi.org/10.4314/jolte.v12i1

Mohajan, D., & Mohajan, H. K. (2023). Effect of Various Inputs When Budget of an Organization Increases: A Profit Maximization Study. *Noble International Journal of Economics and Financial Research*, *7*(4).

Mujennah, M., Artinah, B., & Safriansyah, S. (2019). The Effect of Performance Based Budgeting and Internal Control Systems on Performance Accountability of Government Agencies: A Case Study in Banjarbaru City Inspectorates. *Journal of Economic Info,* 6(3), https://doi.org/10.31580/jei.v6i3.924

Mulyanah, M., & Puspanita, I. (2021). Budget Participation and Managerial Performance with Organizational Commitment and Leadership Style as A Moderation. *Journal of Integrated Accounting Research*,14(1), https://doi.org/10.35448/jrat.v14i1.10411

Musah, M., Kong, Y., & Mensah, I. A. (2019). Exploring the link between operational efficiency and firms' financial performance: An empirical evidence from the Ghana Stock Exchange (GSE). *International Journal of Trend in Scientific Research and Development,* 3(4), 1–7.

Nasri, H., Nurman, N., Azwirman, A., Zainal, Z., & Riauan, I. (2022). Implementation of collaboration planning and budget performance information for special allocation fund in budget planning in the regional development planning agency of Rokan Hilir regency. *International Journal of Health Sciences (IJHS) Ecuador*, *6*(S4), 639-651.

Novlina, L. D., & Indriani, M. (2020). The effect of organizational commitment and Cost management knowledge on the relationship between budget participation and managerial performance. *Jurnal Akuntansi Dan Auditing Indonesia,* 55–66.

Olayinka, A. A. (2022). Financial statement analysis as a tool for investment decisions and assessment of companies' performance. *International Journal of Financial, Accounting, and Management*, *4*(1), 49-66.

Piedmont, R. L. (2024). Construct validity. In *Encyclopedia of quality of life and well-being research* (pp. 1332-1332). Cham: Springer International Publishing.

Popoola, O. A., Adama, H. E., Okeke, C. D., & Akinoso, A. E. (2024). The strategic value of business analysts in enhancing organizational efficiency and operations. *International Journal of Management & Entrepreneurship Research*, *6*(4), 1288-1303.

Rahiminezhad Galankashi, M., & Mokhatab Rafiei, F. (2022). Financial performance measurement of supply chains: a review. *International journal of productivity and performance management*, *71*(5), 1674-1707.

Rashidov, A., Leonodovna, M. N., & Azlarkhan, A. (2023). The importance of financial accounting in business decision-making. *Texas Journal of Multidisciplinary Studies*, *21*, 1-4.

Saunders, M., Lewis, P., & Thornhill, A. (2019). Research methods for business students eight edition. *Qualitative Market Research: An International Journal.*

Serumaga-Zake, J. M., & Van der Poll, J. A. (2021). Addressing the impact of fourth industrial revolution on South African manufacturing small and medium enterprises (SMEs). *Sustainability,* 13(21), 11703.

Shawe, R. (2023). Budget and Organization Management. *Open Journal of Business and Management*, *11*(3), 910-919.

Siziba, S., & Hall, J. H. (2021). The evolution of the application of capital budgeting techniques in enterprises. *Global Finance Journal*, 47, 100504. https://doi.org/10.1016/j.gfj.2019.100504

Swami, V., Barron, D., Weis, L., Voracek, M., Stieger, S., & Furnham, A. (2017). An examination of the factorial and convergent validity of four measures of conspiracist ideation, with recommendations for researchers. PloS one, 12(2), e0172617.

Tzenios, N., Frsph, F., & FWAMS, F. (2022). Budget management for the non-profit organization. *International Journal of Global Economic Light*, *8*(6), 9-13.

Voorhees, C. M., Brady, M. K., Calantone, R., & Ramirez, E. (2016). Discriminant validity testing in marketing: an analysis, causes for concern, and proposed remedies. *Journal of the academy of marketing science*, *44*, 119-134.

Wafiroh, N. L., Abdani, F., & Nurdin, F. (2020). Budget participation and budgetary slack: The mediating effect of autonomous budget motivation. *Jurnal Akuntansi*, 10(3), 287–300.

Wei, F., Abbas, J., Alarifi, G., Zhang, Z., Adam, N. A., & de Queiroz, M. J. (2023). Role of green intellectual capital and top management commitment in organizational environmental performance and reputation: Moderating role of pro-environmental behavior. *Journal of Cleaner Production*, *405*, 136847.

Yu, Q., Yen, D. A., Barnes, B. R., & Huang, Y.A. (2019). Enhancing firm performance through internal market orientation and employee organizational commitment. *The International Journal of Human Resource Management,* 30(6), 964–987.