EFFECT OF RISK MANAGEMENT ON PROFITABILITY OF MANUFACTURING FIRMS IN NIGERIA. A STUDY OF GRAND CEREALS NIG. LTD

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Abstract

This research study was aimed at examining the impact of risk management on the profitability of manufacturing industries in Nigeria, focusing on the Grand Cereal industry in Plateau State. The study investigated the relationship between three independent variables, namely materials price fluctuation risk, operational risks, and supply chain disruption, and the dependent variable of profitability, proxied by return on equity (ROE). The research design employed in this study is a descriptive survey research design. The study population consists of active functional, strategic, and various lines managers in the Grand Cereal industry, Plateau State. A sample size of 384 respondents was selected using the Cochrane formula at a 5% level of significance. The data was collected through a questionnaire administered to the selected respondents. Data analysis was performed using descriptive statistics for the common sample and the Ordinary Least Squares (OLS) regression analysis. The findings of the study reveal a significant and positive relationship between return on equity (ROE) in the manufacturing industry and three key risk management factors: operational risk management, supply chain risk management, and material pricing risk management. These findings emphasize the importance of effectively managing operational risks, such as process efficiency and safety measures, to enhance financial performance. Based on the results, it was concluded that manufacturing firms that prioritize operational efficiency, safety measures, and risk mitigation strategies can expect improved profitability and stronger returns on equity. The study recommended that manufacturing firms leverage the positive and significant relationship between operational risk management, supply chain risk management, material pricing risk management, and return on equity (ROE) to strengthen their financial performance. Furthermore, optimizing material procurement strategies, minimizing the impact of price fluctuations, increasing resilience, and gaining a competitive edge in the industry are crucial recommendations for manufacturing firms to enhance their profitability.

Key Words: Manufacturing firms, Profitability, Risk Management

1. INTRODUCTION

The manufacturing sector holds a pivotal role in driving the Gross Domestic Product (GDP) of countries worldwide. It serves as the linchpin in the transformation of economies from traditional to modern, as noted by Brooking (2018). This sector plays a crucial part in economic development, acting as a catalyst for accelerating structural transformation and diversification. Its significance lies in enabling a nation to harness its inherent resources fully, reducing dependency on foreign aid, and lessening reliance on external sources for finished products or raw materials. This perspective is supported by both the National Bureau of Statistics (NBS, 2014) and Brooking (2018). The manufacturing sector is renowned globally as an engine of growth, with vast potential for wealth creation and job generation, as highlighted in Vanguard (2022).

Like numerous African nations, Nigeria's manufacturing sector historically held significant economic importance, contributing around 10% to the GDP prior to the 1970s oil boom, which shifted the country's focus to oil export. Despite a decline, recent years have witnessed resurgence. Between 2019

and 2021, manufacturing contributed N19.26 trillion to the GDP, second only to agriculture. Notably, from 2010 to 2013, there was steady growth in the sector's contribution, peaking in 2013 with unprecedented growth. Initially encompassing Oil Refining, Cement, and Other Manufacturing, the sector now comprises 13 segments, with Food Beverages and Tobacco being the most significant, accounting for 52.74% of the total, followed by Textiles Apparel and Footwear at 18.02% (NBS, 2022).

Profitability profoundly impacts the sector's performance, serving as a measure of a firm's efficiency and success. Higher profits indicate effective resource management, while lower profits can hinder progress and goal achievement, highlighting why manufacturing firms prioritize not just survival but also profit generation (Adebayo & Onyeiwu, 2018).

The Nigerian government has consistently launched a series of programs and policies since gaining independence in 1960 to foster the development of the nation's manufacturing sector, boost the economy, and create jobs for the growing workforce. Initiatives like the Nigerian Enterprises Promotion Decree (NEPD) of 1972 and the Nigerian Indigenization Policy of 1972 aimed to promote Nigerian ownership and control of industrial enterprises. Subsequent policies and programs include the IMF-engineered Structural Adjustment Policy (SAP) of 1986, the Trade and Financial Liberalization Policy of 1989, the Small and Medium Industries Equity Investment Scheme (SMIEIS) of 2000/2001, the Bank for Industry (BOI) of 2000, the National Economic Empowerment and Development Strategy (NEEDS) of 2004, the National Integrated Industrial Development (NIID) of 2007, and the Industrial Park Development Strategy (IPDS) of 2009.

Despite numerous strategic initiatives undertaken by the government and various stakeholders in the manufacturing sector, this industry has failed to keep pace with the expanding labor force, resulting in a rise in urban unemployment. Analysts contend that the manufacturing firms in Nigeria, especially Fast-Moving Consumer Goods (FMCG) producers, have faced mounting pressure on their profitability and productivity in recent times. This pressure is driven by a combination of internal risks, including operational issues, supply chain disruptions, information loss, asset impairment, financial challenges, and external risks like environmental hazards, sectarian crises, political instability, among others, all of which the sector must grapple with.

Companies operating in this sector are displaying signs of strain, indicating that they are being adversely affected by specific macroeconomic conditions. For example, the Business Day (2021) analysis of Nestle Nigeria, Dangote Sugar, Cadbury, Unilever, and NASCON- all listed on the Nigerian stock exchange (now called Nigerian Exchange (NGX), reveals that their cumulative cost of sales for the period ending in June 2021 amounted to N197 billion. This figure represented a 32 percent increase from the N149 billion recorded during the same period in 2020, significantly impacting their profit, which grew by a modest eight percent, moving from N22.6 billion in 2020 to N24.5 billion in the first half of 2021 (Business Day, October, 2021). This raises the fundamental question of whether firms are genuinely committed to effectively managing various facets of their manufacturing environment in terms of risk elements. This inquiry arises from the widespread belief that proficient risk management can maximize the benefits of a risky situation while minimizing its adverse consequences.

Risk management stands as one of the key methods for providing assurance of a sound investment to stakeholders. The primary objective of risk management is to shield against significant unexpected outcomes, whether positive or negative, which the firm did not anticipate (Fadun & Oye, 2020). In the case of manufacturing firms, concerted efforts are typically made to mitigate several risk factors specific to the sector. Among these common risk factors are operational risk, material price fluctuations, supply chain disruptions, and others.

What is notably lacking in the existing body of literature is empirical evidence demonstrating the specific impact of operational risk management, material price risk management, and supply chain risk management on the profitability (ROE) of manufacturing firms. Consequently, there is a pressing need for a study to investigate the influence of risk management on the profitability of manufacturing industries. This study is motivated by the need to assess the effect of risk management, particularly the operational risk management, raw material price risk management, and supply chain risk management frameworks employed by Grand Cereals Nig. Ltd, on its overall performance in terms of profitability. This is relevant because apart from being one of the manufacturing companies in Nigeria, Grand Cereals is strategically located to enhance proximity to its major sources of raw materials, which happens to be one of the main issues in the study.

1.2 STATEMENT OF THE PROBLEM

Since 1982, when manufacturing in Nigeria reached its peak contribution of 7.83% to the total economic output, its significance has been consistently dwindling. This decline can be attributed to several factors such as structural challenges, policy changes, and economic fluctuations over the years. This includes the COVID-19 pandemic which caused remarkable disruption to global supply chains and adversely affected the manufacturing sector in Nigeria. Lockdowns, supply chain disruptions, and decreased consumer demand contributed to a decline in manufacturing contribution and profitability (Mezgebe et al., 2023). This overarching decrease in manufacturing's contribution to Nigeria's total economic output mirrors its lackluster financial performance. This notion aligns with the argument that a firm's growth trajectory is intricately linked to its profitability (Yero & Hamisu, 2023; Business Day, October, 2021).

The main issue prompting this study is that inadequate risk management in manufacturing firms leads to their inability to achieve profitability. Risks such as volatile fluctuations in raw material prices can have far-reaching consequences for manufacturing organizations, potentially destabilizing markets and supply chains and hindering financial success if not effectively managed. Abiodun et al. (2017) emphasize that the unpredictable and erratic price fluctuations of materials pose a substantial obstacle to the growth of the Nigerian construction industry, resulting in losses for project owners.

In light of these multifaceted challenges, this study endeavors to assess the impact of effective risk management on the profitability of manufacturing industries, focusing specifically on the Grand Cereals Company in Jos, Plateau State.

1.3 OBJECTIVES OF THE STUDY

The main objective of the study is to find out the effect of risk management on the profitability of manufacturing industries in Nigeria. Specifically, this study seeks to:

i. Evaluate the effect of materials price fluctuation risk management on the profitability (ROE) of Grand Cereals Company.
ii. Examine the effect of operational risks management on the profitability (ROE) of Grand Cereals Company.
iii. Determine the effect of supply chain disruption risk management on the profitability (ROE) of Grand Cereals Company.

1.4 RESEARCH HYPOTHESES

The research hypotheses are stated in their null form below:

i. H_0: There is no significant relationship between materials price fluctuation and profitability (ROE) of Grand Cereals Company.
ii. H_0: There is no significant relationship between operational risks management and the profitability (ROE) of Grand Cereals Company.
iii. H_0: There is no significant relationship between supply chain disruption and the profitability (ROE) of Grand Cereals Company.

1.5 SCOPE OF THE STUDY

The main scope of the study is an evaluation of the effect of risk management on the profitability of the manufacturing industries. Specific attention is devoted to risk factors in the areas of operation, supply chain and material pricing and how they impact on the company's earnings. Spatially, the scope is focused on the Grand Cereals Company, located in Jos, the Plateau State capital. This is relevant because apart from being one of the manufacturing companies in Nigeria, Grand Cereals is strategically located to enhance proximity to its major sources of raw materials, which happens to be one of the main issues in the study.

Periodically, the scope is focused on the company's net profit from the year 2010-2020. This is also important because within this period, series of events which have impacted on the operation of the company unfolded within the operational environment of the company. Within the period under review, the company's business environment witnessed series of events which may have taken a toll on the supply chain of the company or influenced the price of its raw materials.

1.6 SIGNIFICANCE OF THE STUDY

This result of this study will be of great benefit to the Grand Cereals Company, researchers and stakeholders in the manufacturing sector. The significance of this study cannot be over-emphasis given the threat risks pose to the successes of most manufacturing firms.

Practically, the study will of great benefit to the decision-making body of the Grand Cereals Company. The study has the potential of enlightening appropriate line managers of the company on the effect of risks on profitability, particularly in terms of net profit margin or return on assets. The study will guide on what strategies to develop to effectively manage or reduce the company's vulnerability to risks. It will help disclose the devastating effect of ineffective management of risks associated to manufacturing.

Secondly, the study is capable of contributing to the growth of existing knowledge and theories through its findings. It will serve as a good source of useful information for other readers and researchers as this may form part of the foundational basis upon which newer works will be started. It is capable of widening other readers' scope of knowledge academically, occupationally and economically.

2. LITERATURE REVIEW

Concept of Risk and Risk Management

The term risk is used to describe the probability of occurrence of an adverse event. It is the expression of the likelihood and impact of an event with the potential to affect the achievement of the goals of an organization. Risk can be seen from the perspective of the uncertainty that surrounds future events and occurrences. Emma and Gabriel (2012) viewed risk as a state where there is a likelihood of a loss but also a hope of gain. This implies that risk is not always tended to loss but also gain in certain cases.

Broadly though, risk management is an integral part of good management practice which involves systematic application of management policies, procedures and practices to the tasks of identifying, analyzing, assessing, treating and monitoring of risk. However, there have been differing opinions on the concept of risk management among scholars who have delved into studies on the subject of risk management. For instance, the concept and concern of risk management, the practical and functional

behavior of risk management and the major purpose of it, differ based on different perspectives (Mohammed & Knapkova, 2016).

According to the Institute of Risk Management (2012), risk management is a process with the aim to increase the probability of success and reduce the event of a failure. Rejda (2013) defined risk management as a practice of identifying loss exposures faced by an organization and selecting the most appropriate procedures for treating these particular spotlights effectively. Wenk (2005) opined that risk management is the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to mitigate, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities. One key striking feature in these two definitions is the identification of the risk(s) to be managed. This suggests that for any risks to be managed effectively, they must be clearly identified or foreseen before any proactive measure or management functions can be undertaken to mitigate their effect. Meanwhile, Ugah (2020) noted that risk management involves coordinated activities aim at controlling risk. This links well with Res et al. (2016) who view risk management to consist of a series of steps, which allows for continuous improvement of decision making by establishing the context, identifying and analyzing deviations, monitoring and communicating risks in an organization. Also, Almasarweh et al. (2022) defined risk management is the process that identifies, evaluates, and monitors threats to a company's capital and profits as well as generates strategies to manage impending risks and risks that have already occurred.

One major deduction from the foregoing definitions is that the ultimate goal of risk management in any organization is to identify risks and the measures to mitigate the risks and more importantly monitor the profile of the organization. In other words, risk management of any organization should be handled in such a way that gives positive result while guiding against the unfavourable and unexpected situation that could hinder the desirable result.

Operational Risk Management

Scholars who have attempted to define operational risk in recent past have claimed that defining the term operational risk is complex, slippery and continues to evolve (Mainelli, 2002; Okeke et al.,2018). However, the Basel Committee on Banking Supervision, based on the New Basel Capital Accord (2003), defined operational risk as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This includes legal risk, but excludes strategic and reputation risk. Kerongo and Mwaura (2016) simply referred to operational risk the financial loss to business as a consequence of conducting it in an improper or inadequate manner and may result from external factors. Operational risk may appear in the form of technical and information technology breakdown, business disruption, control failures, human errors, misdeeds or external events. In its later review, the Basel Accord (2007) adopted the definition of operational risk according to the British Bankers´ Association (BBA), “as the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events. Operational risk is tended to become a major constraint since it involves taking appropriate measures to ensure the qualitative transactions without processing errors in order to deliver the best services to the customers (Grody et al., 2005). Following severe operational failures resulting in the restructuring of the affected financial institutions or in the sale of the entity (Barings), the emphasis on operational risk management within banks has increased, leading regulators, auditors, and rating agencies to expand their focus to include operational risks as a separate entity besides market and credit risk (Helbok & Wagner, 2006).

Managing operational risk requires that the analysis and mitigation of risks be geared toward identifying and controlling hazards at the various levels of the firm so as to lower risks to barest minimal. A business risk analysis entails the identification of the assets, the threats, the potential business impact in case of realized threats, and the vulnerabilities in the firm's protection. A manufacturing firm's purpose of risk management is to reduce the firm's vulnerability through suitable controls on individual loss events, after consideration of security and costs. Such controls can be both technical and procedural and these must be integrated into the entire organization/business units (Bagherzadeh & Jöehrs, 2015). Similarly, operational risk management is integral to decision-making and successful risk management will help address firm's failure possibilities proactively (Ndaiga 2016).

Supply Chain Disruption Risk Management (SCRM)

A supply chain is the linkage of series of organizations with facilities, functions, processes, and logistics activities that are involved in producing and delivering a product or service. Supply chains essentially constitute organizational frameworks based on exchange and dependence between firms, each with its own objectives and motivations and drawing a payoff, whose risks it must also sustain and manage, in as many ways as it may be able to measure and conjure (Tapiero & Kogan, cited Panday & Panday, 2018). Supply chain risks consist of anything that might disrupt the smooth flow of materials or the flows in supply of the forms of material, finance and information (Waters, cited Panday & Panday, 2018). Supply Chain Management (SCM) is a principle emphasizing the utilization of an efficient integrated system of suppliers, producers, warehouses, retailers and customers, so that items can be produced and distributed system-wide at the right quantities, locations, and time to minimize costs and maximize services (Panday & Panday, 2018). In the past, when firms manufactured in-house, sourced locally and sold direct to the customer, 'risk' was less diffused and easier to manage. With the advent of increased product/service complexity, and outsourcing of supply networks across international borders, risk is increasing and the location of risk has shifted through complex changing supply networks (Panday & Panday, 2018).

Series of attempts have been made by various authors to conceptualize supply chain risk (SCR) on one hand and supply chain risk management (SCRM) on the other. Some authors noted that there is no consensus on the definition of "supply chain risk" and "supply chain risk management" (Sodhi et al., 2012; Diehl & Spinler, 2013). However, Jüttner et al. (2003) defined supply chain risk as "any risks for the information, material and product flows from original suppliers to the delivery of the final product for the end user." This definition is rather applicable in specific domains such as information flow risk, material flow risk, and product flow risk. However, supply chain risk, according to Zsidisin (2003), is "the probability of an incident associated with inbound supply from individual supplier failures or the supply market occurring, in which its outcomes result in the inability of the purchasing firm to meet customer demand or cause threats to customer life and safety.

Materials Pricing Risk Management

Materials are simply inputs without which no organizations can successfully operate. The efficiency of any activity for production of goods and services depends to a great extent, on the supply of materials, equipment and manpower made available in their right proportions (Ibegbulem & Okorie, 2015). The authors described materials as industrial goods that will become part of another physical product. Rumelt (2002), classified materials for manufacturing under (1) raw materials: primarily from agriculture and the various extractive industries e.g. mineral resources, fruits, and vegetables sold to processor, (2) semi-finished goods and processed materials: to which some work has been applied or value

added e.g. rods, wires, paper, chemicals, etc. and (3) component parts and assemblies: which are completely finished products of one manufacturer, and can be used as part of more complex product by other manufacturers.

One of management's commitments towards materials is purchasing. No wonder, Ibegbulem and Okorie (2015) opined that materials management is that aspect of business activity that deals with planning for purchasing, receiving, handling, storing, and releasing of materials for use in production with effective control measures. Thus, the goal of materials management is to ensure that the right item is bought and made available to the manufacturing operations at the right time, at the right place and at the lowest possible cost (Banjoko et al., 2000; Jacobs et al., 2009).

Literature has shown that packaged consumer goods companies, airlines, packaging companies, construction companies, auto makers, and utilities have all become more vulnerable to rising material costs in the past few years (Frankl et al., 2015 Frankl et al., 2015). Raw material costs, for instance, are among manufacturing firms' biggest expense, accounting for about half of their total costs. However, passing this burden through price increases in a timely manner to customers is not always easy, particularly in highly competitive growing global markets, where a meager jump in the prices of raw materials can either double a company's earnings or wipe them out completely. Thus, if firms must stay ahead, they need to shift their procurement mind-set toward commodity price risk management (Frankl et al., 2015).

Profitability

The term profit is used to describe the excess of revenue/income above the costs/expenses incurred in the process of producing the revenue/income (Evans, 2014). According to Toshniwal (2016), profit is the excess of output over the input factors expressed in monetary terms is called profit. This implies the excess of income over costs. Evans (2014) posited that profit is an absolute measure of the positive gain from an investment or business operation after subtracting all expenses. In other words, it is the absolute amount of money a business makes after accounting for all expenses, and is calculated using the formula "Profit = Total Revenue – Total Expenses" as part of an Income Statement.

However, Toshniwal (2016) in a succinct definition, argues that profit, in term of financial management, includes the test of efficiency and a measure of control; a measure of the worth of investment to the owners; the margin of safety to the creditors; a source of fringe benefits to the employees; a measure of taxable capacity and the basis of legislative action to the government; and an index of economic progress, national income generated and rise in the standard of living to the country. Making a profit is what all businesses strive to do because without profit, the business will not survive in the long run. Toshniwal (2016) broadly classified profit into accounting profit (excess of revenue over related costs applicable to a transaction, a group of transactions or the transactions of an operating period); economic profit (deduction of "implicit" as well as "explicit" costs of a period from the revenue of that period); and social profit (the excess of social benefits over the social costs). By "explicit" and "implicit", the author meant the expenditure incurred on the raw materials consumed by a firm and the reward of those factors of production which are owned by the entrepreneur himself respectively.

The term 'profitability', on the other hand, is a coinage from the words, 'profit' and 'ability.' Deducing from the definitions of profit above, the term 'profit' can be summarily described as the sum arrived at by deducting total costs from sales revenue. While 'ability' is a reflection of the power to earn profit by of an enterprise or earning power or earning capacity or operating performance of the concerned investment (Toshniwal, 2016). So, simply put, profitability is the ability of a given investment to earn a

return from its use. In other words, it is the size of the profit relative to the size of the business. It is a term used to measure how efficient the business is in using its resources to produce profit, that is, rate of return on investment. Unlike profit, Evans (2014) noted profitability is a relative measure of the success or failure of a business. Thus, profitability has more to do with the rate of return expected on an investment (capital), or the size of the return, compared to what could have been obtained from an alternative investment (such as putting your money in a risk-free certified deposit or buying government treasury bonds). In the context of this study, however, profitability is measured in terms of return on equity (ROE). It is the ratio of net profit before taxes divided by total equity. Return on Equity (ROE) is the measure of a company's annual return (net income) divided by the value of its total shareholders' equity, expressed as a percentage. It can also be derived by dividing the firm's dividend growth rate by its earnings retention rate. Return on Equity (ROE) is a two-part ratio in its derivation because it brings together the income statement and the balance sheet, where net income or profit is compared to the shareholders' equity. The number represents the total return on equity capital and shows the firm's ability to turn equity investments into profits made for each amount of money from shareholders' equity.

THEORETICAL FRAMEWORK

There is the axiomatic belief that a direct link exists between risk management and the performances of firms. Puspitaningtyas (2017) noted that it has been theoretically suggested that direct relationship is expected between risks and return of firms. No wonder, discussions on the nexus between risk management and profitability have hovered around certain selected theories. Prominent among these theories is the Stakeholder theory. This section discusses this theory and it relevance to the current.

Stakeholders Theory

The stakeholder theory was originally detailed by Edward Freeman in 1984. In his book, "Strategic Management: A Stakeholder Approach," Freeman noted that a company's stakeholders include just about anyone affected by the company and its workings, without whose support the organization would cease to exist. These groups include customers employees, suppliers political action groups, environmental groups, local communities, the media, financial institutions, governmental groups and more (Simon, 2016). Stakeholders theory is concerned about three interconnected problems relating to business.. They include problem of value creation and trade, which means, how is value created and traded in a rapidly changing and global business context?

The stakeholder's theory states that business is made up as a result of the relationships that exist among groups that have a stake in the business (Freeman, 1984; Jones, 1995; Walsh, 2005). It is basically about how customers, suppliers, employees, financiers (stockholders, bondholders, banks, etc.), communities and managers interact to jointly create and trade value. To understand a business is to know how these relationships work and change over time. It is the executive's job to manage and shape these relationships to create as much value as possible for stakeholders and to manage the distribution of that value (Freeman, 1984). Where stakeholder interests conflict, the executive must find a way to re-think problems so that the needs of a broad group of stakeholders are addressed, and to the extent this is done even more value may be created for each (Harrison et al., 2010). Many reasons exist to explain why the stakeholder's theory is relevant to this study. This is because mutually beneficial stakeholder relationships can enhance the wealth-creating capacity of the corporation, while failure to do so limits capacity for future wealth generation (Post et al., 2002) and avoidance of negative outcomes/risk reduction creates more predictably stable returns (Fama, 1970; Graves & Waddock, 1994).

REVIEW OF EMPRIRCAL STUDIES

In a study entitled "Risk Management and Financial Performance of Manufacturing Firms in Nigeria",Akinleye and Olanipekun (2021) investigated risk management and financial performance of manufacturing firms with a view to analyzing the effect of liquidity risk and market risk on after tax profit of manufacturing firms in Nigeria. The results revealed that liquidity risk positively and significantly affect profit after tax while market risk (measured by interest rate risk) negatively and insignificantly affect profit after tax of sampled firms quoted in Nigeria. This study concluded that efficient and effective risk management will positively affect performance of quoted firms in Nigeria, most specially management of internal risk such as the liquidity risk. Hence, firms should build an internal control system flexible in nature to harness the benefit of internal risk management and also normalize the negative effect of external risk such as the interest rate on performance.

Similarly, Ayeni and Emeka (2021) explored the effect of financial risks on the performance of manufacturing firms in Nigeria. It was discovered that leverage risk, liquidity risk, firm size have adverse and significant effect on return on asset while age of firm has positive and insignificant effect on return on asset. Financial risk of manufacturing sector in Nigeria is on the rise, especially as a result of debt and increase in current liabilities over current assets which are constraints on general performance. It is recommended that manufacturing firms should avoid incurring excessive debt in order to avoid increase the risk of leverage. In addition, effective strategies should be employed to monitor and manage financial risks in order to reduce or eliminate the negative consequences of these risks.

In an MBA project research, Njeru (2021) sought to determine the effect of financial risk management on profitability of oil marketing firms in Kenya. The study specifically considered the effect of credit risk management, exchange rate risk management, interest rate risk management and price risk management on profitability of oil marketing firms in the study area. The result showed a positive and significant effect (β=0.02, p=0.038) of exchange rate risk management on profitability of oil marketing companies in Kenya; a positive and significant effect (β=0.023, 0.007) of credit risk management on profitability of oil marketing companies in Kenya; and a positive and significant effect (β=0.13, p=0.001) of price risk management on profitability of oil marketing companies in Kenya. Interest rate risk management was not found to have a significant relationship with profitability **(**β=0.013, p=0.405**).** The study recommended among other things the need to for financial managers of the oil marketing firms to put in practices and strategies to get involved in forward contracts, future contracts, options contracts and swaps to minimize the risk and exposure of exchange rates and interest rates in Kenya.

Fadun and Oye (2020) conducted a study, "Impacts of Operational Risk Management on Financial Performance: The results showed that there is a positive relationship between operational risk management and the financial performance of banks. The findings revealed that sound operational risk management practices impact positively on the financial performance of banks. It was therefore, recommended that banks' management should deploy adequate resources towards understanding operational risk to ensure sound operational risk management and improved financial performance of banks.

3. METHODOLOGY

This study examines the effect of risk management on the profitability of manufacturing industry in plateau state; hence study adopted descriptive survey research design. This design is appropriate for this study since information will be gathered from a sample of the population (functional managers, line and strategic managers) of Grand Cereal industry, Plateau State who are believed to be involved in the

issues of the study. Consequently, the Cochran's formula for determining the sample size of an unknown population was used which produces a sample size of approximately 384. This was arrived at given the quantitative approach to this research. Hence, the need to determine how much error will be tolerated by a confidence interval. For example, a result may be stated at a 90% confidence level. This means, if a survey were to be repeated over and over, 90% of the time, the same result would be obtained. Therefore, if there is 95% confidence, and at least 5% plus (+) or minus (-) precision, a 95% confidence gives a Z values of 1.96, per the normal tables (Cochran, 1963). That is to say, the probability of making an error is 5%, while the confidence level is 95%. Consequently, the Cochran's formula for determining the sample size of an unknown population will be used. The formula is given below:

$n_0 = Z^2pq/e^2$

n_0 = is the sample size

p = degree of variability (0.5)

q = 1-p

e = margin of error 0.05

z = tabulated value from a 95% confidence level (1.96)

$$n_0 = \frac{(1.96)^2\ (0.5)\ (0.5)}{0.0025}$$

$$n_0 = \frac{(3.8416)\ 0.25}{0.25}$$

$$n_0 = \frac{0.9604}{0.0025}$$

n_0 = 384.16

n_0 = 384

Therefore, the questionnaire was allocated evenly across four sections (operation, finance, marketing & distribution, and purchasing) in Grand Cereal that was relevant to this study.

For data analysis, descriptive statistics (common sample) and the Ordinary Lead Square (OLS) model of regression was used to analyzed the data in this study. The justification for the choice of this model of analysis for this study is its simplicity, and the fact that most of econometric techniques involve components of OLS method (Gujarati and Sangeetha, 2007). The method has been used in a wide range of economic relationships with fairly satisfactory results been yielded. More so, it is good unbiased linear estimator. OLS is suitable for this study because the coefficient estimates are more efficient if the model is free from other econometric problems such as serial correlation, hetero schedasticity and multi collinearity (Koutsoyannis, 1977). The explicit model specified is as follows:

ROE = *f*(ORM, SCRM, MPRM) ----------(1)

Where;

ROE = return on equity

ORM = operational risk management

SCRM = supply chain risk management

MPRM = material pricing risk management

The linear relationship $ROE_t = \beta_0 + \beta_1\ ORM_t + \beta_2\ SCRM_t + \beta_3 MPRM_t\ \varepsilon_t$ ---------- (2)

Where;

ROE, ORM, SCRM and MPRM are as specified above

β_0= Intercept of the model

β_1, β_2 and β_3= Coefficient of ORM, SCRM and MPRM respectively
ε_t = Stochastic error term
β_1-β_3 = are the partial slope coefficients,

4.0 RESULTS AND DISCUSSIONS

Table 1: Results of Descriptive Statistics

	ROE	ORM	SCRM	MPRM
Mean	25.25340	25.25298	25.24362	25.26289
Median	25.92000	26.44000	26.70000	26.82589
Maximum	38.48000	38.48000	40.58000	39.68525
Minimum	13.09000	13.09000	1.830000	1.925000
Std. Dev.	6.688283	7.503856	10.36371	10.25687
Skewness	0.430199	0.044372	-0.874638	0.952545
Kurtosis	2.276678	2.123047	3.094198	2.275101
Jarque-Bera	2.474311	1.521473	6.009809	5.500011
Probability	0.290208	0.467322	0.049543	0.055551
Sum	1186.910	1186.890	1186.450	1186.420
Sum Sq. Dev.	2057.724	2590.161	4940.696	4562.568

Source: Researcher's computation using the econometric software; Eviews[10], 2023.

The standard deviation in table 1, which measures the dispersion or spread in the series, shows lower values (ROE- 6.688283, ORM- 7.503856, SCRM- 10.36371 and MPRM- 10.25687) than those of the values of the mean (ROE- 25.25340, ORM- 25.25298, SCRM- 25.24362 and MPRM- 25.26289). This is an indication of lower deviation of the series from its mean. A positive skewness, as shown in the table indicates that the distribution has a long right tail. Each of ROE, ORM, SCRM and MPRM has a skewness of a near normal distribution of 0.430199, 0.044372, -0.874638 and 0.952545 respectively. While the ROE, ORM and MPRM have distribution of a long right tail, with positive kewness, SCRM skewness implies that the distribution has a long left tail, with a negative skewness. The Kurtosis for ROE (2.276678), ORM (2.123047) and MPRM (2.275101) indicate a flat (platykurtic) distribution relative to the normal distribution of 3, while SCRM which is well over 3 indicates a peaked (leptokurtic) distribution, relative to the normal.Given the null hypothesis for the test statistic of normal distribution that the series is normally distributed, a non-significant ROE, ORM, SCRM and MPRM at 5% p-values indicate a non-rejection of the H_0. An indication that the series are normally distributed, which suggests that the data series involved for the statistical analysis are symmetrical and hence feasible for analysis.

Regression Result

Table 2: Results of Ordinary Least Square (OLS) Regression

Dependent Variable: ROE

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	25.17388	3.045380	8.266252	0.0000
ORM	0.418658	0.145067	-2.885965	0.0060
SCRM	0.421964	0.105036	4.017327	0.0002
MPRM	0.001668	0.000745	2.240269	0.0054

R-squared	0.271860	Mean dependent var	25.25340
Adjusted R-squared	0.238763	S.D. dependent var	6.688283
S.E. of regression	5.835452	Akaike info criterion	6.427482
Sum squared resid	1498.310	Schwarz criterion	6.545577
Log likelihood	-148.0458	Hannan-Quinn criter.	6.471922
F-statistic	8.213988	Durbin-Watson stat	2.036329
Prob(F-statistic)	0.000931		

Source: Student's computation using the econometric software; Eviews[10], 2023.

Table 2 above showed the sign of the coefficients of ORM, SCRM and MPRM are positive. This literarily means that ROE (Return on Equity) increases with higher ORM (Operational Risk Management), SCRM (Supply Chain Risk Management) and MPRM (Material Pricing Risk Management), and decreases with lower ORM and lower SCRM and MPRM. This could also suggest that effective operational risk management may influence the growth of Return on Equity rate of manufacturing industry just as the Supply Chain Risk Management and Material Pricing Risk Management have a far more reaching effect on the Return on Equity rate of manufacturing industry in the study area. It could also mean that the impact of operational risk management on the Return on Equity rate of manufacturing industry in the study area is as pronounced as it is with Supply Chain Risk Management and Material Pricing Risk Management. This goes to buttress the claims that Supply Chain Risk Management and Material Pricing Risk Management are peculiar with the manufacturing sector (Otekunrin et *al*, 2021; Puspitaningtyas, 2017, & Mwelu, et *al*, 2014).

In terms of magnitude, however, it implies that every increased attempt at operational risk management across the manufacturing industry in the study will on average, lead to about 42% increase in the Return on Equity. On the other hand, every 1% increase in the rate of SCRM and MPRM will on average, lead to 42% rise in ROE. These results conform to the economic *apriori* expectations.

Meanwhile, considering the statistical significance of the coefficients which could be judged from the Standard Error, T-Statistic and the probability value of each coefficient, the results showed that each ORM, SCRM and MPRM are statistically significant. R-squared statistic shows that explanatory variables in the model (ORM, SCRM and MPRM) account for about 27.2 percent of the variation in the dependent variable (ROE). Thus, the explanatory power of the model is low and appears to suggest that the included variables are perfect predictors of ROE. Adjusted R-squared being very close to the R-squared implies

that there is less likely penalty for irrelevant variables in the model. F-statistic being significant implies that the overall goodness of fit of the model is, however, satisfactory. The Durbin Watson (DW) statistic value of 2.036329 implies the absence of serial correlation in the model. Thus, the regression model can be reliably used for decision making the issues in the study.

Table 3: Results of Ordinary Least Square (OLS) Regression Model

Dependent Variable: LOG(ROE)
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.286722	0.359217	9.149676	0.0000
LOG(ORM)	0.220064	0.134304	-1.638555	0.1084
LOG(SCRM)	0.199673	0.055286	3.611656	0.0008
LOG(MPRM)	0.421966	0.001785	1.339331	0.3124

R-squared	0.232705
Adjusted R-squared	0.197828
S.E. of regression	0.237676
Sum squared resid	2.485564
Log likelihood	2.391617
F-statistic	6.672139
Prob(F-statistic)	0.002946
Mean dependent var	3.194721
S.D. dependent var	0.265370
Akaike info criterion	0.025889
Schwarz criterion	0.143983
Hannan-Quinn criter.	0.070328
Durbin-Watson stat	2.019011

Source: Researcher's computation using the econometric software; Eviews[10], 2023.

The results of the Ordinary Least Square (OLS) model in Table 3 indicated a log-linearized transformation of the model. Consequently, the coefficients are being interpreted as proportional/percentage change.

The coefficient of the log of ORM is positive which satisfies economic *apriori* expectation and its magnitude is 0.220 which implies that a 1 percent increase (decrease) in ORM will lead to about 22.0 percent increase (decrease) in return on equity (ROE) of manufacturing sector in the study area. This shows that the proportional change in ORM is higher than the proportional change in ROE, thus, it suffices to conclude that ROE (Return on Equity) is ORM (Operational Risk Management) inelastic. Comparatively, the coefficient of the log of SCRM is positive and its magnitude is 0.199673, which implies that a 1 percent increase (decrease) in SCRM will lead to about 19.97 increase (decrease) in return on equity (ROE) of manufacturing sector in the study area. This is an indication that the proportional change in SCRM is greater than the proportional change in ROE, therefore the conclusion that ROE (return

on equity) is SCRM (supply chain risk management) elastic. Similarly, the coefficient of the log of MPRM is positive and its magnitude is 0.421966, which implies that a 1 percent increase (decrease) in MPRM will lead to about 42.19 increase (decrease) in return on equity (ROE) of manufacturing sector in the study area. This is an indication that the proportional change in MPRM is greater than the proportional change in ROE, therefore the conclusion that ROE (return on equity) is SCRM (supply chain risk management) elastic.

The results of the Ordinary Least Square (OLS) are summarized below:

ROE =	25.17388 + 0.418658ORM + 0.421964SCRM + 0.001668MPRM			
SE =	(3.045380)	(0.145067)	(0.105036)	(0.000745)
P.value =	(0.0000)	(0.0060)	(0.0002)	(0.0054)
R-squared =	0.271860			
Adjusted R^2 =	0.238763			
F-stat. =	8.213988			
F.prob. =	0.000931			
DW stat =	2.036329			

The above OLS results showed that the autonomous component of the model is positive (25.17388) and significant at 5% level. This is because the probability level of 0.0000 is way less than 0.05. This is a possible indication that factors other than ORM, SCRM and MPRM may have positive and significant impact on return on equity of the manufacturing sector. Meanwhile, ORM (operational risk management in the study area) has a positive and significant impact on the return on equity of the manufacturing industry in the study area, with a value 0.418658 and with probability value of 0.0060. This implies that a unit increase in the operational risk management will lead to about 41.87 percent increase of return on equity of Grand Cereal Company. In other words, operational risk management is capable of increasing the return on equity of the manufacturing industry as well enhancing the sustainability of the growth and by extension the profitability of manufacturing industry in Plateau State and Nigeria at large. This further buttresses Laryea (2019)'s claim that operational risk is a dynamic factor that management can capitalize on to improve profitability.

On another hand, SCRM (the supply chain risk management) is, from the results, shown to have a positive and significant impact on return on equity, given the positive value (0.421964) and a significant (0.0002) value at 5% level of significance. This is an indication that a unit increase in the supply chain risk management will lead to about 42.196 percent increase in return on equity of the study area. It could also be inferred here that though supply chain risk management leads to increase in return on equity of manufacturing industry, the intensity of the supply chain risk management process in the study area is low and hence the responses. This is conformity with Ochieng (2019)'s study which found that supply chain risk management practices (risk identification and hedging) positively and significantly affect performance of manufacturing firms in Kenya.

In the same vein, MPRM (material pricing risk management), as shown in the result, has a positive and significant impact on return on equity, by virtue of the positive value (0.001668) and a significant (0.0054) value at 0.05 level of significance. This, like the other variables in this study, is indicative of a positive impact on the return on equity of the manufacturing industry. Hence, a unit increase in the material pricing risk management of Grand Cereals Company will lead to about 16.68 percent increase in return on equity of the study area.

From the results, R^2 being 0.271860 implies 27.19% of the variation in the ROE is explained by variations in the explanatory variables; ORM, SCRM and MPRM, while the remaining 72.81% could be accounted for by the error term. The low percent rate could be as a result of the less significant impact of the explanatory variables used, on return on equity in the study area. Adjusted R^2 being 0.238763, on the other hand, implies that 23.89% of the variation in ROE is as a result of variations in the explanatory variables; ORM, SCRM and MPRM, while 76.11% could be explained by the error term. However, in the view of Frost (2019), low r-squared values can be perfectly good models for some fields of study with an inherently greater amount of unexplainable variation, for example, where studies try to explain human behaviours, which is harder to predict than things like physical processes. Frost further argues that low r-squared values with statistically significant independent variables can still lead to drawing important conclusions about the relationships between the variables. This is the exact scenario in the model for analysis used in this study, where the p-values, for ORM, SCRM and MPRM are all statistically significant at 0.0060, 0.0002 and 0.0054 respectively. Thus, the results can be valid for conclusions. Besides, statistically significant coefficients continue to represent the mean change in the dependent variable given a one-unit shift in the independent variable (Koutsoyannis, 1977).

The *F*-statistic which measures the joint statistical influence of the explanatory variable in explaining the dependent variables stood at 8.213988, with a significant probability value as 0.000931. This is suggestive of an indication that effective risk management process in the manufacturing industry would, affect, regardless of the magnitude, the return on equity of the manufacturing industry which is susceptible to such risks as supply chain disruption risk, material pricing variability risk as well as operational risk.

5.0 CONCLUSION AND RECOMMENDATIONS

Based on the empirical results of the hypotheses tested, the study concludes that manufacturers that prioritize operational efficiency, safety measures, and risk mitigation strategies can expect improved profitability and stronger returns on equity. Similarly, proactively addressing supply chain disruptions and implementing strategies to manage material pricing fluctuations contribute to maintaining profitability and optimizing procurement decisions. In view of the following recommendations were made:

i. Based on the research findings that operational risk management (ORM) has a positive and significant relationship with the return on equity (ROE) of the manufacturing industry, it suffices to recommend that manufacturing firms should focus on enhancing their operational risk management practices. This can involve implementing robust risk identification and assessment processes, developing effective risk mitigation strategies, and ensuring proper monitoring and control measures are in place

ii. Based on the findings that supply chain risk management (SCRM) has a positive and significant relationship with return on equity (ROE), it is pertinent to recommend that manufacturers should focus on improving their capabilities for identifying and assessing supply chain risks. This involves conducting thorough risk assessments to understand the potential impact of disruptions, delays, and other supply chain-related risks on ROE.

iii. Based on the research findings that material pricing risk management (MPRM) has a positive and significant relationship with return on equity (ROE), it is important to recommend that manufacturers should establish a robust system for monitoring and analyzing material price trends. By staying informed about market conditions, industry dynamics, and factors affecting material prices, manufacturers can proactively identify potential risks and opportunities.

Study Implication and Area for further Research

The implication of this study findings particularly for manufacturing industry is that effective management of operational risks, such as process efficiency and safety measures will enhance financial performance. Additionally, mitigating supply chain risks, such as disruptions and inventory shortages is crucial for achieving higher ROE. Moreover, managing material pricing risks, driven by factors like market conditions and demand fluctuations plays a pivotal role in optimizing procurement strategies and maintaining profitability. These results highlight the significance of comprehensive risk management practices in the manufacturing sector, enabling companies to improve financial outcomes and gain a competitive edge.

Despite the remarkable contributions of the study to the body of knowledge, its limitations included among others the fact that findings from Grand Cereals alone may not apply to other manufacturing companies, thereby limiting the generalization in the contexts of populations, geographical scope and other specific circumstances or unique characteristics. Hence, there is the need for further studies to be undertaken to determine the impact of risk management of manufacturing sector on economic development in Nigeria or the impact of risk management on the manufacturing companies in North-Central Nigeria.

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