Relationship of Supply Chain Management Practices and Corporate Performance of Oil Industry in Pakistan. The Mediating role of Competitive Advantage.

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MBA 2 YEARS WEEKEND PROGRAM

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ABSTRACT

The objective of this study is to evaluate the impact of supply chain management practices on corporate performance of firms operating in oil industry of Pakistan during 2022-2023, with focus on risk management, innovation, energy efficiency, stakeholder participation, and competitive advantage including its mediating role. Through the distribution of online questionnaires, primary data were collected from a sample size of 400 individuals. The respondents were the employees of companies in the Oil Industry, using non-probability purposive sampling. Employing a quantitative approach with Structural Equation Modeling (SEM), the findings reveal that risk management, energy efficiency, innovations, and competitive advantage along with its mediating role significantly influence corporate performance. These outcomes offer insights into the complicated dynamics of these variables, enlightening their roles in shaping corporate performance within the studied framework.

Keywords: *Corporate Performance, Risk Management, Innovations, Energy Efficiency, Stakeholder Participation*

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Lastly, I would like to acknowledge the contributions of all those who participated in the research process, whether through interviews, surveys or other forms of collaboration. Your willingness to share your knowledge and experiences has greatly enriched the depth and scope of this study.

CHAPTER 01: INTRODUCTION

1 Overview

The supply chain of oil sector is very sensitive to changes, which starts from exploration/production of crude by suppliers, having prolonged lead time of transportation whereby limited means of transportation, being the world most prime raw material of vital important, a primary source of energy from decades and the foremost components of world economy that has a substantial influence on the growth, operation and enlargement of other industries *(Lisitsa et al., 2019)*.

The supply chain network and operations of Pakistan oil sector is divided into three main sectors that is upstream, mid-stream and downstream. Upstream includes exploring reserves (both Crude & Gas) both offshore and onshore (Exploration & Production sector), midstream includes connecting upstream with downstream sector, crude transportation through pipeline, roads, marine shipping (in case of imports) & its storages while downstream includes refining & blending, supply, distribution, marketing and sales. Corporation in the upstream are E&P companies, midstream shipping companies, oil tankers companies, Pipeline Companies, Pakistan Railways and on the downstream Oil Marketing Companies (storages and retail outlets). Ministry of Energy (Petroleum Division) being the policy maker and Oil & Gas Regulatory Authority (OGRA) is the regulator.

In the upstream sector, Exploration and Production (E&P) companies are tasked with the exploration and extraction of crude oil and natural gas reserves. These companies employ various techniques, such as seismic surveys and drilling, to locate and develop these valuable resources. Midstream companies, including pipeline operators and storage and terminal firms, play a crucial role in transporting crude oil and natural gas from extraction sites to refineries and distribution points. They facilitate the secure and efficient movement of hydrocarbons through pipelines and manage intermediate storage points. Downstream companies, such as refineries and Oil Marketing Companies (OMCs), focus on refining crude oil into usable products like gasoline and diesel, and subsequently distributing these products to end consumers.

In addition to these operational segments, the oil industry in Pakistan is governed by regulatory bodies and policy makers. The Oil and Gas Regulatory Authority (OGRA) serves as the primary regulatory body, overseeing and regulating the activities of upstream, midstream, and downstream entities. OGRA is responsible for ensuring compliance with industry regulations, monitoring pricing, and fostering healthy competition. On the policy-making front, the Ministry of Energy (Petroleum Division) formulates and implements policies related to the exploration, production, and utilization of petroleum and natural gas resources. Collaborating with other government bodies, advisory boards, and environmental protection agencies, policy makers aim to create a conducive environment for the growth and sustainability of the oil and gas sector in Pakistan. Their efforts contribute to transparent governance, environmental protection, and the reliable supply of energy resources to the nation.

Pakistan Oil sector is both dependent on indigenous and import of oil product. The schematic flow of the supply chain and demand FY 2021-2022 including imports and local production (source Pakistan Oil Report (2020-21)-OCAC) in Figure 1;

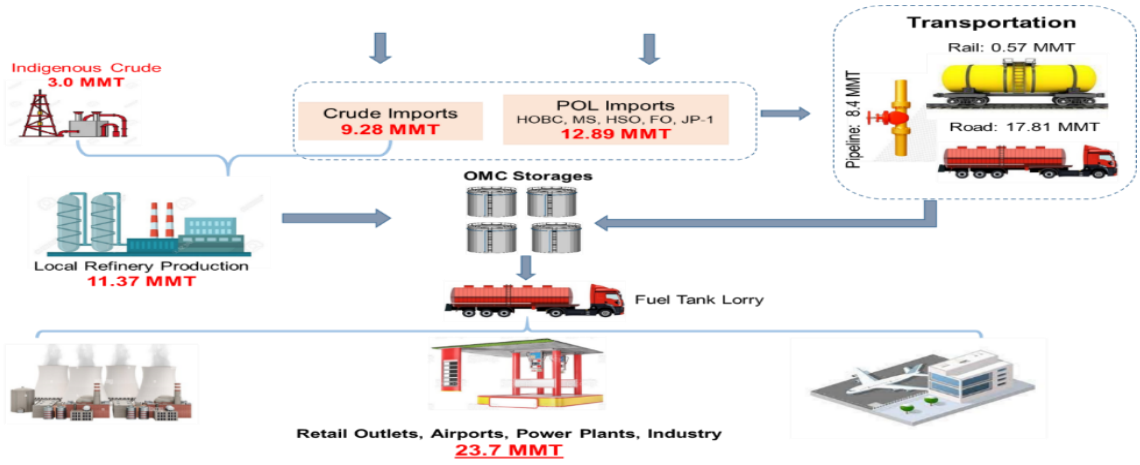


Figure 1.1 Petroleum Products Supply & Demand Pakistan

Further the modes of transportation used for transportation of petroleum products within the country (FY 2021-2022-Pakistan Oil Report) is shown in Figure 2 with significant usage of road transportation 70% followed by 28% through pipeline and less usage of railway 2%.

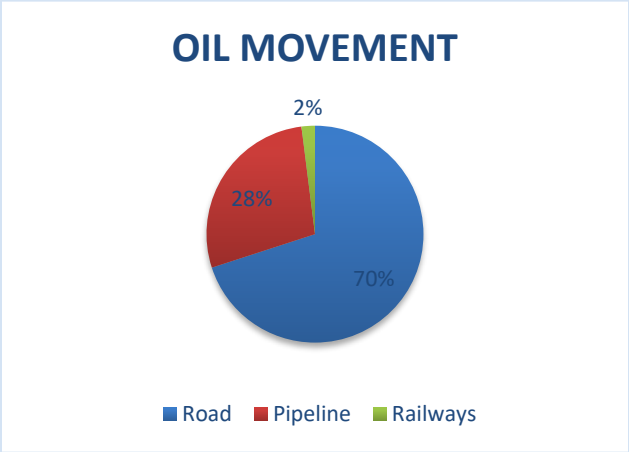


Figure 1.2 Modes of Transportation (Oil Movement)

1.1 Research Problem

Oil & Gas Sector is a higher probability of uncertainty, highly impacted both externally & internally such as international oil pricing, internal political stability, failure of operation and the major hurdle encounter within the industry is a whole is cost of exploration, production and supply of oil products to end consumers. Further, managing the entire supply chain effectively can rise the effectiveness and attractiveness of industry *(Lisitsa et al., 2019).*

Gathering of data about Oil and Gas Supply chain management provide a shared platform having multiple benefits such as distribution, implementing, enabling, merging and dealing SCM practices

among the stockholders and experts in the industry(Alhosani & Zabri, 2018). Oil industry is material flow intensive where the supply cost is about 40% of total refining cost and effective management along with cost optimization are noteworthy *(Saad et al., 2018)*. The availability of oil reserves is not a challenge of the industry but effective and efficient handling of the product to end user at minimum cost is a challenge *(Chima, 2007)*. Oil prices and exchange rates impact each other, likewise, geopolitics and oil prices have a casual impact on each other *(Aloui & Hamida, 2021)*.

Engagement with stakeholders at a strategic level is a critical factor influencing company performance and decision-making, yet numerous practical challenges remain unaddressed despite extensive theoretical research on its significance in organizational value creation *(Hristov & Appolloni, 2022)*.

Initially, researches into the drivers of productivity & growth primarily emphasized on contributions of capital and labor, but in recent decades, greater emphasis has been placed on investigating the intangible component of the Solow growth residual, which is often referred to as technological advancements or innovation *(Crowley & McCann, 2015)*.

Several studies have revealed the precariousness of energy efficiency uptake in the manufacturing industry, primarily attributed to the insufficient expertise and training of employees in this field*(Fernando et al., 2018)*.

Competitive advantage, rooted in the concept that a company's performance is shaped by its distinctive and hard-to-replicate resources and capabilities, is explored through the lens of the theory that employing Integrated Supply Chain Management can unlock strategic opportunities, fostering competitiveness, and ultimately reinforcing the company's overall performance *(Utari et al., 2022)*.

Due to this multifaceted relationship between oil prices, currency exchange rates, having impacts on each other's, their understanding, analyzing, interaction is crucial for developing strategies and polices. In order to handle such uncertainness, the application of effective supply chain practices can better mitigate the associated risks for enhancing performance. Further adaptation of influencing supply chain practices to overcome cost challenges, enhancing efficiency, optimize operations, mitigate external risks and to ensure consistent, convenient and cost-effective delivery of oil products to consumers hereby enhancing the performance of firms in the oil industry.

For industrial perspective, the aim of this study is to understand the significant factors influencing company success. We're investigating how organizations manage risks, foster innovation, engage with stakeholders, and promote energy efficiency. Moreover, we're exploring the impact of competitive advantage by exploring the firm competitive edge makes these aspects more or less serious for a company's overall performance.

1.2 Research Question

Based on research problem following are the research questions;

- What is the impact of Risk Management on Corporate Performance?
- What is the impact of Risk Management on Competitive Advantage?
- Does Competitive Advantage mediate the relationship of Risk Management and Corporate Performance?

- What is the impact of Innovations on Corporate Performance?
- What is the impact of Innovations on Competitive Advantage?
- Does Competitive Advantage mediate the relationship of Innovations & Corporate Performance?
- What is the impact of Energy Efficiency on Corporate Performance?
- What is the impact of Energy Efficiency on Competitive Advantage?
- Does Competitive Advantage mediate the relationship of Energy Efficiency and Corporate Performance?
- What is the impact of Stakeholder Participation on Cooperate Performance?
- What is the impact of Stakeholder Participation on Competitive Advantage?
- Does Competitive Advantage mediate the relationship of Stakeholder Participation and Cooperate Performance?
- What is the impact of Competitive Advantage on Cooperate Performance?

1.3 Research Objective

Based on research questions the basic purpose and objective of this research is;

- To investigate the impact of Risk Management on Corporate Performance.
- To investigate the impact of Risk Management on Competitive Advantage.
- To investigate that Competitive Advantage, mediate the relationship of Risk Management and Corporate Performance.
- To investigate the impact of Innovations on Corporate Performance.
- To investigate the impact of Innovations on Competitive Advantage.
- To investigate that Competitive Advantage, mediate the relationship of Innovations & Corporate Performance.
- To investigate the impact of Energy Efficiency on Corporate Performance.
- To investigate the impact of Energy Efficiency on Competitive Advantage.
- To investigate that Competitive Advantage, mediate the relationship of Energy Efficiency and Corporate Performance.
- To investigate the impact of Stakeholder Participation on Cooperate Performance.
- To investigate the impact of Stakeholder Participation on Competitive Advantage.
- To investigate that Competitive Advantage, mediate the relationship of Stakeholder Participation and Cooperate Performance.
- To investigate the impact of Competitive Advantage on Cooperate Performance.

1.4 Significance of Research

Our research is rooted in the foundational work presented by *(Utari et al., 2022)*, which precisely examined the interplay among Supply Chain Management, Risk Management, competitive advantage (along with its mediating role), and corporate performance. In a deliberate departure from this influential research, our study endeavors to enrich and extend the existing discourse by introducing novel dimensions to the research model.

What sets our investigation apart is the deliberate insertion of three distinct independent variables Innovation, Energy Efficiency, and Stakeholder Participation. This deliberate expansion is not merely an augmentation but a strategic effort to capture a more comprehensive and significant understanding of the multifaceted dynamics at play within the corporate environment, especially within the context of the oil industry in Pakistan.

The base paper primarily focused on a subset of critical factors, our research recognizes the importance of Innovation as a catalyst for organizational evolution, Energy Efficiency as a crucial aspect of sustainable practices, and Stakeholder Participation as an integral component of corporate strategy. By weaving these additional threads into the research fabric, we aim to delve deeper into the complex practices of supply chain management practices and their reflective influence on corporate performance.

For industry viewpoint, this study will cover Mechanism through which supply chain in this industry has been made better and what future expectation of the same is. We will get to know that introducing technological advances in this industry thrive prosperity. It is very unique in the way that normally in industries efficiency and cost effectiveness are the only aspects which play part in the supply and demand of commodities and the same holds true to some extent in this research also, however oil and gas market is unique in a way that it shapes and is used as a means to shape policies of regions. Politics and alliances of counties in the short- and long-term guide transactions and the same overshadows efficiency of supplies and/or prices all together. Without divulging too much into specific it's a known fact that how oil and gas supplies have shaped the world. In the recent decades in fact in countless instances countries have been redefined according to their preferences and alliances in the global arena. Due to the fact firm among the industry should always explore ways to redefine and improve their supply chain management practices towards improvement for better results and sustainability.

This research article has a considerable importance due to many convincing reasons. It assumes a detailed investigation of firm productivity by interlacing essential features of supply chain management procedures like risks, innovative practices, stakeholder involvement and energy advocacy. Due to its beneficial insights, the same highlights success initiatives in today's complex business environment. In this word of uncertainty this study emphasized how risk organization is an important role for making effective decisions hereby provide a real guide for firms that is searching improvement in their risk mitigation policies. We will get to know how organizational energy advocacy, intensions and implementation make better the supply chain as a whole while impacting productivity positively. Further, involving the potential bodies, groups, firms and individuals who are the part of or have interest in or effected by firm operations collectively called stakeholder in various phases of strategic decisions make better the productivity of the firm.

This study will provide practical suggestion to businesses, letting them to improve the long term polices and get a better navigation in the multi dynamics and competitive business environment. The evidence-based proofs of this study can influence policymakers and strategist to plan better & efficient policy and advise the best suited strategic planning for enhancing productivity of firms in the industry.

The last and the foremost significance of this research article is to boost and supplement current knowledge of academia in the field of investigation by connecting the vast areas of business investigations tools by increasing the knowledge about how risk, innovations, stakeholder and energy management complicatedly influence productivity and firm performance. This will also provide a platform to the interested researches to expand their knowledge and expertise for betterment & prosperity of the industry.

CHAPTER 02: LITERATURE REVIEW & HYPOTHESIS

2 Overview

Literature review serves as a crucial foundation, providing a context for the study by exploring existing knowledge about the variables of the topic and synthesizing key concepts. It provides a theoretical framework, guides hypotheses, and informs methodology, placing our study within the broader academic discourse. Various research articles were studies to confirm the existence of concepts and what other researchers views about the variables being selected for investigation.

2.1 Literature Review

2.1.1 Risk Management

The hard challenge encountered by supply chain managers nowadays is the frightening 36% year-over-year growth in supply chain risk proceedings globally, which has introduced a significant concern among industries and result disruptions across raw material shortages and product quality *(Dellana et al., 2022)* .

Firms risk is the uncertainty in the management rules, dealings and corporate structure that could cause damage or losses while its managing is proactive approach of identification, appraisal, mitigation, monitoring & reporting through clear role, responsibilities, answerability which substantially impact corporate performance*(Utari et al., 2022)*.

For effective mitigation strategy of financial uncertainties all stakeholders including industries, professionals, regulators, policy makers, rating agencies, international standard organizations and business consultants should track, boost and apply enterprise risk management *(Horvey & Odei-Mensah, 2023)*.

Supply chain experts are expected to ready themselves for numerous unpredictable risk events with uncertain timelines and occurrences to meet these contests. Further a proficient supply chain will be a value addition in cultivating a robust risk management mindset with a practical approach of risk moderation for onward improvement of the firm's risk managing actions *(Dellana et al., 2022)*.

Risk Management is an important variable in performance of a firm and its handling, evaluation, mitigation is significant. Oil industry is subjected to various risks such as price variations, currency value fluctuation, economic & political conditions, safety & security etc.

2.1.2 Innovations

Innovation and economic growth are an endogenous and has been a focus of attention in the modern age. Similarly, innovation is the concept of satisfaction of new wants through innovative driving forces such as new product, methods, segment, new way of shaping the business, exploring new ways of supply and has significant positive impacts on the productivity of firms *(Crowley & McCann, 2015)*.

Innovation may be described by its type and limits which includes National, Sectorial, Technological & is a complicated interface between micro & macro phenomena by altering macro-structure circumstances, micro dynamics and new small-scale circumstances by small scale methods *(van der Merwe et al., 2020)*.

Both academics and experts have shown a keen interest in leveraging innovation as a strategic tool for competitive distinction and value creation, and a comprehensive innovation culture scale can be effectively delineated through the incorporation of seven crucial factors such as innovation tendency, organizational constituency, organizational learning, creativity and empowerment, market orientation, value orientation, and implementation context *(Dobni, 2008)*.

Innovative Practices refers to introducing national, technological and sectoral revolutions in the entire supply chain of oil and gas sector for efficient exploration, production, blending, refining, storage and transportation to increase the productivity and performance of firms.

2.1.3 Energy Efficiency

Energy Efficiency refers to actual utilization of energy versus actual required and Energy advocating is awareness & encouragement of efficient energy utilization *(Hassan et al., 2009)*. Energy and economic efficiency are two distinct areas one encouraging utilization of less energy resources while other encouraging efficient utilization of all resources *(Sutherland, 1994)*. The important but mistreated topic is energy efficiency and the basic objective of engineers is to yield more while utilizing less in hand, further crude oil is dominating less than half of total energy demand and its availability, price are the only global influential forces *(Malpas, 1989)*.

Several research findings have highlighted the vulnerability of energy efficiency implementation within the industry, stemming from insufficiently trained personnel, a lack of managerial commitment to prioritize energy efficiency, while the benefits of adopting energy management practices have been extensively examined in advanced nations *(Fernando et al., 2018)*.

Companies across various industries have the opportunity to consider energy efficiency as a strategic approach for enhancing their competitiveness after fulfilling their environmental objectives encountering hindrances such as financial limitations, technical difficulties, behavioral issues, organizational barriers, and accompanied by certain other challenges. Further as a result organization may not consistently prioritize energy efficiency in comparison to other investment options *(Siciliano et al., 2015)*.

Many industries hesitate to accept energy-efficient technologies, despite their economic and environmental requirements and their straightforward implementation, resulting in a phenomenon known as the energy-efficiency gap. Further this has been extensively explored in literature which is extended to emphasize the combined potential of investing in energy-efficient technologies and ongoing energy management practices *(Cagno et al., 2013)*.

Studies on energy and environmental awareness reveals that it affects behavior, the gap between consumer attitudes and actions impacting energy conservation practices but not the adoption of energy-

efficient technologies, which is primarily driven by environmental and financial concerns *(Akroush et al., 2019)*.

In a short the implementation of internal and external controls to achieve energy efficiency all along the supply chain by training the suppliers, employees and consumers and emphases to adopt practices of energy efficiency through innovations.

2.1.4 Stakeholder Participation

Researcher and managers acknowledging the fact that participation of stakeholders/interested entity in the business can make the resources utilization efficient, increase compliance, reduce effort for implementation and utilization of local knowledge, further a co-management terminology is used and is defined as arrangement between entity and group(s) of shareholders by giving a power to participate in decision making *(Smith, 2012)*.

A researcher used the terminology of "the wheel of participation" where four levels of participation have been described that is inform, consult, involve and empower *(Mannan et al., 2020)*.

Stakeholder are being the essential part of organization which originates its presence through freedom as well as wisdom in their action and system itself manifest and thrive through their active participation *(De Blois, n.d.)*.

By using resource-based theory, the effective stakeholder engagement is a valuable resource that not only leads to strong financial performance, makes it hard for competitors to override, ensuring long lasting success and firm considering the fact get competitive advantage in the industry *(Ansong, 2017)*.

Consequently, "stakeholders" are frequently described broadly as individuals who can be impacted by or have the capacity to influence a decision, spanning from the general public to groups of deeply involved decision-makers; furthermore, stakeholder engagement has gained considerable prominence across various scenarios as a favored approach for planning and decision-making *(Talley et al., 2016)*.

Even among those who do not view participation as an ideal, it is difficult to deny the significance of themes like stakeholder involvement, inclusion, and empowerment in the field of evaluation*(Daigneault & Jacob, 2009)*.

The increasing focus on stakeholder involvement in assessment like collaborative, democratic, empowerment-oriented, inclusive, utilization-focused evaluations are more effective ways to help judge and improve programs*(Daigneault et al., 2012)*.

Stakeholder are the government entities, policy makers, regulators, oil marketing companies, exploration and production companies, transportation companies, refineries and employees and customers itself etc. and participation is their involvement at different levels specifically during executing agreements that provide options for alternate remedies rather than liquidated charges / penalties for defaulting party hereby reducing un-certainties in supply chain.

2.1.5 Competitive Advantage

At the bottom of accomplishing and sustaining superior performance in a competitive market is the central concept of attractiveness called competitive advantage and is defined by how effectively a company implements generic strategies like cost leadership, product/service differentiation, tailored responsiveness to the specific needs of targeted segments *(Utari et al., 2022)*.

Competitive advantage is the unique value that a business offers, compelling customers to choose its products or services over those of competitors while simultaneously creating barriers that discourage actual or potential direct/indirect competitors from takeover *(Arokodare et al., n.d.)*. Applying the Resource-Based View and Dynamic Capabilities perspective, it is emphasized that competitive advantage arises when firms synchronize employees' motivations, skills, attitudes with the firm-level systems, processes and practices to promote nonstop capabilities *(Singh et al., 2019)*. A company attains a competitive advantage when it successfully executes a value-creating strategy that is distinct and not concurrently employed by its competitors*(Utari et al., 2022)*.

Examining competitive advantage explored how strategic opportunities, fostering competitiveness can reinforcing overall company performance. *(Utari et al., 2022)*.

In view of above, competitive advantage is an essential element of the business in the oil industry which encouraging technological & skills advancements, sustainability, safety, supply chain efficiency, diversification, and regulatory obedience to over opponents in the competition.

2.1.6 Corporate Performance

Firm performance has two aspects operational practice & financial performance and is defined as the effort to reach organizational goal like a social system with inadequate resources/ means without any additional efforts from its associates, further the performance is defined as the achievement of a person, team, firm to reach its strategic goals which was planned earlier with probable results *(Utari et al., 2022)*. The sustainable performance refers to ongoing value creation for shareholders and stockholder while following environment necessities *(Whidya Utami et al., 2019)*.

Corporate performance can be summarized as the end results of all planned activities or the accomplishments of an organization towards its strategic goals by creating non-stop value creation for its shareholder and stock holders.

2.2 Development of Research Hypothesis

2.2.1 Research Hypothesis

The following hypothesis is being developed on the basis of research question and literature review for investigation;

- H_1 Risk Management substantially impact Corporate Performance.
- H_2 Risk Management substantially impact Competitive Advantage.
- H_3 Competitive Advantage mediate the relationship of Risk Management and Corporate Performance.

- H_4 Innovations substantially impact Corporate Performance.
- H_5 Innovations substantially impact Competitive Advantage.
- H_6 Competitive Advantage mediate the relationship of Innovations & Corporate Performance.
- H_7 Energy Efficiency substantially impact Corporate Performance.
- H_8 Energy Efficiency substantially impact Competitive Advantage.
- H_9 Competitive Advantage mediate the relationship of Energy Efficiency and Corporate Performance?
- H_{10} Stakeholder Participation substantially impact Cooperate Performance.
- H_{11} Stakeholder Participation substantially impact Competitive Advantage.
- H_{12} Competitive Advantage mediate the relationship of Stakeholder Participation and Cooperate Performance.
- H_{13} Competitive Advantage substantially impact Cooperate Performance.

2.2.2 Theoretical Framework

Based on the development of research hypothesis as above, the theoretical framework is established and the research model is illustrated in Figure 2.1 as below;

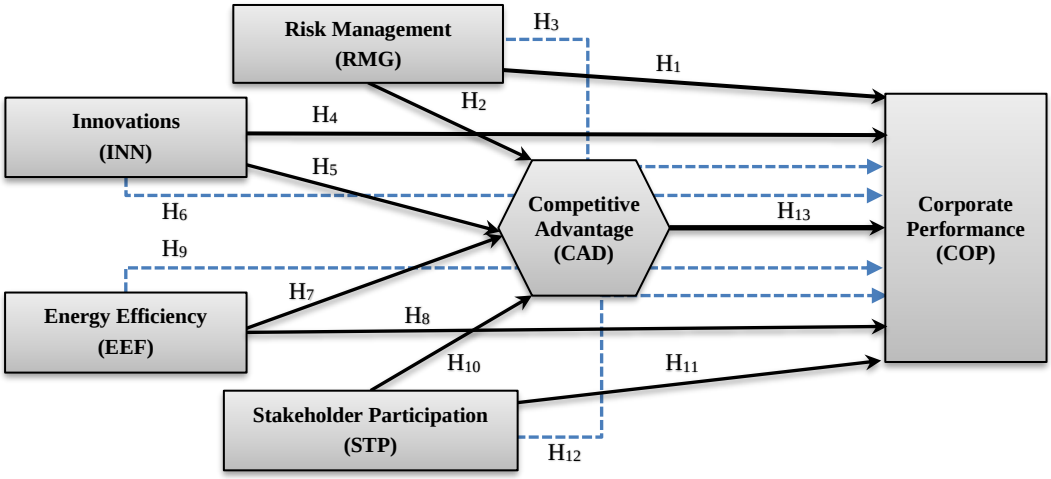


Figure 2.1 Research Model

2.2.3 Regression model

Based on the theoretical framework, the proposed regression model is;

$$COP = \oint (RMG, INN, EEF, STP, CAD)$$

Where; COP is Corporate Performance, RMG Risk Management, INN Innovations, EEF Energy Efficiency, STP Shareholder Participation, CAD Competitive Advantage and COP Corporate Performance.

CHAPETR 03: RESEARCH METHODOLOGY

3 Overview

This chapter serves as a crucial roadmap, seamlessly bridging the gap between the theories we explored in our literature review and the practical steps we took in conducting our study. This chapter explain what particular group we're focusing on, what is our research population and get a peek into how we've selected the individuals for our study, intricately entwined with the method we used to collect important data. Further it detailed on how we measured key things like Risk Management, Innovations, Energy Efficiency, Stakeholder Participation, Competitive Advantage, and Corporate Performance. The statically methods and their interpretations which will be used for analysis along with data collection techniques are briefly outlined as below;

3.1 Research Population

A quantitative research approach was employed to collect primary data via a questionnaire due to the availability of rich information in the literature for variables under study. Population of the study was a diverse range of organizations within Pakistan's oil industry such as companies in upstream, midstream and downstream sectors. The firms include within the industry are exploration & production companies, oil transportation companies, oil refineries, oil marketing firms, oil and gas regulatory bodies, policy-makers, and consultants offering services to this sector.

3.2 Research Sample

The targeted participants were Chief Executive, General Managers, Senior Managers, Directors Generals, Directors, Senior Directors, Regional heads, Chief managers, Deputy Chief Managers, Chief Engineers, Deputy Chief Engineers, Research Assistants of these organizations.

3.3 Sampling Approach

There are two distinct sampling approaches: "probability sampling" and "non-probability sampling." In probability sampling, the method employed is random sampling, ensuring that every member of the designated population, such as organizations working in the oil industry upstream, midstream, and downstream, has an equal opportunity to be included in the sample. Conversely, non-probability sampling involves a non-random sample selection, relying on the researchers' expertise or convenience sampling.

In the context of this study, the target population consists of organizations working in the oil industry upstream, midstream, and downstream considerably large sector for which the collection of data from all organizations was humanly not impossible. To address this challenge, the researcher has opted for non-probability sampling, specifically known as judgmental sampling, which is based on convenience sampling.

3.4 Sample Size & Data Collection

The questionnaire was distributed among a sample of 400 participants using an online Google Form whereas only 244 individuals provided their responses. After initial scrutiny no vague data was found and subsequently a dataset of 244 respondents was selected for onward examination.

3.5 Measurement of Variables

To gather information for stated variables across the firms in oil industry a questionnaire was precisely developed. In order to asses & measure the variables of this research article a specific & tested instrument have been used. The instruments along with sources are detailed below where evaluation scale ranged from 1 to 5. The actual annexure of the research questionnaire is annexed as Appendix -I to this report. The questionnaire basically divided into two sections where Section- A includes the demographics of the participants such as the primary business of the firm, education, experience, age etc. and Section B includes the closed ended equations against each variable.

3.5.1 Risk Management

The Sub-Section 1 consist of 8-items to measure the effectiveness of organizational risk management and have been taken from *(Dellana et al., 2022)*.

Code	Item Statement
RMG1	We employ a mature systematic process for scanning the business environment to identify potential risk events.
RMG2	We employ a mature systematic process for prioritizing potential risk events.
RMG3	We typically rank potential risks based on quantitative analysis.
RMG4	We usually consider the difficulty of risk detection when planning for potential risks.
RMG5	We often simulate risk events to assess our ability to respond effectively.
RMG6	When a risk event occurs, we usually have a well-defined contingency plan available to reduce the impact of the event.
RMG7	We have redundancy of supply for all critical products and services.
RMG8	Our supply chain employs flexible facilities to cope with changing conditions or markets.

Table 3-1 List of Instrumentation of Risk Management

3.5.2 Innovations

The Sub-Section 2 consist of 8-items to measure the effectiveness of organizational innovative Practices and have been taken from *(Dobni, 2008)* .

Code	Item Statement
INN1	Innovation is an underlying culture and not just a word.
INN2	Our business model is premised on the basis of strategic intent.
INN3	Our senior managers are able to effectively cascade the innovation message throughout the organization.
INN4	We have an innovation vision that is aligned with projects, platforms, or initiatives.
INN5	This organization's management team is diverse in their thinking in that they have different views as to how things should be done.
INN6	There is a coherent set of innovation goals and objectives that have been articulated.
INN7	Innovation is a core value in this organization.
INN8	We have continuous strategic initiatives aimed at gaining a competitive advantage.

Table 3-2 List of Instrumentation for Innovation

3.5.3 Energy Efficiency

The Sub-Section 3 consist of 8-items to measure the effectiveness of organizational Energy Efficiency Practices and have been taken from *(Akroush et al., 2019)*.

Code	Item Statement
EEF1	The main cause of energy problems in Pakistan is a lack of energy efficiency awareness.
EEF2	Current energy problems are very serious for our future.
EEF3	Conventional products pose serious energy problems; hence, energy efficient products are needed.
EEF4	Energy-efficient products give my organization extra value for example, economic value, environmental value, social.
EEF5	Energy-efficient products have high utility.
EEF6	Energy-efficient products can meet my organizational requirements.
EEF7	If my organization can choose between energy-efficient and conventional products, it prefers energy-saving one.

EEF8	My organization have a favorable attitude towards purchasing an energy-efficient product.

Table 3-3 List of Instrumentation for Energy Efficiency

3.5.4 Stakeholder Participation

The Sub-Section 4 consist of 8-items to measure the effectiveness of organizational Stakeholder Participation in decision making and have been taken from *(Ansong, 2017)*.

Code	Item Statement
STP1	Stakeholders directly affected by your organization's operations, both positively and negatively
STP2	Stakeholders who have interest in, or influence over the organization's operations
STP3	Stakeholders who have knowledge about the impact of the operations of your firm
STP4	Stakeholders who are part of the broader community who have an interest in, concern with, or influence over the operation of your firm
STP5	Authorities or regulators at the national or local level
STP6	Authorities who control or issue licenses or permits to operate
STP7	Authorities or regulators who exercise control over your sector or industry
STP8	Authorities responsible for social and economic development, infrastructure and service provision, town and regional planning

Table 3-4 List of Instrumentation for Stakeholder Participation

3.5.5 Competitive Advantage

The Sub-Section 5 consist of 6-items to measure the Competitive Advantage within the industry and have been taken from *(Singh et al., 2019)*.

Code	Item Statement
CAD1	My Organization's products/services are better than its competitors.
CAD2	My Organization's R&D capabilities are better than its competitors.
CAD3	My Organization's managerial capabilities are better than its competitors.

CAD4	My Organization’s profitability is better than its competitors.
CAD5	My Organization’s image is better than its competitors.
CAD6	My Organization’s competitive advantage is better than its competitors.

Table 3-5 List of Instrumentation for Competitive Advantage

3.5.6 Corporate Performance

The Sub-Section 6 consist of 4-items to measure organizational Corporate Performance within the industry and have been taken from *(Cragg et al., n.d.)*.

Code	Item Statement
COP1	Long Term Profitability
COP2	Sales Growth
COP3	Financial resources *(Liquidity and investment capacity)*
COP4	Public Image & Client Loyalty

Table 3-6 List of Instrumentation for Corporate Performance

3.6 Cronbach’s Alpha

In utilizing a questionnaire comprising multiple items, as detailed earlier in this research, the emphasis on collecting primary data necessitated a thorough examination of the questions' reliability. The most effective gauge for assessing the reliability of items associated with variables is Cronbach's Alpha, and the interpretation of Cronbach's Alpha can be found in Table 3-7 below;

Cronbach Alpha Criteria	Classification
$a \geq 0.9$	Very good
$0.8 \leq a < 0.9$	Good
$0.7 \leq a < 0.8$	Be accepted
$0.6 \leq a < 0.7$	Doubtful
$0.5 \leq a < 0.6$	Bad
$a < 0.5$	Not acceptable

Table 3-7 Interpretation Cronbach's Alpha values

3.7 PLS-SEM

In the context of this research, a detailed analysis of the data was conducted using the "Partial Least Squares Structural Equation Modeling (PLS-SEM)" methodology. PLS-SEM, functioning as a two-step analytical process, played a pivotal role in unraveling the complexities of the relationships under scrutiny.

The first step in the PLS-SEM procedure revolves around the measurement model, wherein a meticulous evaluation of data validity and reliability is undertaken. This phase involves a thorough review of the measurement instruments to ensure their accurate representation of the underlying constructs of interest. Through this initial step, the researchers assessed the robustness and appropriateness of the measurement model, instilling confidence in the reliability of the collected data for subsequent analyses.

Following the measurement model, the subsequent step involves the application of the structural model, a critical component of PLS-SEM. This stage serves a dual purpose by conducting hypothesis testing and evaluating the overall fit of the model. Hypothesis testing scrutinizes the relationships proposed in the conceptual framework, assessing their significance and magnitude. Simultaneously, the evaluation of the overall fit of the model provides insights into the alignment of the theoretical framework with empirical data, offering a comprehensive understanding of the underlying dynamics and interconnections among the variables.

In summary, the utilization of the PLS-SEM approach in this research facilitated a systematic and rigorous analysis, covering both measurement and structural components. This methodology provided a robust foundation for drawing meaningful conclusions, thereby contributing to a deeper understanding of the phenomena under investigation.

3.8 Date Analysis Tools

In the examination of descriptive data, the researchers opted for the widely used "Statistical Package for the Social Sciences (SPSS) version 25" to conduct a comprehensive statistical analysis. This software played a pivotal role in the exploration and interpretation of the dataset, facilitating the extraction of meaningful insights and patterns inherent in the descriptive information.

Additionally, to delve into the intricate relationships among the variables under scrutiny and to construct a robust structural model, the researchers applied the sophisticated technique known as "Partial Least Squares Structural Equation Modeling (PLS-SEM)." This advanced statistical method offers a comprehensive approach to modeling complex relationships among latent constructs, allowing for a nuanced examination of the interdependencies and causal links within the conceptual framework.

The meticulous execution of the PLS-SEM methodology was carried out using "Smart-PLS software version 3.3.3." This particular version of the software is well-regarded for its efficacy in implementing PLS-SEM, providing researchers with a user-friendly platform equipped with powerful analytical tools. The use of Smart-PLS 3.3.3 ensured the accuracy and reliability of the structural equation modeling process, allowing for a thorough and insightful exploration of the underlying relationships among the variables of interest in the research study.

CHAPTER 04: STATISTICAL ANALYSIS & RESULTS

4 Overview

This chapter presents an in-depth analysis of the data collected during the survey. It focuses on the measurement model, evaluating the reliability and validity of the data before transitioning to the structural model. Additionally, this chapter includes an assessment of collinearity, hypothesis testing, and measures the impact of independent variables on the dependent variable.

4.1 Respondents Demographics

The table provides a comprehensive overview of participant demographics and characteristics in the research survey being conducted. Gender distribution indicates a majority of male participants (95.1%), while age groups show a varied representation, with over half of the participants being above 40 years old (51.6%). Experience levels range from less than 5 years (7.0%) to over 15 years (56.1%). Education reveals a majority with master's degrees (63.9%). In terms of management roles, a substantial portion belongs to middle management (58.6%). Lastly, the primary business of participants' firms spans various sectors, with oil marketing companies being the most prevalent (57.4%), followed by exploration and production companies (15.2%). The cumulative percentages offer insights into the overall distribution patterns across these demographic and professional categories. The descriptive statistics of respondent's demographics are summarized in below Table 4-1.

Description	Frequency	Percentage	Cumulative Percentage
GENDER			
1. Female	12	4.9%	4.9%
2. Male	232	95.1%	100.0%
AGE			
1. 25-30	25	10.2%	10.2%
2. 30-35	45	18.4%	28.7%
3. 35-40	48	19.7%	48.4%
4. Above	126	51.6%	100.0%
EXPERIENCE			
1. Less than 5 Years	17	7.0%	7.0%
2. 5 to 10 Years	42	17.2%	24.2%
3. 10 to 15 Years	48	19.7%	43.9%
4. Above	137	56.1%	100.0%
EDUCATION			
1. Graduation	80	32.8%	32.8%
2. Masters	156	63.9%	96.7%
3. Above	8	3.3%	100.0%
MANAGEMENT ROLE			
1. Top Management	30	12.3%	12.3%

2.	Middle Management	143	58.6%	70.9%
3.	Lower Management	71	29.1%	100.0%
FIRM PRIMARY BUSINESS				
1.	Oil Marketing Company	140	57.4%	57.4%
2.	Exploration & Production	37	15.2%	72.5%
3.	Oil Transportation Company	16	6.6%	79.1%
4.	Oil Refinery	25	10.2%	89.3%
5.	Regulator/Policy Maker	8	3.3%	92.6%
6.	Consultant (Oil & Gas)	18	7.4%	100.0%

Table 4-1 Demographics of Respondents

Further the Graphical representation of respondent's demographics are shown as below;

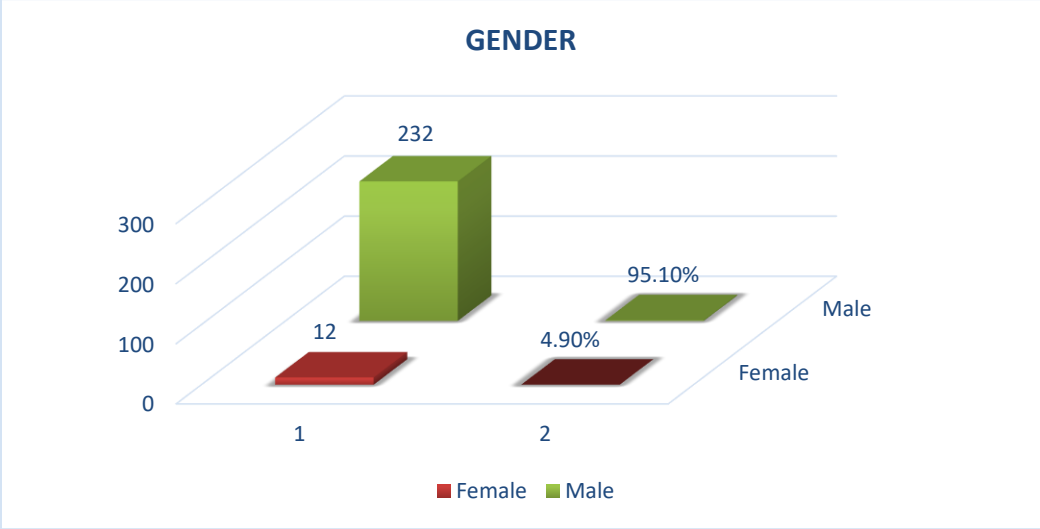


Figure 4.1 Graphical Presentation (Gender)

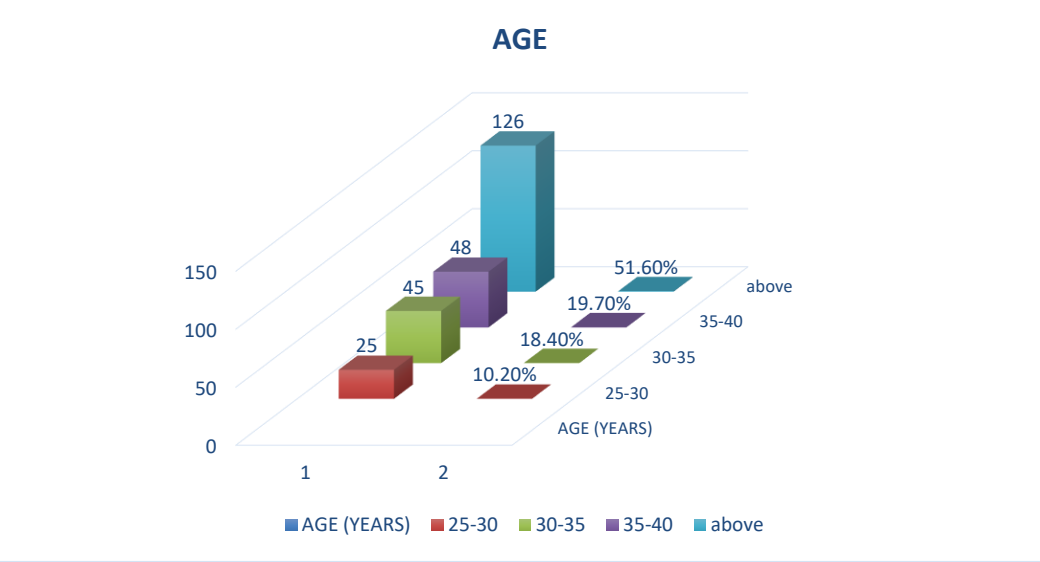


Figure 4.2 Graphical Presentation (Age)

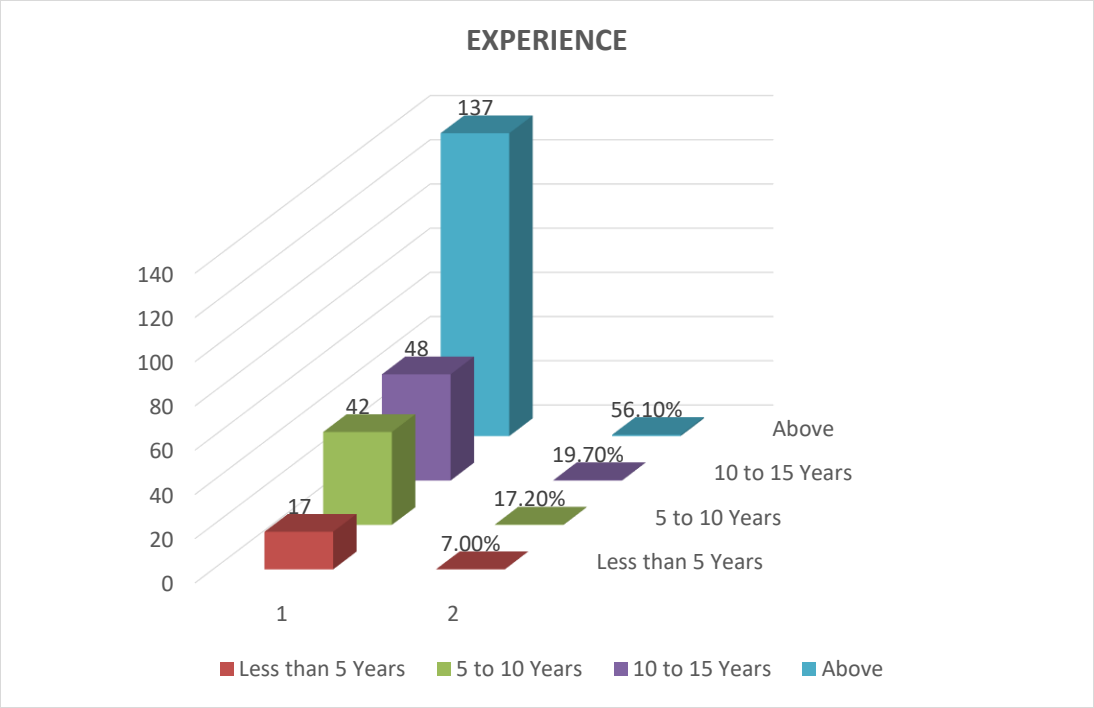


Figure 4.3 Graphical Presentation (Experience)

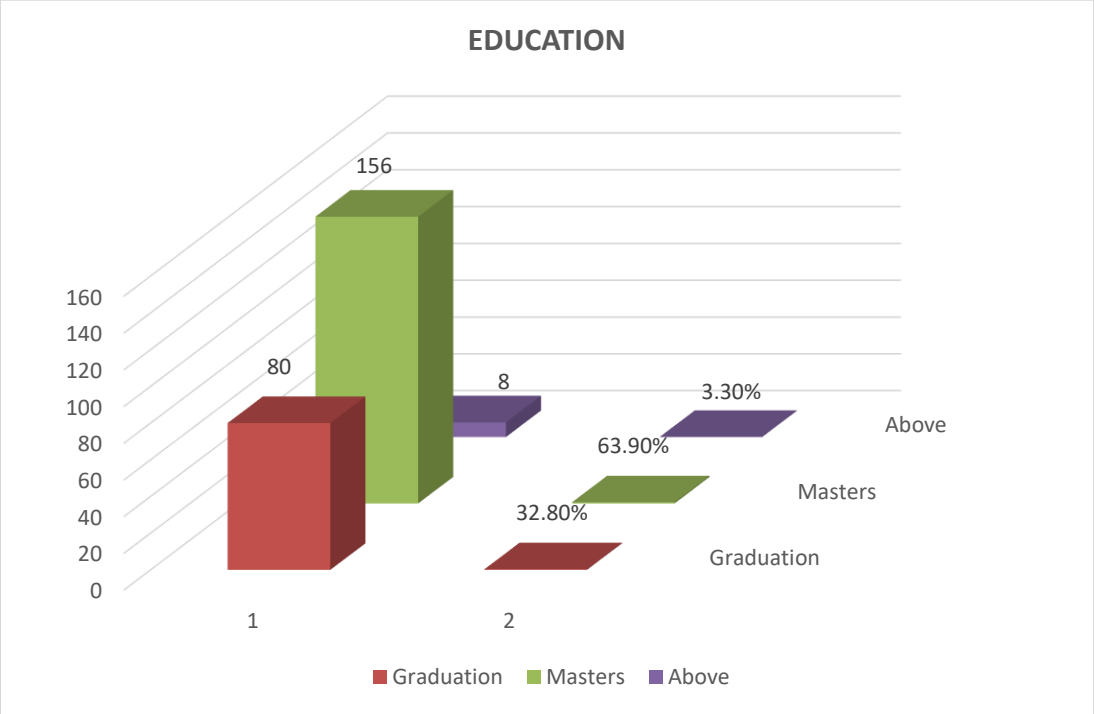


Figure 4.4 Graphical Presentation (Education)

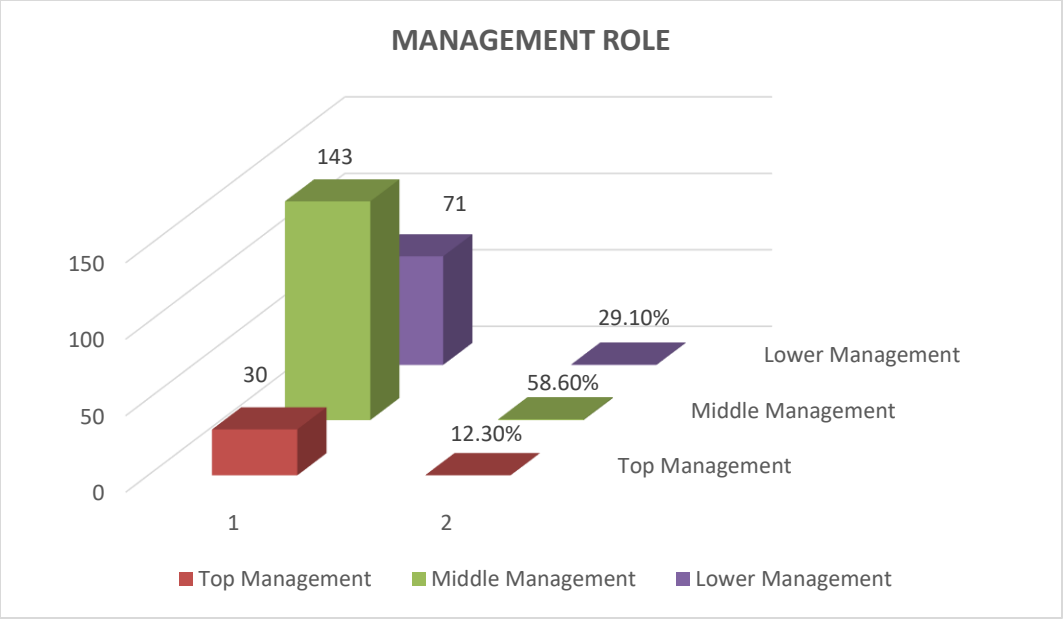


Figure 4.5 Graphical Presentation (Management Position)

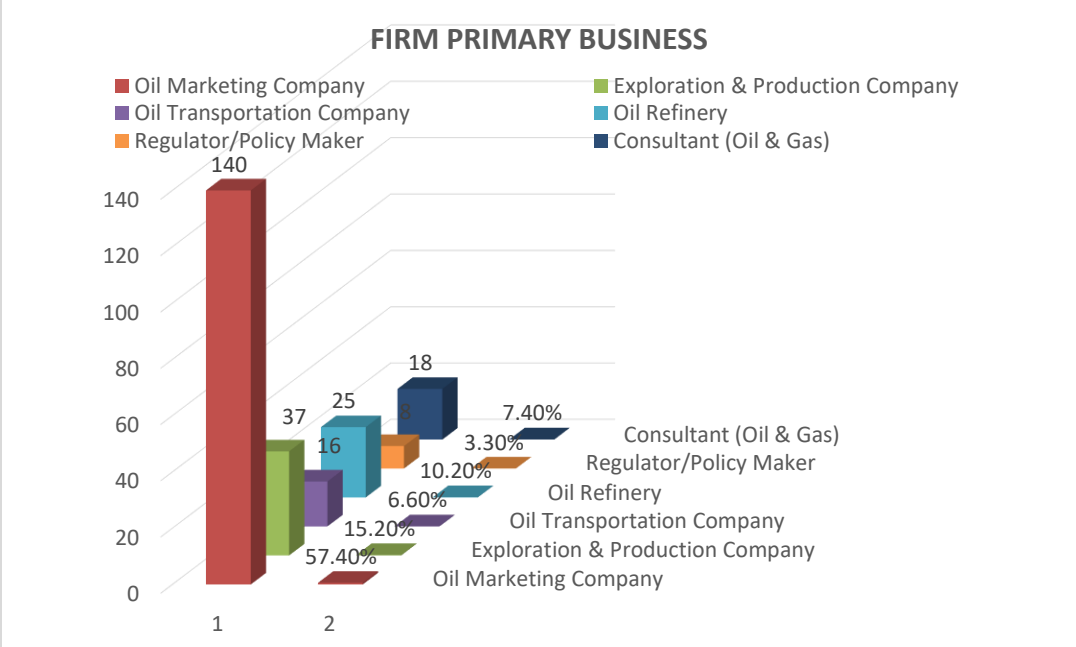
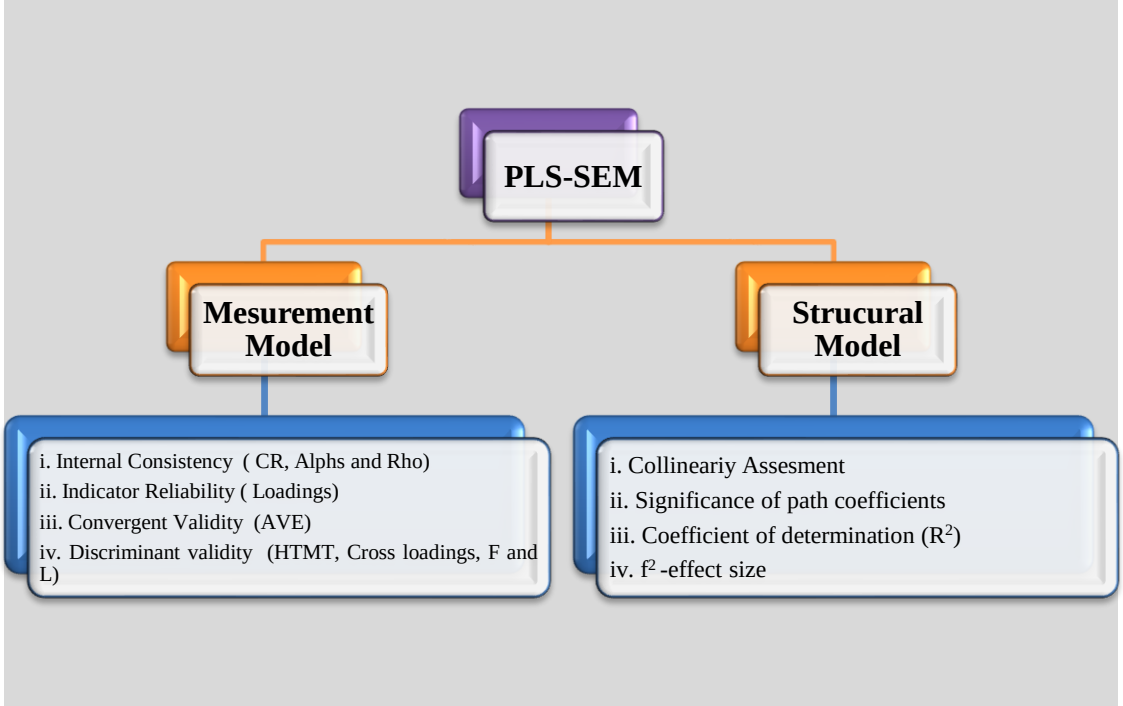


Figure 4.6 Graphical Presentation (Firm Primary Business)

4.2 PLS-SEM Approach

As previously detailed, Partial Least Squares Structural Equation Modeling (PLS-SEM) proficiently elucidates intricate relationships among various variables. PLS proves valuable in gauging heterogeneity within path modeling. The subsequent section undertakes the two-stage process of Structural Equation Modeling (SEM), with the detailed depiction of this dual-phase procedure illustrated in the figure below.



4.2.1 Measurement Model

The measurement model scrutinizes the measurement attributes of latent constructs by illustrating how they have been evaluated through observable variables. In our research, six variables RMG, INN, EEF, STP, CAD and COP were assessed using a total of 42 items. Smart-PLS was used to ascertain the reliability and validity of these items. The measurement model is shown below in Figure 4.7;

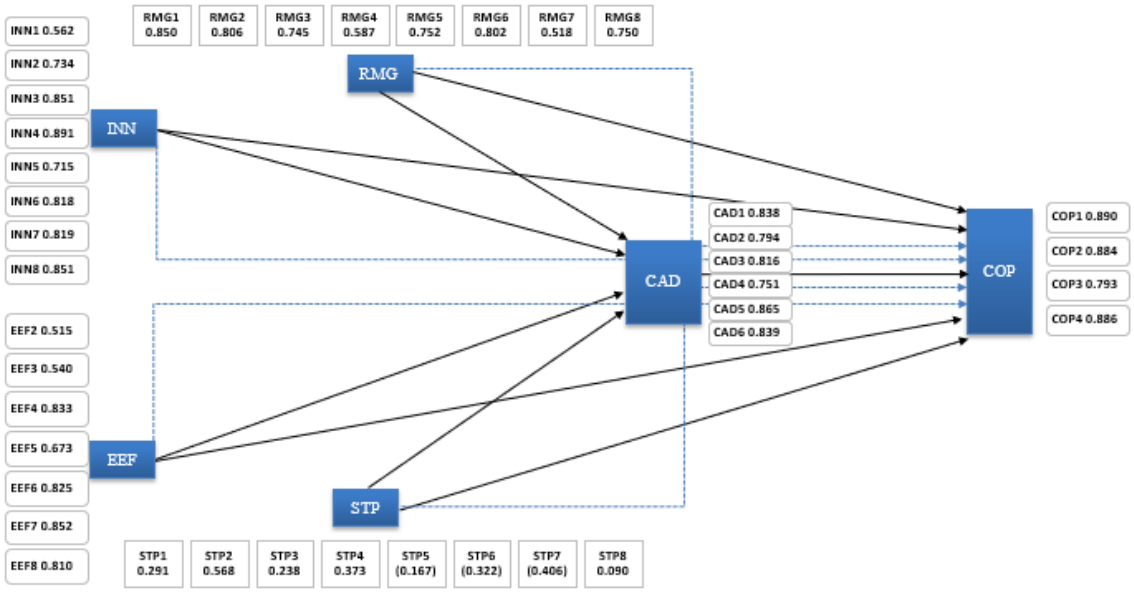


Figure 4.7 Measurement Model

4.2.1.1 Internal Consistency (CR, Alpha and Rho)

A higher alpha coefficient, approaching 1.00, indicates greater instrument reliability, while a coefficient below 0.6 suggests unreliability*(Utari et al., 2022)*. Convergent validity, indicated by CR > 0.7 signifies an absence of measurement error in the outer model, allowing all latent variables to predict inner model structural functions*(Muafi et al., 2017)*.

Convergent validity in our study is demonstrated through the utilization of various measures such as Cronbach's alpha, rho A, Composite Reliability (CR), and Average Variance Extracted (AVE). Table 4-3 below illustrates the convergent validity findings.

Convergent validity, a key component of measurement validation, is assessed in our study using various indicators including Cronbach's alpha (α), rho A (ρA), Composite Reliability (CR). Refer 4-2 where all values are above the threshold of Cronbach's Alpha 0.60 and Composite reliability above 0.70 and is considered reliable.

Variable	α	ρA	CR	Conclusion
Competitive advantage	0.901	0.905	0.924	Reliable as α>0.60 & CR>0.70
Corporate Performance	0.888	0.906	0.922	Reliable as α>0.60 & CR>0.70
Energy Efficiency	0.846	0.911	0.874	Reliable as α>0.60 & CR>0.70
Innovation	0.910	0.929	0.927	Reliable as α>0.60 & CR>0.70
Risk Management	0.875	0.897	0.901	Reliable as α>0.60 & CR>0.70
Stakeholder Participation	0.908	-1.041	0.059	Not Reliable as CR < 0.70

Table 4-2 Convergent Validity

The results, as presented in the table, reveal that all values for Cronbach's Alpha exceed the threshold of 0.60, signifying high internal consistency for the examined variables. Similarly, Composite Reliability values surpass the 0.70 threshold, further confirming the reliability of the measurement instruments used in the study.

Specifically, for each variable, including Competitive Advantage, Corporate Performance, Energy Efficiency, Innovation, and Risk Management, the values for Cronbach's alpha, rho A, and Composite Reliability are consistently above the designated thresholds. This consistency across indicators underscores the robustness and reliability of the measurements for these variables.

However, it is noteworthy that Stakeholder Participation exhibits an anomaly with a negative value for rho A and an exceptionally low value for Composite Reliability, indicating unreliability. This suggests a potential issue with the measurement instruments for Stakeholder Participation, warranting careful consideration and potential reassessment of the measurement approach for this particular variable.

In conclusion, the overall assessment of convergent validity based on Cronbach's alpha and Composite Reliability indicates a high level of reliability for most variables in the study. The exception of Stakeholder Participation emphasizes the importance of critically evaluating and refining measurement approaches for specific constructs to enhance the overall robustness of the study.

4.2.1.2 Indicators Reliability (Outer Loadings)

The outer loading threshold in structural equation modeling (SEM) serves as a criterion for evaluating the strength and significance of relationships between observed indicators and their corresponding latent constructs. These loading values denote the standardized regression coefficients between the latent construct and its observed variables.

While a universal threshold isn't prescribed for all research contexts. Researchers should contextualize their work and consider established practices when interpreting outer loading values. It's crucial to acknowledge that low outer loading values may signal inadequate measurement quality, implying that observed variables might not effectively capture the latent construct. In such instances, researchers should reassess their measurement model, exploring modifications to enhance the reliability and validity of the indicators. This threshold ensures a robust relationship between observed variables and latent constructs.

Variables exhibiting substantial loading values (> 0.40) suggest their adequacy in representing the corresponding factor(Shrestha, 2021).

a) Risk Management

In the Risk Management Table 4-3, each indicator (RMG1, RMG2, RMG3, RMG4, RMG5, RMG6, RMG7, RMG8) is linked to an outer loading value, signifying the strength and orientation of its relationship with the latent construct, importantly all outer loading values exceed the threshold of 0.40. These outcomes underscore robust and positive connections between each indicator and the latent construct of Risk Management. Consequently, all indicators are deemed reliable and were retained for analysis.

RMG1	0.850	Acceptable as > 0.40
RMG2	0.806	Acceptable as > 0.40
RMG3	0.745	Acceptable as > 0.40
RMG4	0.587	Acceptable as > 0.40
RMG5	0.752	Acceptable as > 0.40
RMG6	0.802	Acceptable as > 0.40
RMG7	0.518	Acceptable as > 0.40
RMG8	0.750	Acceptable as > 0.40

Table 4-3 Outer Loading RMG

b) Innovations

Within the Innovations Table 4-4, each indicator (INN1, INN2, INN3, INN4, INN5, INN6, INN7, INN8) is linked to an outer loading value, revealing the strength and orientation of its relationship with the latent construct in structural equation modeling (SEM). Importantly, all outer loading values are above the 0.40 threshold. These outcomes highlight robust and positive connections between each indicator and the latent construct of Innovations. These outcomes underscore robust and positive connections between each indicator and the latent construct Innovations. Consequently, all indicators are deemed reliable and were retained for analysis.

INN1	0.562	Acceptable as > 0.40
INN2	0.734	Acceptable as > 0.40
INN3	0.851	Acceptable as > 0.40
INN4	0.891	Acceptable as > 0.40
INN5	0.715	Acceptable as > 0.40
INN6	0.818	Acceptable as > 0.40
INN7	0.819	Acceptable as > 0.40
INN8	0.851	Acceptable as > 0.40

Table 4-4 Outer loading INN

c) Energy Efficiency

In the Energy Efficiency table, each indicator (EEF1, EEF2, EEF3, EEF4, EEF5, EEF6, EEF7, EEF8) is associated with an outer loading value, outer loading values are above the threshold of 0.40 except 0.302 for EEF1. Due to its value falling below the threshold, EEF1 was considered unreliable and was subsequently deleted/not considered in the analysis. These outcomes underscore robust and positive connections between each indicator and the latent construct of Energy Efficiency. Consequently, all indicators are deemed reliable and were retained for analysis.

EEF1	**0.302**	Not acceptable as < 0.40
EEF2	0.515	Acceptable as > 0.40
EEF3	0.540	Acceptable as > 0.40
EEF4	0.833	Acceptable as > 0.40
EEF5	0.673	Acceptable as > 0.40
EEF6	0.825	Acceptable as > 0.40
EEF7	0.852	Acceptable as > 0.40
EEF8	0.810	Acceptable as > 0.40

Table 4-5 Outer Loading EEF

d) Stakeholder Participation

With a designated threshold set at greater than 0.40 for outer loadings, it becomes apparent that only STP2 (0.568) surpass this criterion, indicating robust positive associations with the overarching construct of stakeholder participation. Conversely, components falling below the threshold, such as STP1, STP3. SPT4 and STP8, along with those exhibiting negative values (STP5 and STP6), may be flagged as areas necessitating attention or improvement. Their lower outer loadings imply a comparatively weaker relationship with stakeholder participation, underscoring the need for further investigation, refinement, or targeted interventions to enhance their alignment with the overarching construct.

STP1	0.291	Not acceptable as < 0.40
STP2	0.568	Acceptable as > 0.40
STP3	0.238	Not acceptable as < 0.40
STP4	0.373	Not acceptable as < 0.40
STP5	(0.167)	Not acceptable as < 0.40
STP6	(0.322)	Not acceptable as < 0.40
STP7	(0.406)	Not acceptable as < 0.40
STP8	0.090	Not acceptable as < 0.40

Table 4-6 Outer loading SPT

e) Competitive Advantage

Refer Table Competitive Advantage, each indicator (CAD1, CAD2, CAD3, CAD4, CAD5, CAD6) is linked to an outer loading value, revealing the strength and orientation of its relationship with the latent construct in structural equation modeling (SEM). Importantly, all outer loading values surpass the 0.40 threshold. These outcomes highlight robust and positive connections between each indicator and the latent construct of Competitive Advantage. Consequently, all indicators are deemed reliable and were retained for analysis.

CAD1	0.838	Acceptable as > 0.40
CAD2	0.794	Acceptable as > 0.40
CAD3	0.816	Acceptable as > 0.40
CAD4	0.751	Acceptable as > 0.40
CAD5	0.865	Acceptable as > 0.40
CAD6	0.839	Acceptable as > 0.40

Table 4-7 Outer Loading CAD

f) Corporate Performance

In the Corporate Performance Table, each indicator (COP1, COP2, COP3, COP4) demonstrates an outer loading value, signifying the strength and direction of its relationship with the latent construct in structural equation modeling (SEM). Notably, all outer loading values, surpass the threshold of 0.40. These values denote robust and positive associations between each indicator and the latent construct of Corporate Performance, highlighting their substantial contribution to the accurate measurement and representation of Corporate Performance within the structural model. Consequently, all indicators are deemed reliable and were retained for analysis.

COP1	0.890	Acceptable as > 0.40
COP2	0.884	Acceptable as > 0.40
COP3	0.793	Acceptable as > 0.40
COP4	0.886	Acceptable as > 0.40

Table 4-8 Outer Loading COP

4.2.1.3 Convergent Validity (AVE)

Convergent validity is deemed established when the average variance extracted (AVE) attains a value of 0.5 or higher *(Shrestha, 2021)*. The study utilizes Average Variance Extracted (AVE) as a metric for assessing convergent validity, gauging the degree to which indicators within each variable converge or share common variance. Refer Table 4-9 the AVE values for Competitive Advantage, Corporate Performance, Energy Efficiency, Innovation, and Risk Management are 0.669, 0.747, 0.482, 0.618, and 0.539, respectively. These results indicate that the majority of variables meet the recommended threshold of 0.50 for AVE, suggesting acceptable convergent validity. However, the variable Stakeholder Participation stands out with a lower AVE of 0.113, signaling less shared variance among its indicators. This raises concerns about the convergent validity of Stakeholder Participation, underscoring the need for further scrutiny and potential refinement of measurement instruments associated with this variable to enhance its reliability in the study. In summary, while most variables exhibit satisfactory convergent validity, the lower AVE for Stakeholder Participation necessitates careful consideration when interpreting results related to this specific construct.

Variable	AVE	Conclusion
Competitive Advantage	0.669	Correct as AVE ≥ 0.50
Corporate Performance	0.747	Correct as AVE ≥ 0.50
Energy Efficiency	0.482	Correct as AVE ≥ 0.50
Innovation	0.618	Correct as AVE ≥ 0.50
Risk Management	0.539	Correct as AVE ≥ 0.50
Stakeholder Participation	0.113	Not correct as AVE < 0.50

Table 4-9 Convergent Validity (AVE)

4.2.1.4 Discriminant Validity

This assessment gauges the extent to which variables differ from one another. Smart-PLS evaluates discriminant validity through three distinct criteria. Discriminant validity is established when the square root of a construct's Average Variance Extracted (AVE) surpasses the inter-item correlation, indicating that the items related to a construct exhibit more variability than other elements. The initial two criteria, namely "Fornell and Lacker" and "Cross Loading," are not considered reliable. In contrast, the third criterion, "Heterotrait-Monotrait ratio (HTMT)," is deemed reliable for assessing discriminant validity. HTMT is calculated as the average of all correlations among indicators measuring different constructs relative to the geometric mean of the average correlations among indicators measuring the same construct.

HTMT value exceeds the threshold of HTMT 0.85 or HTMT 0.90, issues with discriminant validity arise *(Yusoff et al., 2020)*. Values for this measure should be below 0.90, signifying that the variables are distinct from each other. Refer Table 4-10, overall, these findings suggest generally acceptable discriminant validity which is below the threshold of 0.90.

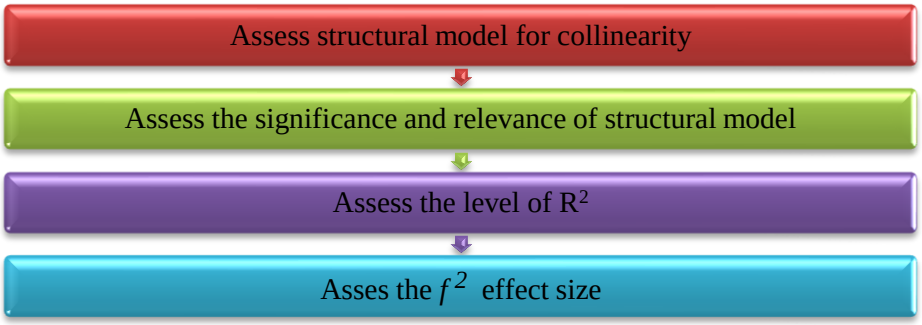
Variable	CAD	COP	EEF	INN	RMG
Competitive Advantage					
Corporate Performance	0.645				
Energy Efficiency	0.400	0.426			
Innovations	0.593	0.479	0.594		
Risk Management	0.521	0.464	0.463	0.773	
Stakeholder Participation	0.081	0.069	0.258	0.141	0.147

Table 4-10 Discriminant Validity with Heterotrait-Monotrait Ratio (HTMT)

The Heterotrait-Monotrait (HTMT) ratio is employed to assess discriminant validity, which evaluates whether a construct is sufficiently distinct from others in the model. In our research, examining the HTMT values between constructs reveals varying levels of discriminant validity. The HTMT values for Competitive Advantage with other constructs are reasonably low, suggesting good discriminant validity. Similarly, Corporate Performance demonstrates distinctiveness from Energy Efficiency, Innovations, and Risk Management with HTMT values of 0.645, 0.426, and 0.464, respectively. Energy Efficiency exhibits a moderate level of discriminant validity with COP (0.426) and INN (0.594). Innovations and Risk Management show relatively lower discriminant validity with each other (0.773) compared to their relationships with other constructs. Stakeholder Participation demonstrates good discriminant validity with the lowest HTMT values, emphasizing its distinctiveness from the other constructs.

4.2.2 Assessment of Structural Model

When the outer model proves to be valid, it triggers the examination of the inner path model. The significance of the connections and coefficients between constructs is established in the second phase, without delving into statistical terms. The researcher employs the Bootstrap technique to explore the associations between variables in the Structural model assessment. Four criteria were employed for evaluating the structural model: assessing collinearity, examining the path coefficient (Beta) for the strength of the relationships between variables, scrutinizing R-Square (R2) as a regression score, and evaluating the effect size of f-square (f2). A visual representation is depicted in the figure below;



4.2.2.1 Assessment of Collinearity

In PLS-SEM, the analysis relies on Ordinary Least Square (OLS) regression for each independent variable. It is crucial to evaluate collinearity among variables to eliminate any potential biased estimates. In Smart-PLS, we utilize the Variance Inflation Factor (VIF) to examine the presence of multicollinearity. Values exceeding 3.3 indicate high collinearity. In this research investigation, an analysis of Variance Inflation Factors (VIFs) was undertaken to evaluate the extent of multicollinearity among pivotal variables within the regression model. Refer Table 4-11 the outcomes of the VIF examination reveal low to moderate level of multicollinearity's below;

Variable	VIF
CAD -> COP	1.527
EEF -> CAD	1.426
EEF -> COP	1.450
INN-> CAD	2.226
INN-> COP	2.437
RMG -> CAD	1.940
RMG -> COP	1.978
STP -> CAD	1.026
STP -> COP	1.037

Table 4-11 Assessment of Collinearity

- CAD -> COP (VIF: 1.527): The VIF of 1.527 implies that collinearity between the predictor variable CAD and criterion variable COP is minimal, and the estimated coefficients' variance is not significantly inflated.
- EEF -> CAD (VIF: 1.426): With a VIF of 1.426, the relationship between EEF and CAD indicates low collinearity, suggesting that the estimated coefficients for EEF with respect to CAD are not substantially affected.
- EEF -> COP (VIF: 1.450): Similarly, the VIF of 1.450 for the EEF and COP relationship indicates low collinearity, emphasizing that multicollinearity concerns are minimal.
- INN -> CAD (VIF: 2.226): The VIF of 2.226 indicates a moderate level of collinearity between INN and CAD, warranting attention but falling below the commonly accepted threshold of 3.3.
- INN -> COP (VIF: 2.437): The VIF of 2.437 suggests a moderate level of collinearity between INN and COP, requiring further consideration but not reaching a critical level.
- RMG -> CAD (VIF: 1.940): The VIF of 1.940 for RMG with respect to CAD suggests low collinearity, affirming that the relationship between RMG and CAD is not significantly influenced by multicollinearity.
- RMG -> COP (VIF: 1.978): The VIF of 1.978 for RMG and COP implies low collinearity, mirroring the favorable conditions observed in the RMG-CAD relationship.

- STP -> CAD (VIF: 1.026): The very low VIF of 1.026 for STP with respect to CAD indicates almost no collinearity, presenting a favorable outcome.
- STP -> COP (VIF: 1.037): Similarly, the VIF of 1.037 for STP and COP denotes very low collinearity, reinforcing the positive assessment of this relationship.

In summary, the regression model of the research demonstrates generally low to moderate collinearity levels. None of the VIF values exceed the commonly recommended threshold of 3.3, suggesting that multicollinearity among pivotal variables is within an acceptable range. Nonetheless, it is advisable to complement these results with additional diagnostic tests and consider the broader research context.

4.2.2.2 Significance of Model

In our research analysis, the utilization of p-values has been instrumental in assessing the statistical significance of our findings. Notably, variables with p-values less than 0.01 indicate a highly significant relationship, providing robust evidence to reject the null hypothesis. Similarly, results with p-values below 0.05 suggest a statistically significant association, reinforcing the rejection of the null hypothesis at a conventional significance level. Furthermore, variables with p-values below 0.10 imply a suggestive level of significance while p value greater than .10 replicates no evidence against the null hypothesis. In a detailed examination of the statistical outcomes refer Table 4-12, our study reveals insights that either support or challenge the proposed hypotheses against the null hypothesis.

	Hypothesis	β	STDEV	t-val	p-val	Decision
H_1	RMG -> COP	0.128	0.077	1.670	0.048	Accepted at p < 0.05
H_2	RMG -> CAD	0.157	0.100	1.569	0.058	Accepted at p < 0.10
H_3	RMG -> CAD -> COP	0.070	0.045	1.551	0.061	Accepted at p < 0.10
H_4	INN -> COP	0.016	0.083	0.193	0.424	Not accepted.
H5	INN -> CAD	0.372	0.087	4.252	0.000	Accepted at p < 0.01
H_6	INN -> CAD -> COP	0.167	0.047	3.539	0.000	Accepted at p < 0.01
H_7	EEF -> COP	0.196	0.072	2.700	0.003	Accepted at p < 0.01
H_8	EEF -> CAD	0.121	0.073	1.657	0.049	Accepted at p < 0.05
H_9	EEF -> CAD -> COP	0.054	0.035	1.559	0.059	Accepted at p < 0.10
H_{10}	STP -> COP	0.058	0.083	0.698	0.243	Not accepted.
H_{11}	STP -> CAD	-0.086	0.085	1.005	0.158	Not accepted.
H_{12}	STP -> CAD -> COP	-0.038	0.039	0.984	0.162	Not accepted.
H_{13}	CAD -> COP	0.448	0.077	5.802	0.000	Accepted at p < 0.01

Table 4-12 Results of Hypothesis Tests

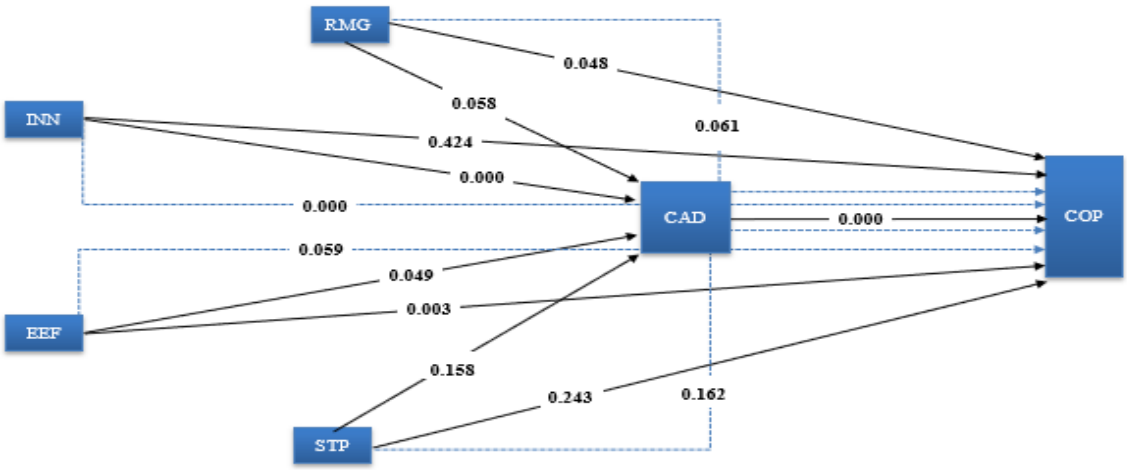


Figure 4.8 Research Structural Model

g) Hypotheses (Validated)

- H_1 (RMG -> COP): The beta coefficient is 0.128, and the p-value is 0.048, both below the conventional significance level of 0.05, leading to the acceptance of the hypothesis. This suggests a positive relationship between RMG and COP.
- H_2 (RMG -> CAD): With a beta coefficient of 0.157 and a p-value of 0.058, this hypothesis is accepted. It implies a positive association between RMG and CAD.
- H_3 (RMG -> CAD -> COP): The beta coefficient is 0.070, and the p-value is 0.061, meeting the criteria for acceptance. This indicates a positive relationship involving RMG, CAD, and COP.
- H_5 (INN -> CAD): The beta coefficient is 0.372, and the p-value is 0.000, leading to the acceptance of the hypothesis. There is a significant positive relationship between INN and CAD.
- H_6 (INN -> CAD -> COP): With a beta coefficient of 0.167 and a p-value of 0.000, this hypothesis is accepted, suggesting a positive relationship between INN, CAD, and COP.
- H_7 (EEF -> COP): The beta coefficient is 0.196, and the p-value is 0.003, leading to the acceptance of the hypothesis. A positive relationship is suggested between EEF and COP.
- H_8 (EEF -> CAD): With a beta coefficient of 0.121 and a p-value of 0.049, this hypothesis is accepted, implying a positive association between EEF and CAD.
- H_9 (EEF -> CAD -> COP): The beta coefficient is 0.054, and the p-value is 0.059, meeting the criteria for acceptance. There is a positive relationship involving EEF, CAD, and COP.
- H_{13} (CAD -> COP): The beta coefficient is 0.448, and the p-value is 0.000, leading to the acceptance of the hypothesis. A significant positive relationship is suggested between CAD and COP.

h) Hypotheses (Not Validated)

- H_4 (INN -> COP): The beta coefficient is 0.016, and the p-value is 0.424, both exceeding the significance level of 0.10. This hypothesis is not accepted, suggesting insufficient evidence for a relationship between INN and COP.
- H_{11} (STP -> COP): The beta coefficient is 0.058, and the p-value is 0.243, both exceeding the significance level of 0.10 and is not accepted, indicating a lack of evidence for a relationship between STP and COP.
- H_{12} (STP -> CAD): The beta coefficient is -0.086, and the p-value is 0.158, both exceeding the significance level of 0.10 and is not accepted, suggesting insufficient evidence for a relationship between STP and CAD.
- H_{13} (STP -> CAD -> COP): The beta coefficient is -0.038, and the p-value is 0.162, both exceeding the significance level of 0.10. This hypothesis is not accepted, indicating insufficient evidence for a relationship between STP, CAD, and COP.

To summarize H_1, H_2, H_3, H_5, H_6, H_7, H_8, H_9 & H_{13} are validated and H_4, H_{10}, H_{11}& H_{12} are not validated against the null hypothesis.

4.2.2.3 Explanatory Power of the Model

R-squared (R^2) plays a pivotal role in regression analysis by assessing how well a model explains the variability in the dependent variable. This metric ranges from 0 to 1, with 0 indicating the model's inability to account for any variance and 1 denoting a perfect explanation of variance. In essence, R-squared quantifies the percentage of variability in the dependent variable that the model's independent variables can explain. A higher R-squared value reflects a more effective fit of the model to the data, suggesting that a larger share of the variability in the dependent variable is captured. It's essential to note, however, that while a high R-squared indicates a robust correlation, it does not establish causation. R-squared and adjusted R-squared values would be in the context of how well predictors explain the variability in Competitive Advantage and Corporate Performance and is explained below;

Competitive Advantage: Refer Table 4-13, the R-squared value of 0.345 indicates that the model accounts for approximately 34.5% of the variance in Competitive Advantage. The adjusted R-squared value of 0.334 considers the model's complexity, suggesting that even after considering the number of predictors, the model still explains around 33.4% of the variance in Competitive Advantage.

Corporate Performance: Refer Table 4-13, the R-squared value of 0.406 implies that the model explains about 40.6% of the variance in Corporate Performance. The adjusted R-squared value of 0.393, after adjusting for the number of predictors, suggests that around 39.3% of the variability in Corporate Performance is explained by the research model.

Dependent Variable	R-square	R-square adjusted
Competitive Advantage	0.345	0.334
Corporate Performance	0.406	0.393

Table 4-13 Results of R-Square (Dependent & Mediator) variables

4.2.2.4 Effect Size f^2

In this research study, we assessed the impact of various constructs on our dependent variable, employing the f^2 statistic to gauge the effect size of each predictor. F^2 is a measure of effect size used in analysis of variance to quantify the proportion of variance in the dependent variable explained by an independent variable. It ranges from 0 to 1, where 0 denotes no effect and 1 indicates that the entire variance is explained by the independent variable. The interpretation of f-square values includes small effects around 0.01, medium effects around 0.06, and large effects around 0.14. These values serve as general benchmarks, and their significance may vary based on the specific context and field of study, providing a useful metric for understanding the practical importance of observed relationships in statistical analyses.

Refer Table 4-14; The f-square values provided represent the proportion of variance in the dependent variable, Corporate Performance (COP), explained by each respective independent variable (construct). A higher f-square indicates a greater contribution to explaining the variance. In this context, CAD accounts for 4.4%, EEF 4.5 % and INN contribute minimally (0.0%) while RMG explains 1.4% of the variance in COP.

Construct	COP	Effect
CAD	0.221	Large Effect
EEF	0.044	Medium Effect
INN	0.000	No Effect
RMG	0.014	Medium Effect

Table 4-14 Effect Size F-Square (Dependent Variable)

Refer Table 4-15; The provided values for the mediator variable CAD represent the effect size (Cohen's f-square) of each respective independent variable (EEF, INN, RMG) on CAD. In this context, EEF has a small effect 1.6%, INN exhibits a medium effect 9.5% and RMG has a small effect 1. 9% on Competitive Advantage. The term "Medium Effect" refers to the magnitude of the influence and suggests a moderate impact of EEF and RMG, and a relatively stronger impact of INN on CAD.

Construct	CAD	Effect
EEF	0.016	Medium Effect
INN	0.095	Medium Effect
RMG	0.019	Medium effect

Table 4-15 Effect Size F-Square (Mediator variable)

CHAPTER 05: CONCLUSIONS & RECOMMENDATIONS

5 Overview

This chapter delves deeply into a comprehensive exploration of the study's findings, seamlessly building upon the foundational work established in the preceding chapter. These discussions are artfully framed within the broader context of the research objectives initially outlined in the opening chapter. At its core, the primary objective of this research was to meticulously evaluate the collective impact of Risk Management, Innovations, Energy Efficiency, Stakeholder Participation, and Competitive Advantage on the corporate performance both directly and indirectly through the mediation of competitive advantage for firms within Pakistani oil industry,

The introductory segment of this chapter critically scrutinizes the empirical findings unearthed from the study, skillfully aligning them with the accurately defined research objectives. Following this, the subsequent section investigates into the rich theoretical and managerial implications that naturally flow from the study's outcomes. In a fitting conclusion, this chapter not only outlines the encountered limitations during the research journey but also charts a course of actions for future research endeavors.

In core, this chapter serves as an artful mixture and interpretation of the results vis-à-vis the study's overarching objectives, providing invaluable insights for advancing both theoretical comprehension and practical applications in the dynamic landscape of the oil industry in Pakistan.

5.1 Experimental findings

The main objective of the research to check and ascertain the relationship of variables where Risk management, Innovations, Energy Efficiency, Stakeholder Participation, Competitive Advantage was independent variable and corporate performance was dependent variable. The indirect relationship of independent variable with dependent variable was also check through mediator (competitive Advantage). The primary data was collected through questionnaire from oil industry of Pakistan. The discussions on each hypothesis based on the results in the previous chapter are as follow;

5.1.1 Analyzing the impact of Risk Management on Corporate Performance.

In investigating the impact of Risk Management and Corporate Performance within the unique contours of the Pakistani oil industry, uncovers a compelling and positive correlation. With a beta coefficient of 0.128 and an astutely low p-value of 0.048 beneath the established significance threshold of 0.05, this investigation firmly validates the hypothesis. The distinguished outcome signifies that the implementation of skilled risk management practices deeply influences and uplifts corporate performance within the Pakistani oil sector.

In light of the established nexus between RMG and COP, it is strongly advised that entities operating in the Pakistani oil industry place a strategic emphasis on fortifying and elevating their risk management frameworks. This entails the deployment of comprehensive risk assessment protocols, the proactive execution of risk mitigation strategies, and the cultivation of a corporate attitude that is highly attuned

to risk dynamics. Furthermore, the infusion of risk management considerations into the overarching strategic planning kit is recommended, fostering an interdependent relationship that augments decision-making efficacy and enhance corporate performance. A continuous and adaptive approach to monitoring risks, attuned to the evolving landscape of the oil industry in Pakistan, is essential. By skillfully addressing risk factors, organizations stand self-assured to strengthen their resilience, thereby navigating the complexities of the Pakistani oil sector and charting a course towards sustained corporate prosperity.

5.1.2 Analyzing the impact of Risk Management on Competitive Advantage.

In analyzing the impact of Risk Management on Competitive Advantage in the Pakistani oil industry, we find a clear link. The numbers show a good connection, with a 0.157 (beta) and 0.058 (p-value) which is significant at 0.10 level. So, we can say that good risk management is connected with having an edge over competitors in the Pakistani oil sector.

With this understanding, it's a good idea for oil companies in Pakistan to focus more on making their risk management strategies better. Paying special and close attention to possible risks, doing things to prevent them, and making sure everyone in the company knows about risks. It's also smart to think about risk management when planning important moves for the company. Doing this fine can help make decisions better and give the company a long-lasting edge over others in the tricky sector of oil business in Pakistan.

5.1.3 Analyzing that Competitive Advantage mediate the relationship of Risk Management and Corporate Performance.

The beta coefficient of 0.070 sheds light on the intricate connection between proficient risk management and its potential impact on gaining a competitive advantage in the context of the Pakistani oil industry. While the coefficient signifies a relatively modest positive influence, it suggests that company's adept at navigating and mitigating risks stand a better chance of securing a competitive edge over their industry peers. This advantage, as suggested by the analysis, carries broader implications, potentially contributing to an overall improvement in the performance of these companies.

Although the p-value slightly exceeds the conventional threshold of 0.05, the continued statistical significance at the pre-determined level below 0.10 reinforces the robustness of the identified relationship. In practical terms, this indicates that the positive correlation between effective risk management and a competitive advantage remains noteworthy and reliable, even under careful statistical scrutiny.

The practical implications of these findings extend beyond statistical validation. They propose that companies operating in the Pakistani oil sector may derive substantial benefits from a strategic emphasis on risk management. While the impact might be subtle, the cumulative effect on competitive positioning and, subsequently, overall company performance is considerable. The study advocates for a paradigm shift among decision-makers, highlighting risk management as more than a mere compliance-driven activity but as a potential catalyst for sustained success and advantage in a fiercely

competitive industry. Additionally, exploring contextual factors influencing this relationship, such as market dynamics or regulatory environments, is warranted to refine strategies tailored to the distinctive challenges of the Pakistani oil sector.

In summary, the study not only validates the significance of vigilant risk management in the competitive dynamics of the Pakistani oil industry but also provides a foundation for strategic discussions within companies. Decision-makers may find value in leveraging effective risk management practices not only for compliance but as a purposeful and strategic choice capable of contributing to a sustainable competitive advantage and improved overall performance in the dynamic and intricate landscape of the Pakistani oil business.

5.1.4 Analyzing the impact of Innovations on Corporate Performance.

The exploration of the interplay between innovation and corporate performance within the Pakistani oil industry has produced statistical outcomes indicative of a limited correlation between these variables. The calculated beta coefficient of 0.016, serving as a measure of the strength and direction of this correlation, suggests a faint positive link. However, the relatively modest size of the coefficient alone does not establish the statistical significance of this relationship. Correspondingly, the associated p-value of 0.424, a pivotal statistic in assessing significance, surpasses the conventional thresholds of 0.05 or 0.10. This indicates that the observed results lack statistical significance, thereby insufficiently supporting the rejection of the null hypothesis, which posits no direct association between innovation and corporate performance in the specified context.

The inference drawn from these results is that, based on the dataset and analytical approach adopted in the study, there exists insufficient statistical backing to affirm a clear and meaningful connection between innovation and corporate performance within the Pakistani oil industry. While the beta coefficient implies a positive correlation, it lacks the robustness required for definitive conclusions. The elevated p-value reinforces this stance, suggesting that the observed outcomes might plausibly occur randomly in the absence of any genuine relationship between innovation and corporate performance. Consequently, the study refrains from establishing a statistically substantiated claim that innovation significantly influences the performance of companies in this particular industry and geographical context.

The absence of statistical significance should not necessarily undermine the potential importance of innovation in shaping corporate performance. Decision-makers in the Pakistani oil industry should interpret these findings as specific to the dataset and methodology employed in this study. The results prompt a consideration of the conditions or factors that may contribute to the observed statistical outcomes. Additionally, this underscores the importance of recognizing inherent research limitations, such as sample size or measurement methods, which can impact a study's ability to detect a genuine relationship.

In summary, while the present study falls short of providing definitive evidence for a direct link between innovation and corporate performance in the Pakistani oil industry, it emphasizes the need for further exploration. Subsequent investigations might delve into alternative variables, methodologies, or

industry dynamics to offer a more detailed comprehension of the intricate relationship between innovation and corporate performance. The study contributes valuable insights to the ongoing dialogue on the influence of innovation on corporate performance, with the understanding that its results should be viewed within the broader context of research limitations and the dynamic nature of business landscapes.

5.1.5 Analyzing the impact of Innovations on Competitive Advantage.

The statistical analysis for investigating the relationship between Innovation and Competitive Advantage uncovers a substantial beta coefficient of 0.372 and an exceptionally low p-value of 0.000. The p-value significantly surpasses the accepted threshold of .01. This indicates a robust and statistically significant positive connection between innovation and gaining a competitive advantage. It notably contributes to a positive impact on obtaining a competitive advantage (CAD). The extremely low p-value of 0.000 further emphasizes the strength and reliability of this observed relationship, providing compelling evidence for a meaningful and positive correlation.

For companies navigating the difficult landscape of the Pakistani oil sector, the insights offer a strategic pathway for enhancing competitive advantage: prioritize and invest in innovation. Cultivating a culture of innovation, embracing emerging technologies, and exploring inventive solutions can significantly contribute to gaining a competitive edge. Regular evaluations of how innovative practices translate into a competitive advantage, coupled with ongoing vigilance of industry trends, are essential components of a proactive and forward-looking strategy. By aligning innovative endeavors with broader business goals, companies position themselves as pioneers in the industry, fostering sustained success and adaptability in the competitive milieu of the Pakistani oil sector.

5.1.6 Analyzing that Competitive Advantage mediate the relationship of Innovations & Corporate Performance.

A robust beta coefficient of 0.167 and a p-value of 0.000, both indicating a statistically significant connection. This suggests a positive flow from innovation to competitive advantage and subsequently, corporate performance. The beta coefficient of 0.167 suggests that when there's innovation, it has a positive impact on gaining a competitive advantage which in turn positively affects overall corporate performance. The low p-value of 0.000 emphasizes the strength and reliability of this relationship. A substantial and meaningful connection between innovation, competitive advantage, and corporate performance in the Pakistani oil sector is concluded.

For companies in the Pakistani oil industry, these findings offer a clear directive: prioritize and invest in innovation. Fostering a culture of innovation can lead to gaining a competitive advantage, ultimately contributing to improved overall corporate performance. Strategies may involve encouraging creative problem-solving, investing in research and development, and staying attuned to technological advancements within the industry. Companies should also keep a watchful eye on industry trends, ensuring that their innovation efforts align with the evolving landscape of the Pakistani oil sector. By leveraging innovation strategically, companies can position themselves for sustained success and prominence in the competitive business environment.

5.1.7 Analyzing the impact of Energy Efficiency on Corporate Performance.

By exploring the correlation between Energy Efficiency and Corporate Performance within the Pakistani oil industry. The statistical analysis unfolds a robust beta coefficient of 0.196 and remarkably low p-value of 0.003 underscores the robustness of this observed relationship, providing compelling evidence for the positive connection. In summary it is clearly endorsed that underscored a meaningful and positive correlation between energy efficiency and corporate performance in the Pakistani oil industry.

For businesses navigating the Pakistani oil sector, the outcome presents a clear roadmap for augmenting corporate performance that is prioritize investments in energy efficiency. Embracing energy-efficient practices, technologies, and processes can not only yield cost savings but also foster a positive impact on overall corporate performance. This may involve integrating sustainable energy sources, optimizing energy consumption, and exploring innovative technologies to enhance efficiency. Regular assessments of energy efficiency initiatives and their ramifications on corporate performance are imperative. Additionally, staying well-informed in energy-efficient technologies within the industry is crucial. By aligning energy efficiency endeavors with overarching business objectives, companies can position themselves as environmentally conscious and economically efficient entities, thereby contributing to sustained corporate success in the competitive landscape of the Pakistani oil industry.

5.1.8 Analyzing the impact of Energy Efficiency on Competitive Advantage.

The statistical examination for exploring the connection between Energy Efficiency (EEF) and Competitive Advantage (CAD) in the Pakistani oil industry reveals a moderate beta coefficient of 0.121 and a p-value of 0.049 where p-value below the accepted threshold of 0.10. Suggest that improvements in energy efficiency positively contribute to obtaining a competitive advantage (CAD). With a p-value of 0.049, slightly below the conventional threshold, there is evidence for a statistically significant positive correlation which acknowledged, pointing to a noteworthy and positive correlation between energy efficiency and competitive advantage within the Pakistani oil industry.

For companies navigating the intricate landscape of the Pakistani oil sector, this insight provides strategic guidance for enhancing competitive advantage: prioritize and invest in energy efficiency. Implementing energy-efficient practices & awareness, embracing technologies optimizing energy consumption, and exploring innovative solutions can significantly contribute to gaining a competitive edge. Regular evaluations of how energy efficiency initiatives impact competitive advantage and staying informed about industry trends are vital components of a proactive strategy. By aligning energy efficiency initiatives with broader business objectives, companies position themselves as forward-thinking entities, fostering sustained success and resilience in the competitive realm of the Pakistani oil sector.

5.1.9 Analyzing that Competitive Advantage mediate the relationship of Energy Efficiency and Corporate Performance.

The statistical analysis reveals that sequential relationship among Energy Efficiency, Competitive Advantage and Corporate Performance in the Pakistani oil industry a modest beta coefficient of 0.054 and a p-value of 0.059. The beta coefficient of 0.054 implies that enhancements in energy efficiency (EEF) contribute positively to obtaining a competitive advantage and this positive influence extends to overall Corporate Performance (COP). The p-value of 0.059 below the conventional threshold of 0.10 provides evidence supporting a statistically significant positive correlation indicating a positive and meaningful connection between Energy Efficiency, Competitive Advantage, and Corporate Performance within the Pakistani oil industry.

For companies navigating the evolving terrain of the Pakistani oil sector, these insights offer strategic guidance for enhancing overall corporate performance: prioritize and invest in energy efficiency. Implementing energy-efficient practices, adopting technologies that optimize energy consumption, and exploring innovative solutions can significantly contribute to gaining a competitive advantage, thus positively impacting corporate performance. Regular evaluations of how energy efficiency initiatives translate into a competitive edge and their subsequent influence on overall performance are crucial for a proactive and adaptive strategy.

5.1.10 Analyzing the impact of Stakeholder Participation on Cooperate Performance.

This research delves into an in-depth examination of impact Stakeholder Participation on Corporate Performance it was concluded that the alpha coefficient (α) demonstrated high internal consistency (α = 0.908) but notable anomaly in the negative value of average variance extracted (ρA = -1.041) prompts further scrutiny. Composite reliability (CR = 0.059) also raises concerns about the interrelatedness of STP indicators. The outer loading analysis unveiled both positive and negative relationships between STP indicators (STP1 to STP8) and the latent variable. Particularly, STP5, STP6, and STP7 displayed negative loadings, necessitating a careful review and potential refinement of these indicators.

Furthermore, the hypothesized path from STP to COP (STP -> COP) yielded a path coefficient of 0.058 and a p-value of 0.243, a bit higher than our significant level of 0.10 level indicating a lack of statistical significance. This calls for a reevaluation of the initial hypothesis, advising a more understanding of the complicated relationship between Stakeholder Participation and Corporate Performance.

In light of these perceptions, it is recommended to conduct a thorough review and potential refinement of the STP construct, addressing issues related to reliability and validity in the future research. This entails a reconsideration of the inclusion or exclusion of specific indicators and an exploration of modifications to enhance the overall model fit.

5.1.11 Analyzing the impact of Stakeholder Participation on Competitive Advantage.

This research delves into an in-depth examination of impact Stakeholder Participation on Competitive Advantage it was concluded that the alpha coefficient (α) demonstrated high internal consistency (α = 0.908) but notable anomaly in the negative value of average variance extracted (ρA = -1.041) prompts

further scrutiny. Composite reliability (CR = 0.059) also raises concerns about the interrelatedness of STP indicators. The outer loading analysis unveiled both positive and negative relationships between STP indicators (STP1 to STP8) and the latent variable. Particularly, STP5, STP6, and STP7 displayed negative loadings, necessitating a careful review and potential refinement of these indicators.

Furthermore, the hypothesized path (STP -> CAD) yielded a path coefficient of -0.086 and a p-value of 0.158 which higher than our significant level of 0.10 level indicating a lack of statistical significance. This calls for a reevaluation of the initial hypothesis, advising a more understanding of the complicated relationship between Stakeholder Participation and Corporate Performance.

In light of these perceptions, it is recommended to conduct a thorough review and potential refinement of the STP construct, addressing issues related to reliability and validity in the future research. This entails a reconsideration of the inclusion or exclusion of specific indicators and an exploration of modifications to enhance the overall model fit.

5.1.12 Analyzing that Competitive Advantage mediate the relationship of Stakeholder Participation and Cooperate Performance.

This research delves into an in-depth examination of impact Stakeholder Participation through Competitive Advantage on Corporate Performance it was concluded that the alpha coefficient (α) demonstrated high internal consistency (α = 0.908) but notable anomaly in the negative value of average variance extracted (ρA = -1.041) prompts further scrutiny. Composite reliability (CR = 0.059) also raises concerns about the interrelatedness of STP indicators. The outer loading analysis unveiled both positive and negative relationships between STP indicators (STP1 to STP8) and the latent variable. Particularly, STP5, STP6, and STP7 displayed negative loadings, necessitating a careful review and potential refinement of these indicators.

Furthermore, the hypothesized path (STP -> CAD -> COP) yielded a path coefficient of -0.38 and a p-value of 0.162 which higher than our significant level of 0.10 level indicating a lack of statistical significance. This calls for a reevaluation of the initial hypothesis, advising a more understanding of the complicated relationship between Stakeholder Participation and Corporate Performance.

In light of these perceptions, it is recommended to conduct a thorough review and potential refinement of the STP construct, addressing issues related to reliability and validity in the future research. This entails a reconsideration of the inclusion or exclusion of specific indicators and an exploration of modifications to enhance the overall model fit.

5.1.13 Analyzing the impact of Competitive Advantage on Cooperate Performance.

The examination the impact of Competitive Advantage to Corporate Performance within the context of the oil industry in Pakistan has yielded convincing results. The statistical analysis reveals a substantial path coefficient (beta = 0.448) alongside an exceptionally low p-value of 0.000, emphasizing the robust statistical significance of this relationship and leading to the clear acceptance of the hypothesis. These findings provide strong empirical evidence for the positive impact of competitive advantage on corporate performance within the unique dynamics of the oil industry in Pakistan.

The statistical outcomes firmly establish that competitive advantage significantly contributes to corporate performance in the specific context of the Pakistani oil industry. This emphasizes the strategic importance of cultivating and leveraging competitive advantages within the sector. Organizations attuned to market dynamics and responsive to gaining a competitive edge are poised to enhance their overall corporate performance in the oil industry in Pakistan.

5.2 Implication of Study

The outcomes of this research provide valuable guidance for both supply chain managers and management of firm operating in Pakistan's oil sector. The intricate connections between corporate performance, risk management, innovation, energy efficiency, and competitive advantage reveal essential industry dynamics. Supply chain managers can utilize these insights to craft strategic initiatives, optimizing performance and bolstering resilience.

In particular, comprehending the link between corporate performance and risk management opens avenues for proactive risk mitigation strategies, ensuring a robust and resilient supply chain. Insights into the impact of innovation underscore the necessity for ongoing technological advancements to maintain competitiveness in the evolving industry. The focus on energy efficiency suggests pathways for sustainable practices, energy efficient technology, energy awareness, along with effective & efficient utilization of energy by aligning with global trends and improving the industry's environmental profile.

Furthermore, acknowledging the relationship between corporate performance and competitive advantage emphasizes the significance of strategic positioning and differentiation in the market. By integrating these findings into decision-making processes, supply chain managers can fine-tune their strategies, elevate operational efficiency, and contribute to the enduring success of their respective firms.

5.3 Conclusion

This research delves into a comprehensive exploration of the dynamics governing corporate performance in the Pakistani oil industry, focusing on the intricate interplay of risk management, innovation, energy efficiency, stakeholder participation, and competitive advantage. The findings underscore the substantial impact of these factors on the performance of companies operating within this complex sector.

Beginning with risk management, the study establishes a robust correlation between adept risk management practices and corporate performance. This signifies the pivotal role that strategic risk management plays in positively influencing and uplifting companies within the Pakistani oil industry. The results affirm the importance of navigating uncertainties and potential challenges effectively, contributing to overall organizational success.

Further investigation into the connection between risk management and competitive advantage reveals that companies proficient in risk management are more likely to gain a strategic edge over their competitors in the Pakistani oil sector. This finding highlights the strategic advantage that arises from

a proactive and effective risk management approach, reinforcing the notion that mitigating uncertainties can lead to a stronger market position.

Moreover, the study delves into the detailed relationship between risk management, competitive advantage, and corporate performance. Despite complexities, the research suggests a positive flow from effective risk management to gaining a competitive advantage, subsequently influencing overall corporate performance. This intricate relationship emphasizes the need for a holistic understanding of risk management strategies in fostering sustainable competitive advantages and, in turn, contributing to long-term organizational success.

Shifting focus to innovation, the study recognizes its critical role in gaining a competitive advantage within the Pakistani oil sector. While the direct impact on corporate performance is not clearly established, the research highlights the strategic importance of innovation in securing a competitive edge. Companies that prioritize innovation are positioned to adapt to changing market demands and technological advancements, fostering a dynamic and competitive market presence.

Energy efficiency emerges as another key factor influencing corporate performance in the Pakistani oil industry. The study identifies a positive correlation between energy efficiency and corporate performance, emphasizing the significance of sustainable practices. Companies that prioritize energy efficiency contribute not only to their own operational efficiency but also to broader environmental sustainability, aligning with global trends and enhancing their overall corporate image.

Similarly, the research underscores the positive connection between energy efficiency and competitive advantage. Companies that invest in energy-efficient practices are more likely to gain a competitive edge in the market. This finding reinforces the idea that sustainable business practices contribute not only to environmental responsibility but also to strategic advantages in a competitive industry.

Examining the sequential relationship among energy efficiency, competitive advantage, and corporate performance, the study unravels a positive and meaningful connection. Enhancements in energy efficiency not only contribute positively to gaining a competitive advantage but also extend their positive influence on overall corporate performance. This highlights the interconnectedness of these factors, emphasizing the need for a holistic approach to organizational sustainability within the Pakistani oil industry.

However, the study raises important considerations regarding stakeholder participation. Anomalies in the analysis prompt a careful review and potential refinement of certain indicators. While internal consistency is high, negative relationships with specific indicators underscore the need for a detailed understanding of the intricate dynamics between stakeholder participation and corporate outcomes. This calls for a more in-depth examination and refinement of stakeholder participation strategies to ensure a positive impact on corporate performance and competitive advantage.

In conclusion, this research provides a detailed and insightful exploration of the factors influencing corporate performance in the Pakistani oil industry. The findings emphasize the critical importance of strategic risk management, innovation, energy efficiency in shaping organizational success. The study not only highlights the individual significance of these factors but also underscores their interconnectedness, emphasizing the need for a holistic and adaptive approach to business operations

within this unique industry context. These insights contribute to a richer understanding of the challenges and opportunities faced by companies operating in the Pakistani oil sector and provide a foundation for future research and strategic decision-making within this dynamic business environment.

5.4 Limitations

Survey was conducted under time constraints; the study constrained the depth and breadth of data collection. Moreover, access to firms in the Pakistani oil industry was limited, involving only a sample size of 400, potentially insufficient for accurately measuring the intricate relationships under investigation. The complexities of variables within the oil industry context may demand a larger sample for more precise and reliable results. Addressing the essential variability in organizational practices and dynamics within the sector could be better achieved with a more extensive dataset.

In light of these limitations, it is crucial for readers and stakeholders to interpret the findings with caution. It is essential to recognize that the study's outcomes are based on a constrained timeframe, limited access to industry participants and a sample size that may impact the generalizability of the results. Furthermore, with a wide or extensive dataset, there is a probability that the results may yield statistically significant findings beyond what has been reported.

5.5 Track for Future Research

In shaping the trajectory for future research, it is imperative to confront and rectify the recognized limitations of the present study. First and foremost, upcoming research endeavors should prioritize the allocation of ample time resources, allowing for a more comprehensive exploration of the intricate relationships under investigation. An effort should be made to expand access to a diverse array of firms within the Pakistani oil industry, thereby ensuring a more representative dataset and fostering a thorough understanding of the sector's dynamics.

Secondly, for future investigations, the inclusion of a variable “Quality & Quantity” accurate measurements may be considered.

Thirdly, it is recommended to conduct a thorough review and potential refinement of the STP construct, addressing issues related to reliability and validity in the future research. This entails a reconsideration of the inclusion or exclusion of specific indicators and an exploration of modifications to enhance the overall model fit.

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APPENDIX- I: RESEARCH QUESTIONARE

Relationship of Supply Chain Management Practices and Corporate Performance of Oil industry in Pakistan. Does Competitive Advantage impact?

Dear Sir/Madam,

The undersigned is an MBA student at Bahria University Islamabad, Pakistan. I'm conducting important academic research, and your input is vital. Kindly complete research questionnaire; your valuable contribution will significantly enhance my study. Your information will be kept entirely confidential.

Thank you for your time and support. Your assistance is greatly appreciated.

Warm regards

Ihsan Ullah

Bahria University Islamabad, Pakistan

MBA Program

engineerihsan.khan@gmail.com

Please circle one of the following options:

1. **SECTION-1 (DEMOGRAPHICS)**
   - **I. Your company primary business:**
     a. Oil Marketing Company
     b. Exploration & Production Company
     c. Oil Transportation Company
     d. Oil Refinery Company
     e. Regulator/Policy Maker
     f. Consultant (Oil & Gas)
   - **II. Your role in organization**
     a. Top Management
     b. Middle management
     c. Lower management
   - **III. Your Gender is*:***
     a. Male
     b. Female
   - **IV. Your Age (years)**
     a. 25-30
     b. 30-35

c. 35-40
d. above

V. Your education is*:*

a. Bachelor's degree
b. Master's degree
c. Above

VI. Your Experience is.

a. Less than 5 Years
b. 5 to 10 Years
c. 10 to 15 Years
d. Above

2. SECTION-2 Risk Management

Please rate Scale of 1-5 "where 1 strongly disagree and 5 strongly agree" the effectiveness of your organization's risk management processes for overall success and sustainability:

	Strongly Disagre	Disagre e	Neutral	Agree	Strongly Agree
Description	1	2	3	4	5
1. We employ a mature systematic process for scanning the business environment to identify potential risk events.					
2. We employ a mature systematic process for prioritizing potential risk events.					
3. We typically rank potential risks based on quantitative analysis.					
4. We usually consider the difficulty of risk detection when planning for potential risks.					
5. We often simulate risk events to assess our ability to respond effectively.					
6. When a risk event occurs, we usually have a well-defined contingency plan available to reduce the impact of the event.					
7. We have redundancy of supply for all critical products and services.					
8. Our supply chain employs flexible facilities to cope with changing conditions or markets.					

3. SECTION-3 Innovations

Please Rate on a Scale of 1-5 "where 1 strongly disagree and 5 strongly agree" the Effectiveness of Innovative Practices in Your Organization for Achieving Long-term Success and Sustainability".

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
1. Innovation is an underlying culture and not just a word.					
2. Our business model is premised on the basis of strategic intent.					
3. Our senior managers are able to effectively cascade the innovation message throughout the organization.					
4. We have an innovation vision that is aligned with projects, platforms, or initiatives.					
5. This organization's management team is diverse in their thinking in that they have different views as to how things should be done.					
6. There is a coherent set of innovation goals and objectives that have been articulated.					
7. Innovation is a core value in this organization.					
8. We have continuous strategic initiatives aimed at gaining a competitive advantage.					

4. SECTION-4 Energy Efficiency

Please Rate on a Scale of 1-5 "where 1 strongly disagree and 5 strongly agree" the Effectiveness of Energy Efficiency Practices in Your Organization for Achieving Long-term Success and Sustainability.

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
1. The main cause of energy problems in Pakistan is a lack of energy efficiency awareness.					
2. Current energy problems are very serious for our future.					
3. Conventional products pose serious energy problems; hence, energy efficient products are needed.					
4. Energy-efficient products give my organization extra value for example, economic value, environmental value, social.					

5. Energy-efficient products have high utility.					
6. Energy-efficient products can meet my organizational requirements.					
7. If my organization can choose between energy-efficient and conventional products, it prefers energy-saving one.					
8. My organization have a favorable attitude towards purchasing an energy-efficient product.					

5. SECTION-5 Stakeholder Participation

Please Rate on a Scale of 1-5 "where 1 Very Little Involvement & 5 Very High Involvement" the Level of Stakeholder Participation in Your Organization's Decision-making Processes for Achieving Long-term Success and Sustainability.

	Very Little Involvement	Little Involvement	Moderate Involvement	High Involvement	Very High Involvement
Description	1	2	3	4	5
1. Stakeholders directly affected by your organization's operations, both positively and negatively					
2. Stakeholders who have interest in, or influence over the organization's operations					
3. Stakeholders who have knowledge about the impact of the operations of your firm					
4. Stakeholders who are part of the broader community who have an interest in, concern with, or influence over the operation of your firm					
5. Authorities or regulators at the national or local level					
6. Authorities who control or issue licenses or permits to operate					
7. Authorities or regulators who exercise control over your sector or industry					
8. Authorities responsible for social and economic development, infrastructure and service provision, town and regional planning					

6. SECTION-6 Competitive Advantage

Relative to your industry's average or to comparable organizations, what is, in your opinion on a scale 1 to 5, where 1 means 'Strongly disagree' and 5 means 'Strongly Agree,' the Competitive Advantage of your organization.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Description	1	2	3	4	5
1. My Organization's products/services are better than its competitors.					
2. My Organization's R&D capabilities are better than its competitors.					
3. My Organization's managerial capabilities are better than its competitors.					
4. My Organization's profitability is better than its competitors.					
5. My Organization's image is better than its competitors.					
6. My Organization's competitive advantage is better than its competitors.					

7. SECTION 7 Cooperate Performance

Relative to your industry's average or to comparable organizations, what is, in your opinion, on scale 1-5 where 1 means 'Significantly Declined' and 5 means 'Significantly Improved' the performance of your organization;

	Significantly Declined	Declined	Average	Improved	Significantly Improved
Description	**1**	**2**	**3**	**4**	**5**
1. Long Term Profitability					
2. Sales Growth					
3. Financial resources *(Liquidity and investment capacity)*					
4. Public Image & Client Loyalty					

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