Impact of Modern Vendor Selection on Sustainability in Cement Industry of Pakistan

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Abstract

This research explores the influence of modern vendor selection practices on sustainability within the cement industry of Pakistan. A quantitative approach was employed, collecting data from 152 employees across five major cement corporations in the country. The study particularly focused on four key aspects: vendor trust, commitment, communication, and cooperation, with sustainability as the dependent variable. Results demonstrated a significant positive correlation between these aspects and sustainability. Regression analysis revealed that vendor trust, commitment, and communication had a statistically significant positive impact on sustainability. ANOVA results further confirmed the significance of the regression model. The findings suggest that modern vendor selection practices greatly affect the sustainability efforts of cement companies in Pakistan. Specifically, vendors who are trusted, committed, and communicate effectively tend to contribute more to sustainable practices within the industry. The study concludes that fostering strong relationships with vendors, improving communication channels, and prioritizing sustainability in vendor selection criteria are vital for enhancing sustainability in the cement industry. These findings have important implications for both academia and industry, providing insights into the mechanisms through which vendor selection practices can influence sustainability outcomes. Moreover, the research contributes to the growing body of knowledge on sustainable supply chain management, particularly within the context of the cement industry in Pakistan. Future research could further explore the dynamics of vendor relationships and their impact on sustainability, as well as investigate additional factors that may influence sustainable practices in the industry.

Keywords

Vendor Selection, vendor trust, vendor commitment, vendor communication. Vendor cooperation.

Contents

Chapter 1

Introduction

1.1 Background Study

In the highly competitive landscape of the business world, organizations face relentless pressure to adapt and innovate to maintain their competitive edge. The cement industry in Pakistan, like many other sectors, is undergoing significant transformations driven by globalization, technological advancements, and shifting consumer demands. In this context, the role of vendor selection practices and capacity management becomes crucial for maintaining competitiveness and ensuring sustainability. This research explores the impact of modern vendor selection practices on sustainability in the cement industry of Pakistan, delving into the intricate relationships between vendor selection and sustainability within the industry.

Vendor selection is pivotal in determining the competitiveness of organizations. In manufacturing industries such as cement production, the efficient utilization of resources, including labor, machinery, and materials, is essential for achieving economic growth (Markus, 2020). Capacity management involves balancing production capabilities with market demand, ensuring optimal use of resources while maintaining high-quality standards. According to De Azevedo, Meinz, and Luis (2022), firms that effectively adapt and innovate are the ones that thrive amid intense competition. This adaptation in vendor selection covers various factors defining competitiveness, including labor, resources, reliability, quality management systems, and social responsibility (Butchery, 2022).

Vendor selection impacts market response rates, cost structure, and overall operational efficiency, making it a critical component of competitiveness (Chan, 2019). Effective vendor selection ensures that organizations can meet company requirements efficiently while optimizing costs and resources (Byrd, 2022). Achieving competitiveness through vendor selection requires a holistic approach that integrates operational speed, cost control, flexibility, quality culture, and customer satisfaction (Chen, 2019).

Vendor selection practices are closely intertwined with capacity management in the cement industry. The choice of vendors significantly affects material inputs, which are major cost drivers for manufacturing organizations (Lambkin, 2020). Efficient vendor selection practices

help balance efficiency and responsiveness in the supply chain, ensuring the timely and cost-effective supply of materials (Chopra & Meindl, 2021). Effective vendor selection involves evaluating various factors such as quality, reliability, cost, and sustainability practices of vendors. In the context of the cement industry, selecting vendors with sustainable practices not only ensures a reliable supply chain but also contributes to environmental and social sustainability (Marietta, 2022).

Vendor selection, encompassing strategic, tactical, and operational decisions, is crucial for determining the appropriate capacity level to meet market demands (Avildsen, 2022). Lead and lag strategies are commonly used in cement companies, with lead strategies anticipating demand and lag strategies responding to actual demand (Sanchis & Tous, 2021). However, vendor selection and capacity decisions are complex and involve uncertainties, often requiring the use of buffers to mitigate risks (Fletcher, 2020). The Bullwhip Effect, which amplifies demand variability within supply chains, is a significant concern in vendor selection (Davanzo, 2020). Ineffective vendor selection can lead to unpredictable production schedules, resulting in underutilized capacities during low-demand periods (Morgan, 2020). Despite these challenges, effective vendor selection practices can improve supply chain performance (Kamal Ahmadi, 2021). However, it is essential to balance operational gains with inventory performance to maintain customer service levels (Hussain et al., 2019).

Modern vendor selection practices play a critical role in driving sustainability within the cement industry of Pakistan. By choosing vendors who prioritize sustainability in their operations, cement manufacturers can reduce their environmental impact, improve resource efficiency, and enhance social responsibility (Jillian, 2021). One way vendor selection practices contribute to sustainability is through the adoption of eco-friendly materials and processes. Cement manufacturers can choose vendors who offer sustainable alternatives to traditional raw materials, such as recycled aggregates or fly ash (Achill et al., 2022). By using these materials, cement manufacturers can reduce their reliance on natural resources and minimize waste generation.

Moreover, selecting vendors with sustainable manufacturing processes can help cement manufacturers reduce their carbon footprint. Vendors who use renewable energy sources or implement energy-efficient technologies can provide cement manufacturers with greener materials, contributing to overall environmental sustainability (Abdullah, 2022). Social sustainability is also impacted by vendor selection practices. Cement manufacturers can choose

vendors who adhere to ethical labor practices, ensure workplace safety, and support local communities (Gupta & Bhatia, 2020). By partnering with socially responsible vendors, cement manufacturers demonstrate their commitment to social sustainability and contribute to the well-being of their employees and surrounding communities.

Economic sustainability is closely tied to vendor selection practices. By selecting vendors who offer competitive pricing, reliable delivery, and innovative solutions, cement manufacturers can improve their operational efficiency and financial performance (Farooq et al., 2023). Effective vendor selection practices help cement manufacturers optimize costs, streamline operations, and remain competitive in the market.

1.2 Research Gap

While there has been significant research on the role of vendor selection practices in various industries, there is a noticeable gap in understanding how modern vendor selection practices impact sustainability in the cement industry of Pakistan. Despite the critical importance of sustainability in the cement sector, there is limited research specifically addressing the influence of modern vendor selection practices on sustainability within this context. Although there has been significant research on vendor selection practices and sustainability, there is a notable gap in understanding how modern vendor selection impacts sustainability in the cement industry of Pakistan.

1.2.1 Theoretical Research Gap

Despite significant research on vendor selection and sustainability, current theoretical models often fail to address the specific needs of the Pakistani cement industry. Recent studies highlight the need for industry-specific frameworks that consider unique environmental, social, and economic dynamics (Ali & Akhtar, 2023). The lack of tailored theoretical approaches limits the understanding of how modern vendor selection practices impact sustainability in this sector (Khalil, 2021).

1.2.2 Practical Research Gap

Empirical research indicates a scarcity of studies examining the practical implications of vendor selection on sustainability within Pakistan's cement industry. Most existing literature does not provide actionable strategies or guidelines for local manufacturers (Bibi et al., 2024). There is a clear need for practical research that offers concrete recommendations for implementing sustainable vendor selection practices effectively.

1.2.3 Contextual Research Gap

Recent research highlights the lack of focus on the unique challenges and opportunities specific to the Pakistani cement industry, such as local regulatory frameworks, market conditions, and resource availability (Raza et al., 2022). Context-specific studies are essential to understand how these factors influence sustainable vendor selection and to address barriers and facilitators unique to this industry (Munawar, 2020).

1.4 Problem Statement

The research seeks to explore how current vendor selection procedures affect sustainability in Pakistan's cement sector. Despite the crucial relevance of sustainability in this industry, there is a paucity of understanding about how modern vendor selection procedures affect sustainability results (Qayyum, 2023). Cement manufacture has substantial environmental consequences, such as carbon emissions and resource depletion, as well as concerns about social and economic sustainability (Akhter, 2022). The gap is in knowing how vendor selection processes impact sustainability in Pakistan's cement sector. While research has been conducted on sustainability and vendor selection processes individually, their relationship in the context of Pakistani cement manufacture remains unexplored (Subhan, 2023). The study aims to investigate the link between vendor selection methods and sustainability, considering environmental, social, and economic factors. It tries to investigate how diverse vendor selection criteria and techniques affect sustainability results. This research is critical for promoting sustainable practices in the cement industry and addressing the issues that cement manufacturer confront in Pakistan.

1.5 Research Questions

RQ1- What is the impact of vendor trust on sustainability?

RQ2- What is the impact of vendor communication on sustainability?

RQ3- What is the impact of vendor commitment on sustainability?

RQ3- What is the impact of vendor cooperation on sustainability?

1.6 Research Objectives

RO1- To investigate the impact of vendor trust on sustainability.

RO2- To investigate the impact of vendor communication on sustainability.

RO3- To investigate the impact of vendor commitment on sustainability.

RO3- To investigate the impact of vendor cooperation on sustainability.

1.7 Significance of Research

The significance of this study on the impact of modern vendor selection practices on sustainability in the cement industry of Pakistan is closely tied to the outlined problem statement. The cement industry in Pakistan, like many other sectors, faces substantial environmental challenges such as high carbon emissions and resource depletion. Despite the critical importance of sustainability, there is a noticeable gap in understanding how modern vendor selection practices can influence sustainability outcomes in this industry. This gap is particularly pronounced given the unique regulatory, market, and resource constraints faced by the Pakistani cement industry.

1.7.1 Theoretical Significance

The study aims to bridge the theoretical gap by developing a comprehensive framework that integrates modern vendor selection practices with sustainability objectives specifically for the Pakistani cement industry. Theoretical models in existing literature are often generalized and do not account for the unique environmental, social, and economic dynamics of this sector. By addressing this gap, the research will contribute to the academic discourse on sustainable practices in industrial contexts, providing new insights that can be applied to similar industries facing environmental challenges.

1.7.2 Practical Significance

Empirical research examining the real-world implications of vendor selection on sustainability within Pakistan's cement industry is scarce. This study provides actionable insights and practical recommendations for cement manufacturers to enhance their sustainability efforts. By identifying effective vendor selection practices that prioritize eco-friendly processes, waste reduction, and resource optimization, the study offers a roadmap for improving operational efficiency and environmental performance. These insights can help manufacturers comply with increasingly stringent environmental regulations, reduce costs, and avoid penalties, thereby addressing the pressing problem of limited practical guidance in the existing literature.

1.7.3 Contextual Significance

The research highlights the importance of context-specific studies that address the unique challenges and opportunities of the Pakistani cement industry, including local regulatory frameworks, market conditions, and resource availability. Current research tends to generalize

findings from other industries or regions, which may not be directly applicable to Pakistan. This study aims to explore how local environmental regulations, economic conditions, and social factors influence the adoption and effectiveness of sustainable vendor selection practices. By doing so, it addresses the contextual gap identified in the problem statement, providing a nuanced understanding that is deeply rooted in the local industry environment

1.7.4 Enhancing Competitiveness

Investigating sustainable vendor selection practices can assist Pakistani cement manufacturers in adopting methods that enhance their competitiveness and market position. As global markets increasingly prioritize sustainability, the insights from this study can help local manufacturers align with international standards, improving their competitive edge. This addresses the problem of limited research on how modern vendor selection practices impact sustainability and competitiveness within the Pakistani cement industry.

Chapter 2

Literature Review

2.1 Impact of Modern Vendor Selection

Modern vendor selection practices have emerged as a critical component in promoting sustainability within the cement industry. These practices involve a careful evaluation of vendors based on various environmental, social, and economic criteria, aiming to minimize environmental impact, enhance resource efficiency, and foster sustainable development (Camilleri, 2022). The impacts of modern vendor selection practices on sustainability in the cement industry are multifaceted and far-reaching, encompassing environmental stewardship, responsible sourcing, energy efficiency, waste management, and collaborative innovation (McNally, 2023).

Environmental stewardship is a core focus of modern vendor selection practices in the cement industry. Cement production is notorious for its significant environmental footprint, primarily due to high energy consumption and resource depletion (Alghamdi, 2022). Hence, selecting vendors with strong environmental performance is crucial for reducing this footprint. Vendors are evaluated based on their environmental management systems, emissions reduction initiatives, and adherence to environmental regulations (Pinto, 2020). For example, vendors may be required to demonstrate efforts to minimize dust emissions, implement water recycling systems, or invest in cleaner production technologies like low-carbon kilns. By partnering with environmentally responsible vendors, cement companies can improve their own environmental performance and contribute to broader sustainability goals (Whitfield, 2022).

Another key aspect of modern vendor selection practices is responsible sourcing. Cement production relies heavily on raw materials such as limestone, clay, and gypsum, which are often extracted through mining and quarrying (Zunino, 2020). Irresponsible extraction practices can lead to habitat destruction, soil erosion, and biodiversity loss. Therefore, cement companies increasingly prioritize vendors who engage in sustainable sourcing practices (Marinelli & Janardhanan, 2022). This includes vendors that adhere to responsible mining standards, practice land reclamation, and prioritize biodiversity conservation. By selecting vendors committed to sustainable sourcing, cement companies can mitigate the environmental impacts associated with raw material extraction and contribute to the conservation of natural ecosystems (Noguchi, 2020).

Energy efficiency is paramount in the cement industry, given its high energy intensity. Cement manufacturing involves heating raw materials to high temperatures in kilns, a process that requires large amounts of energy, typically derived from fossil fuels (Schneider, 2019). In this capacity, modern vendor selection practices emphasize the adoption of energy-efficient technologies and equipment. Vendors offering energy-efficient kilns, alternative fuels, and waste heat recovery systems are preferred (Brough, 2020). Additionally, vendors providing renewable energy solutions, such as solar or wind power, are increasingly sought after. By collaborating with energy-efficient vendors, cement companies can reduce their energy consumption, lower greenhouse gas emissions, and enhance their overall operational efficiency (Sanal, 2022).

Waste management is another critical consideration in modern vendor selection practices. Cement production generates significant amounts of waste, including by-products like slag, fly ash, and kiln dust (Siddique, 2020). Traditionally, these wastes were often disposed of in landfills, leading to environmental pollution and resource wastage. However, modern vendor selection practices prioritize vendors who offer waste reduction and recycling solutions (Khorasani, 2022). Vendors may provide technologies for recycling cement kiln dust into raw materials or for utilizing industrial by-products as supplementary cementitious materials. By partnering with vendors offering innovative waste management solutions, cement companies can minimize waste generation, conserve resources, and reduce their environmental impact (Shrivastava, 2022).

Moreover, modern vendor selection practices encourage collaborative innovation between cement companies and their vendors (Modgil, 2020). By fostering partnerships with vendors committed to sustainability, cement companies can drive innovation and develop new solutions for environmental challenges. Collaborative research and development projects may focus on developing low-carbon cement formulations, improving process efficiency, or implementing renewable energy technologies (Schneider, 2019). Through collaborative innovation, cement companies can accelerate the adoption of sustainable practices and contribute to the long-term sustainability of the industry.

Modern vendor selection practices significantly impact sustainability in the cement industry by promoting environmental stewardship, responsible sourcing, energy efficiency, waste management, lifecycle assessment, compliance, and collaborative innovation. By partnering with environmentally responsible vendors and embracing sustainable practices throughout

their supply chains, cement companies can reduce their environmental footprint, enhance resource efficiency, and contribute to a more sustainable future. This alignment with sustainability goals is not only beneficial for the environment but also helps cement manufacturers comply with regulatory requirements, improve their competitiveness, and foster economic and social development. As such, modern vendor selection practices are a vital strategy for driving the cement industry towards a more sustainable and responsible operational model.

2.2 Impact of Vendor Trust

Trust motivates buyers and vendors to focus on the relationship's long-term advantages, improving performance outcomes such as firm competitiveness and transaction cost reduction (Hsu, 2022). Long-term relationships are influenced by trust, and it has been found that trust has the largest effect on obtaining collaboration in partnerships (Chen, Lin, & Yen, 2023). Trust is essential for ensuring continuity in traditional channel interactions. Distributor trust is connected to both cooperative norms and distributor satisfaction with financial performance substantially and positively (M., & Janda, 2020).

The significance of confidence in vendor selection success has been well recognized in the literature. The benefits of trust have been studied in various sectors and explained using different theories, primarily transaction cost economics and social exchange theory (Schoenherr, 2020). Trust has economic value in the transaction cost economics theory because it reduces transaction costs, negotiation expenses, monitoring and supervision costs, and uncertainty in information sharing by functioning as a control substitute (Gunby Jr, 2021). Vendor trust is seen as essential for fostering and maintaining social relationships in social exchange theory. It increases the likelihood that organizational actors would share information and expertise, engage in collaborative learning experiences, and share costs associated with discovering and exploiting new opportunities (Loice, 2019).

Trust is recognized as a strong predictor of good outcomes in supply chain performance in terms of greater flexibility, responsiveness, and cost reduction in operations management research. Trust, divided between interpersonal and inter-firm trust, is a critical aspect in the establishment of partnerships among the many agents of a supply chain, resulting in strong procurement performance (Wu, Zhao, & Zuo, 2020). The development of trust in inter-firm interactions might be linked to the cultural background of a country (Dyer & Chu, 2020). Supply chain trust is an essential element that supports loyal customers. Customers cannot be faithful without trust in the brand (Mizz, 2021). Cement companies will develop emotional

trust if they can illustrate that the brand is just for clients and that it suits their viewpoints (Horntail, 2022). Customer confidence in service is to provide quality services that meet the expectations of customers (Anderson & Weitz, 2022). Trust has the greatest value in the calculation of consumer quality goods and services, as the quality of the products and services generates credibility. Trust leads to long-term loyalty and a deeper friendship between the two parties (Singh & Sirdeshmukh, 2023).

The selection, management, and exchange of consumer expertise may be a powerful strategic move for businesses (Murillo & Annabi, 2021). The vendor selection is a company's perception of the desires and expectations of existing and potential consumers (Lee, Naylor, & Chen, 2020). Vendor selection relates to facts, philosophies, and practices that successfully interact with customer relations and create a good reputation for the company of the customer (Motowidlo, 2020). Trust allows consumers to have insight, accounts, activities, communication preferences, and awareness to increase customer interaction in a company that increases customer loyalty and fidelity (Walton, 2021). Krishnan and Fornell (2022) have proposed that customer loyalty is accomplished by a custom-tailored offering. As a medium for contact, loyalty, customer support and satisfaction, trust development, and bank relationship sustainability, customer data can be used as customer relationship management (CRM) systems (Goldsmith & Hofacker, 2019).

This can be accomplished by consumer awareness and facts that can discern one customer from another (Belta, 2020). Awareness and information gaps affect the trust of all parties. However, the use of client knowledge to increase the importance of customer relations seems to be a field that needs to be established (Karishna, 2021). In Anderson and Weitz's (2019) study, faith is the expectation of "one community that actions taken by another group can satisfy its needs in the future." In banking terms, confidence is essential for establishing customer-bank relationships (Sultana & Abdullah, 2022). The recent financial crisis exposed the role of consumer confidence in the cement industry (Russell, 2023).

An associated sense of safety is an efficient way to maintain and draw new existing vendor selection (Behram, 2022). As a regulation system to promote the creation of healthy partnerships, Bradach and Eccles (2020) have proposed that trust suppresses ambiguity, insecurity, and reliance. Many researchers considered trust as the key building in production execution satisfaction and buyback intentions (Sirdeshmukh et al., 2019). Morgan and Hunt (2021) therefore consider trust to be central to studies on vendor selection. They stressed the

importance of faith in the partnership transaction, as trust-based partnerships are regarded highly by both sides.

Trust has been described as the propensity to depend on an exchange partner with trust (Ostrom & Iacobucci, 2019) or trust in the trustworthiness and honesty of an exchange partner (Morgan & Hunt, 2020). Chaudhuri and Holbrook (2021) describe faith as being ready for the consumer to focus on the brand's ability to execute its specified role. Confidence causes loyalty because it decreases the costs of securing deals (Berry, 2020) and reduces the fear of the service vendor's opportunistic performance (Bendapudi & Berry, 2020). Faith in social psychology consists of two elements: trust in the sincerity of the partner and confidence in the benevolence of the partner (Wetzels et al., 2022). Honesty means a partner standing by his terms, while goodwill assumes that the partner has an interest in the wellbeing of the client and will not take acts that have a detrimental effect on the customer. Morgan and Hunt (2022) also claim in consumer marketing that brand trust contributes to brand loyalty and engagement, as trust establishes highly valued trade relationships.

2.3 Impact of Vendor Communication

Proper correspondence framework at each hub of the supply chain improving the joint effort between the association and its supply chain individuals. Data and correspondence are having high significance; however, it is troublesome yet mandatory for business firms to create and support the correspondence sharing ability (Mangan et al., 2020). Creating data and correspondence ability is troublesome on the grounds that it contains different sorts of hindrances including social, authoritative, and specialized, that make challenges in powerful execution and working of it (Rhodes 2019). Data and correspondence suggest the entrance of private information among colleagues permit them to supervise the improvement of orders and items when they go through various methodology in a production network. Correspondence changes from strategic to vital nature and can relate to estimates, individual orders, plans, markets planned operations, and so on. (Gandhi et al., 2022). Information sharing assists with laying out and further develop associations with Vendors and shoppers by better control of merchant connections and client connections (Samra 2021). Likewise, information trade contributes significantly to the incorporation of the inventory network by having useful effects on outside and interior joining (Basheer et al., 2022). Data trade between individuals from the supply chain assumes a key part in production network the executives, as an absence of satisfactory data trade can have an unfortunate result for supply chain achievement or organization execution (Gopal et al., 2019).

The information on item supply streams foundationally downstream, while the data on-request streams upstream through IS from the retail location in a merchant choice (Katrine 2022). Direction is improved by expanding openness and makes it cutthroat in the undertaking and supply chain by trading information with colleagues (Shuja 2022). The retail location information should be usable for a traditionalist inventory network (Hashim et al., 2021). Cost minimization is the primary objective of an inventory network. A proper specialized gadget at every hub of the production network will limit the stock at supply chain hubs (Banson 2020). Coordination with supply chain individuals by the data framework is undeniably challenging, as an organization doesn't decide to share the data on expenses and costs with supply chain individuals (Gopal et al., 2019). For the effective execution of production network rehearses, IS among the part bunches is significant. If the data traded inside the supply chain significant, right, ideal, and secure, the correspondence would gainfully affect authoritative proficiency. Legitimate information accessible brilliantly and area with the right exchanging accomplice will prompt better exchange with Vendors, improved results for an organization (Sukati et al., 2020).

Wanyonyi and Muturi (2020) found that the exhibition of supply chain capabilities is emphatically influenced by merchant skill, frameworks designing, and standards. Cement associations ought to endeavor to embrace current advancements, advance Vendor inclination, and work with the viability of good upright guidelines of morals to upgrade their acquirement and SME's business divisions. Raj and Nathan (2021) were investigating the most recent e-obtainment productivity measures. The review expressed that the Vendor determination is committed to decreasing functional costs around the production network. By and by, client requests are expanded introducing an obstruction for production network and progress in obtaining and buyer fulfilment.

As per Dobler (2020), a compelling acquisition framework in organizations results in worked on functional and acquirement execution. Innovation in the cement area improves consistent and unhindered admittance to Vendor choice data and builds extra market straightforwardness and monetary coordination (Carayannis and Popescu, 2022). Wanyonyi and Muturi (2023) likewise examined the determinants affecting acquisition capability execution by carrying out Vendor and colleague preparing. The report tracked down that ICT, mental capacities, and ethical quality straightforwardly influence the obtainment capability's presentation. Accordingly, it suggests the utilization of ICT in specialized foundations to further develop acquisition capability execution. As per Mumo et al (2020), the primary components in

executing a colossal vital quality procedure of cement organizations are the acknowledgment of customers and wholesaler requests, the improvement of OK quality focuses on, the making of value measures, and the planning of frameworks fit for accomplishing quality principles under functional circumstances and steady results of expanded piece of the pie (Halema 2019).

The intermingling of obtaining exercises and merchant connection with the corporate components of the cement business is exorbitant because of functional redesign and these expenses can be decreased by consolidating a vigorous quality administration system with precise revealing. As per Robinson (2019), an association should first explicitly recognize the market gives that its e-acquisition approach is intended to tackle, prior to presenting e-obtainment. Consequently, a cement organization should direct an intensive reproduction of the obtainment interaction before it can present an e-obtainment program (Sumair 2020).

The valuable chance to lay out correspondence ties through the supply chain permits inventory network agents to trade mindfulness regarding procedures, necessities, and progress bringing about expanded proficiency in the inventory network (Zhang et al., 2021). Information trade energizes participation among inventory network Vendor, colleagues, and collaboration is additionally critical to the limit of the production network to respond (Thomas, 2023). Over the more drawn-out term, all Vendors ought to see the value in the other one's necessities in this way reinforcing the merchant's productivity and acquirement work. Vendor and acquirement organizations will effectively seek after direction on the circumstances and attributes of items and administrations in the cement area to be sold (Shuja, 2021). Eventually, this would affect securing and hierarchical productivity. For choosing Vendors, the generally utilized rules are cost, value, dispersion, and administrations. The merchant determination strategy or convention for the most part characterizes the kind of Vendor picked; in this manner, it contributes altogether to any organization's development in any obtainment body. Thought of the impacts of merchant determination on the presentation of acquirement elements is hence significant.

2.4 Impact of Vendor Commitment

Vendors who are committed to each other demonstrate a genuine desire to build a stable relationship, make short-term sacrifices to maintain the relationship, feel confident in the relationship’s testability, and invest in the relationship, all of which improve procurement performance (Gounaris, 2020). Commitment enables vendors and purchasers to establish the belief that ongoing interactions are highly valuable and worth preserving for a long time, thus

enhancing procurement performance (Stanko et al., 2021). For a relationship to be successful, both parties must invest resources in it. They can secure relationships by aligning with and integrating the goals and values of an external party, thereby increasing a company's procurement performance (Kwon, 2021).

Long-term relationships require high levels of commitment from both purchasers and vendors to achieve a sustained competitive advantage and improve procurement performance (Gefen, 2019). In his study, Stanley (2022) emphasizes that commitment has become a crucial issue in supply chain coordination because effective planning depends on information exchanged among partners, which is a critical component for successful integration and good procurement performance. The success of procurement performance relies on the supply chain partners' high degree of trust and loyalty. Supply chain planning is built on information exchange and commitment among partners, both of which are essential for successful supply chain management. Research has shown that strategic partnerships often fail due to a lack of commitment among participants (Portage, 2021).

Commitment for a vendor selection entails a strong or intense mental attitude to support the association (Allen & Meyers, 2021). Various factors can contribute to fostering commitment. The degree to which customers respond emotionally to a particular bank due to their deep faith in cement is known as service commitment. A loyal customer repeatedly chooses the same bank and feels a sense of responsibility and dedication (Springs et al., 2020). Even if the company changes its price or values, commitment is linked to happiness and the overall success of the bank, which earns customer satisfaction. If satisfaction reaches the peak of customer confidence and organizational strength effectively, commitment will be nurtured (Oliver, 2019). A deep vendor selection contributes to a high degree of commitment in the cement industry (Sachiko, 2021). Vendor selection commitment has strong relations but can be separated by their actions and their demeanor (Pounce upon, 2022).

Vendor relationship commitment is seen as brand loyalty in terms of commitment. Anker (2023) explains bank loyalty as a computation of a customer's attachment to a bank. Brand commitment is an important foundation for distinguishing between bank loyalty and other types of recurring sales and pledges to determine the relative levels of bank loyalty (Jacoby & Kyler, 2020). However, there appears to be no consensus on the actual substance of an organization's commitment and its formation (Pritchard et al., 2019). This paper aims to elucidate the significance of vendor selection by exploring the ties between brand commitment

and several potential associations (Kaleem, 2021). Initially, it describes vendor commitment and provides a model of three potential antecedents and variable outcomes of bank commitment in the following pages (Golden, 2020).

Vendor selection is seen as a commitment that is an affinity or attitude towards keeping the relationship reasonably stable, strong, and intense (Allen & Meyers, 2022). Commitment states may be driven by different factors (Springs et al., 2023). Affective loyalty occurs when you wish to sustain a relationship based on a common feeling of good regard, warmth, and pleasure (Habib, 2021). Calculative commitment exists, on the other hand, when the essential potential costs associated with leaving the relationship are considered to sustain a relationship (Granger, 2020). Since both buyers and vendors have various options at market value, the market association is typically characterized by weak connectedness between buyers and sellers and the fact that the relationship between the two parties is often low (Smith, 2022). Therefore, associations from customers with the brand appear to be more successful than projections. In some product categories, such as certain technology products, calculative loyalty may be more crucial due to the possible incongruity among various cement services (George & Shane, 2020).

The scope of vendor selection involvement is usually not limited. Moreover, some studies argue that individual choice and conscience are crucial to establishing inherent interest (Bagasse, 2021). The presence of exit costs implies a lack of free inclination; hence, it should not be seen as a genuine basis for vendor relationship loyalty, which should be a calculative endeavor because of it (Tommy Nano, 2022). Vendor selection is characterized as the extent to which the customer has an emotional bond with a specific brand of cement choice in a product category. It is the intensity of the customer's value alignment with a brand, which differs from the calculative presence often found in other related fields. This affective commitment can also be demonstrated by choosing to use the cement, promoting the brand to friends, and avoiding competitors' inducements (Bettencourt, 2023).

Most sources argue that brand association is distinct from repeated habits called habit, inertia, or spurious loyalty to the vendor relationship reality (Beatty & Kale, 2021). Market relationship contention assumes that the customer's action is motivated by various, social, and contextual factors and not just the functional property of a commodity (Sheath, 2020). The most known themes for market preference are functional needs and value-added needs (Lutz & Mittal, 2019). Functional motivation involves a customer's external circumstances. On the other hand, true value motivation applies to the consumer's desire for self-identity, a stronger self-image,

self-expression, self-assurance, and thus the need for psychological and personal conditions (Marchland, 2019). It includes items that will help fulfill one's self-concept and express it to others. Likewise, products provide functional and value-expressive benefits (Beenak, 2021).

The advantages of vendor commitment are expected to enhance from the interaction between the product materials and elements of the customers' real world. Objects of social signals related to the ownership and usage of an item are value-expressive benefits (Mittal, 2022). Crosby and Taylor (2023) suggest that an organization's loyalty focuses on a desire to establish a consistent knowledge structure to define the norms and representations of specific financial services, following the concept of utilities and value-expressive needs. The first has to do with maintaining the cognitive consistency of brand awareness, facts, and faith in a reliable outcome of the bank (Youssef, 2021). The character of brand values and images will play an increasing role in sustaining the creation of services that are significantly more distinguishable from their symbolic attributes in today's marketplace than their physical properties and functions (Melina, 2020).

This study reveals that the loyalty of vendor selection may establish two forms of expertise or two paths. The first is the rational functional outcome of the bank, which is combined with the significant needs and motives (Rouyn, 2022). The second is by identifying the cement supply chain's philosophical significance. The second move. We propose and evaluate in this study a model that encompasses all routes (Ronald, 2019). With its mechanisms of customer satisfaction and bank trust, the functional and practical route to commitment is taken—two factors played a significant role in the current research on organizations and were not properly explored in terms of customer loyalty towards cement products (Roman, 2021). To operationalize the second symbolic path to loyalty, the bank service level concept is adopted. Additionally, we include exclusive purchasing intentions as a crucial outcome of vendor interaction considering the value of customer loyalty actions (Maxwell, 2019).

2.5 Impact of Vendor Cooperation

To achieve supply chain direction, exchange partners must collaborate effectively. Retailers increasingly demand greater supply flexibility and responsiveness from their vendors to handle highly variable demand in rapidly changing markets (Rezaei, 2019). Studies indicate that when parties collaborate, they gain a better understanding of each other's expectations and requirements, allowing them to meet their shared goals and thereby improve supply chain

performance (Tavasszy, 2022). Moreover, cooperative parties are more likely to sustain long-term partnerships and enhance performance. Improved supply chain performance recognizes collaboration as crucial to establishing long-term associations and contributing to a company's success (Kang, 2021).

The integrity, credibility, reliability, and reputation of buyers and vendors are used to evaluate their cooperation (Markus, 2023). When collaboration is established, trade partners will feel more confident engaging in cooperative activities and avoiding opportunistic behavior, resulting in increased performance (Premaratne, 2020). The degree to which the retailer assists the vendor increases the vendor's influence. Cooperation stems from the need to maintain the channel relationship to achieve desired goals, highlighting the importance of the vendor's goods and services and their ability to deliver successful outcomes (Marconi, 2019). The term "vendor cooperative association" refers to two or more companies in the supply chain aligning their operations to facilitate the supply of products or services, achieving a competitive advantage through better service or efficiency (Liu, 2022). Additionally, supply chain performance refers to the extended supply chain's activities in meeting end-user needs, such as product availability, on-time delivery, and the necessary inventory and capacity to execute that performance promptly (Hugos, 2020).

Several scholars have investigated the impact of supply chain cooperative relationship characteristics on performance, while others have explored the indirect effects of the process (Delbufalo, 2021). They found that supply chain collaboration, integration, and information sharing can be indirect factors. However, researchers rarely consider the impact of knowledge on the process (Vanpoucke, 2023). Knowledge has become the most critical key resource for a company since the advent of the knowledge economy. Therefore, scholars should focus their efforts on how information can travel and be shared across different industries and the impact it will have on these businesses (Buhalis, 2022). Since information flows throughout enterprises in the supply chain, we chose knowledge to investigate the mediator mechanism of supply chain cooperative relationships and performance. We also selected the high-tech industry because it is more likely to be affected by knowledge, focusing our research on it (Pan & Pan, 2020).

According to similar literature reviews, previous studies show that supply chain cooperative relationships are positively related to performance (Vereecke, 2021). Some theories based on facts include the following: According to transaction cost theory, when a business partnership

is governed by a contract signed by both parties, transaction costs will decrease, and transaction success rates will increase (Ping Ho, 2022). According to the resource-based view theory, different firms have highly diverse resources. To acquire and share external resources, firms must form long-term partnerships (Tehseen, 2021). Collaboration occurs when two or more organizations pool their resources to complete a project that benefits both parties (Pereira & Soares, 2023).

In such situations, the parties explicitly agree to pool their resources to create long-term mutual benefits, emphasizing supply chain efficiency, beneficial innovation areas, and improved overall chain performance (Patterson, 2023). Through partnership agreements, each party maintains its autonomy while gaining new opportunities. For example, a strategic alliance could help firms establish more efficient operations, access new markets, and gain a competitive edge over competitors (Cooke, 2022). Collaboration is still in its early stages regarding SCM, having evolved from the most dominant form of cooperation, Collaborative Planning, Forecasting, and Replenishment (CPFR). According to common assessment, before the introduction of CPFR, companies used more basic forms of collaboration, such as Vendor Managed Inventory and Continuous Replenishment Programs (Barratt & Oliveira, 2023). An increasing number of companies are discovering that they cannot succeed without the help of supply chain partners who can pool their resources and capabilities (Larsen et al., 2020).

The importance of cooperation in achieving supply chain coordination cannot be overstated. It leads to improved mutual understanding, fulfillment of shared goals, and enhanced performance (Travesty, 2022). Cooperation ensures that supply chain partners feel confident in their relationship, thereby avoiding opportunistic behaviors and fostering trust (Premaratne, 2020). This trust, built on integrity, credibility, reliability, and reputation, forms the foundation of effective supply chain partnerships (Markus, 2023). When both parties are committed to maintaining the relationship, they can better support each other, thus enhancing the overall supply chain performance (Kang, 2021).

Supply chain performance is measured by how well the extended supply chain meets end-user needs, emphasizing product availability, on-time delivery, and the required inventory and capacity to meet demand promptly (Hugos, 2020). Effective collaboration allows supply chain partners to align their operations more closely, resulting in greater efficiency and service quality (Liu, 2022). By pooling resources and sharing information, companies can improve their competitive position and achieve long-term success (Marconi, 2019).

Information sharing is a critical component of successful supply chain cooperation. Knowledge, as the most valuable resource in the knowledge economy, must be effectively managed and disseminated across the supply chain to ensure optimal performance (Balais, 2022). The high-tech industry relies heavily on the flow of information to maintain its competitive edge (Pan & Pan, 2020). By focusing on knowledge as a mediator, researchers can better understand the mechanisms that drive supply chain performance and the role of cooperative relationships in this process (Vanpoucke, 2023).

Supply chain theories, such as transaction cost theory and the resource-based view, provide valuable insights into the benefits of cooperative relationships (Tehseen & Sajilan, 2021). These theories suggest that long-term partnerships reduce transaction costs, increase success rates, and allow firms to access and share diverse resources. Collaboration, therefore, becomes a strategic imperative for firms looking to enhance their supply chain efficiency and performance (Pereira & Soares, 2023).

In summary, the impact of vendor cooperation on supply chain performance is profound. Cooperative relationships lead to better mutual understanding, trust, and fulfillment of shared goals (Premaratne, 2020). Effective information sharing and resource pooling further enhance supply chain efficiency and competitiveness (Pan & Pan, 2020). By leveraging the principles of transaction cost theory and the resource-based view, firms can establish long-term partnerships that drive sustained success and superior performance (Ping Ho, 2022).

2.6 Sustainability

Sustainability in the context of supply chain management is a multifaceted approach that focuses on enhancing the efficiency, productivity, and overall excellence of business firms within their industries. It involves integrating sustainable practices into supply chain activities to improve performance and productivity while reducing negative environmental and social impacts.

Sustainability in supply chain management is fundamentally about improving operational efficiency and achieving operational excellence. Companies can reduce lead times by implementing highly efficient distribution methods and lowering unit production costs (Mangan et al., 2020). For instance, by optimizing logistics and transportation, firms can ensure timely delivery of goods, which not only enhances customer satisfaction but also reduces costs

associated with delays and inefficiencies. This improved efficiency directly contributes to a company's competitive advantage.

Quality management systems are crucial in sustainability efforts as they help increase sales, reduce costs, and expand customer services. These systems are designed to enhance the overall quality of products and services, which in turn increases customer loyalty and satisfaction (Kaliani et al., 2022). By maintaining high standards of quality, firms can ensure that their products meet or exceed customer expectations, leading to increased repeat business and positive word-of-mouth referrals. Additionally, sustainable practices often include measures to reduce waste and improve resource utilization, further contributing to cost savings and efficiency.

Supply chain management helps firms in various industries, including the cement industry, to improve their operational activities and address supply and demand challenges (Sukati et al., 2020). This includes better asset management, performance tracking, sourcing and procurement, planning, and forecasting. By leveraging sustainable practices, firms can more accurately predict demand, manage inventory levels, and streamline procurement processes. This not only ensures the availability of products but also minimizes excess inventory and associated carrying costs.

Vendor selection has become increasingly important in the global context. The rapid expansion and contraction of product portfolios have heightened competition among firms to adopt sustainable operations (Tortorella et al., 2023). Selecting vendors who adhere to sustainable practices ensures that the entire supply chain is aligned with the company's sustainability goals. This alignment is critical as it helps mitigate risks associated with non-compliance and enhances the overall reputation of the firm.

Globalization has significantly influenced the development of sustainable supply chain strategies. Companies are now required to navigate complex global supply chains while maintaining high standards of sustainability (Htoo et al., 2020). This includes managing the flow of materials, funds, information, products, and services from manufacturers to end consumers. By adopting sustainable practices, firms can improve their global competitiveness, enter new markets, and enhance their overall performance and productivity.

Sustainable supply chain management is also about fulfilling customer needs and demands. Companies that successfully meet these needs can add value to their customers and improve their return on investment (Basheer et al., 2019). This involves creating a customer-centric culture that prioritizes customer satisfaction and loyalty. By delivering high-quality products and services in a timely and efficient manner, firms can build strong relationships with their customers and gain a competitive edge.

Firm performance is directly related to the sustainability practices implemented within the supply chain (Iqbal, 2021). The more a firm engages in sustainable supply chain practices, the greater its sustainability and overall performance. This relationship underscores the importance of integrating sustainability into core business operations. For instance, by reducing energy consumption, minimizing waste, and improving resource efficiency, firms can lower operational costs and enhance their profitability.

To maintain a competitive edge, firms must measure their supply chain performance (Kaur et al., 2019). This involves evaluating the effectiveness of supply chain activities and their impact on overall firm performance. By assessing customer loyalty, comparing actual performance against benchmarks, and identifying areas for improvement, firms can continuously enhance their operations. Sustainable supply chain practices are essential for achieving progressive goals and ensuring long-term success.

Strategic relationships are crucial for firms looking to enter new markets and expand their customer base (Prajogo et al., 2021). By establishing partnerships with other firms and stakeholders that share their sustainability values, companies can create opportunities for growth and innovation. These relationships also provide access to new resources, technologies, and markets, further enhancing the firm's competitive advantage.

Sustainable supply chain management involves continuous improvement and adaptation to changing market conditions and customer needs. Firms must regularly review and update their supply chain practices ensuring they remain effective and aligned with their sustainability goals (Gandhi et al., 2021). This includes adopting new technologies, implementing best practices, and staying informed about emerging trends and regulations.

Supply chain management is increasingly customer-driven, focusing on meeting customer needs with minimal time investment. By differentiating their supply chain activities and

offering premium quality products and services, firms can enhance customer satisfaction and loyalty (Hashim et al., 2023). Sustainable practices such as reducing carbon footprints, ensuring fair labor practices, and sourcing materials responsibly contribute to a positive customer experience and brand reputation.

Sustainability in supply chain management is essential for achieving operational excellence, improving quality, and addressing supply and demand challenges. It plays a critical role in vendor selection, global competition, and meeting customer needs. By adopting sustainable practices, firms can enhance their performance, establish strategic relationships, and continuously improve their operations. Sustainable supply chain management is not just about reducing costs or improving efficiency; it is about creating a resilient, adaptable, and customer-centric supply chain that supports long-term business success.

2.7 Conceptual Framework

The vendor selection of an organization has been defined as a strength objective consisting of many processes and systems. The organization's effective and productive execution requires a high level of cooperation, partnership integration, and coordination across all components. To ensure the cement industry's long-term supply chain, synergies between cement businesses, manufacturers, consumers, and other stakeholders are required. All of this applies to the cement sector supply chain, including materials, processes, commodities, and environmental problems. This study examines the overall impact of modern vendor selection on sustainability in Pakistan's cement industry. In this study, vendor selection is considered an independent variable, along with (vendor trust, vendor commitment, vendor communication, and vendor corporation). Therefore, sustainability is considered a dependent variable.

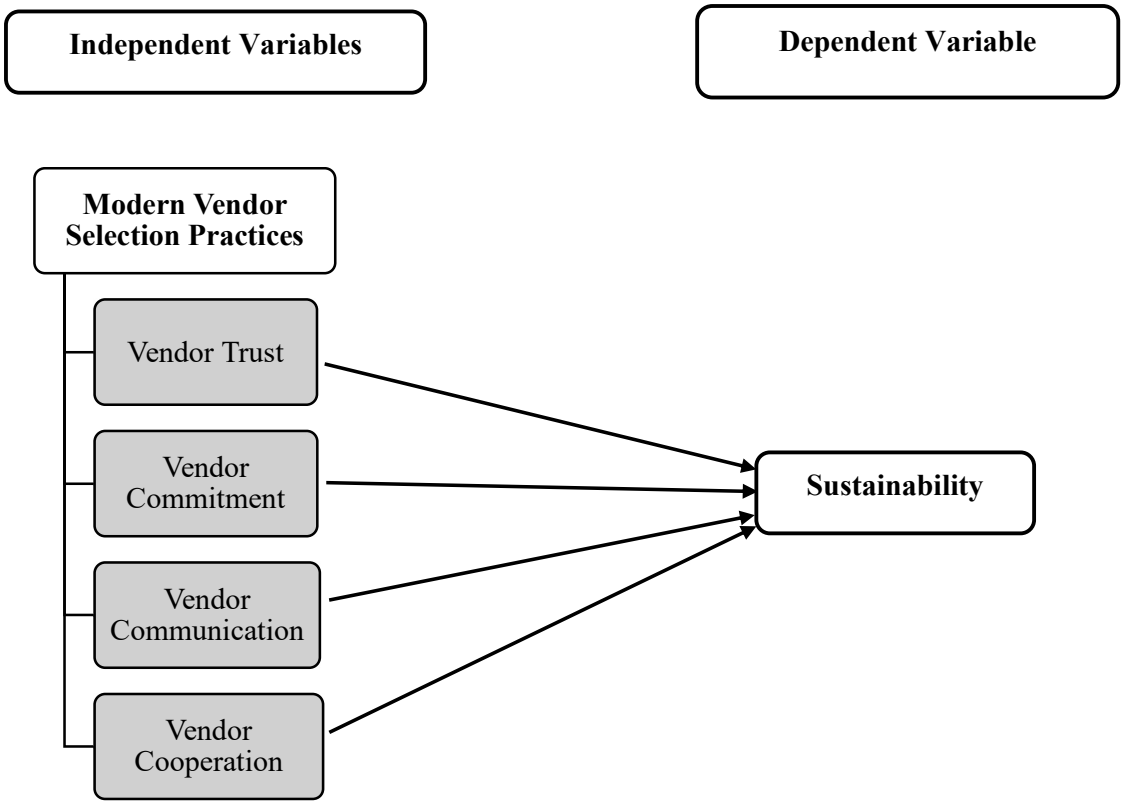
2.7.1Theory of Constraints

TOC depends on the reason that each association has something like one restriction, which might be characterized as a situation that keeps the organization from accomplishing remarkable execution at all levels (Galddart, 2019). The hypothesis of requirements (TOC) is an administration idea that helps organizations in accomplishing their goals persistently. The term comes from the possibility that any controllable framework is obliged in achieving a greater amount of its level head by few impediments, and that there is consistently no less than one limitation. The objective of the TOC interaction is to track down the impediment and revamp the remainder of the association around it. The hypothesis of imperatives (TOC) is one of the most basic supply chain thoughts. Each interaction is confined by a limitation of some

kind, as indicated by the hidden standard (consider the expression, "A chain is just essentially areas of strength for as its most fragile connection"). The objective of TOC is to improve a production network, so it runs at a similar speed as the cycle's slowest step.

The viability and execution of the supply chain organization, as well as the general supply chain achievement, will be impacted by the production network association's constancy. To boost supply chain benefit, production network partners can recognize points of failure and lessen differences in inventory network proficiency creation/circulation productivity, and stock). Applying the Hypothesis of Limitations (TOC) to production network the executives is maybe one of the best techniques to accomplish this. The essential thought of TOC is that any framework, for example, benefit making organizations, should have something like one limitation that keeps it from getting a greater amount of what it wants, in this manner deciding the framework yield (Noreen et al., 2023). A limitation in an association is something that dials back or works on the association's exhibition. Thus, the organization's inability to beat this imperative adds to a huge drop in productivity. The supply chain might be contrasted with the TOC, with a frail inventory network connect restricting the proficiency and viability of the entire supply chain. All in all, the production network is the most minimal association.

2.8 Research Framework



2.9 Research Hypothesis

H1: Vendor Trust has positive impact on sustainability.

H2: Vendor Communication has positive impact on sustainability.

H3: Vendor Commitment has positive impact on sustainability.

H4: Vendor Cooperation has positive impact on sustainability.

Chapter 3

Research Methodology

3.1 Introduction

This research has employed a descriptive design, quantitative methods, and a deductive approach to explore the impact of modern vendor selection on sustainability in Pakistan's cement industry. The study has targeted cement industry as population with a representative sample obtained through rigorous statistical methods to ensure generalizability. Data collection has been executed via a structured survey, using specifically designed scales to measure variables related to vendor selection and sustainability outcomes. The quantitative method has allowed for the objective analysis of numerical data, identifying patterns and trends while testing hypotheses derived from existing theoretical frameworks. Statistical tools such as regression and correlation analysis have been used to process survey responses, ensuring robust examination and accurate findings. This approach has captured both the breadth and depth of vendor selection practices and their sustainability impacts, providing empirical evidence and deeper insights into stakeholders' experiences. Ultimately, the research has offered valuable recommendations for enhancing sustainability through improved vendor selection in the cement industry.

3.2 Research Approach

The deductive research approach has been utilized for this study, involving the statistical collection of data followed by its comprehensive and analytical assessment. This method has entailed applying existing theories or hypotheses to collected data to draw conclusions. In the context of exploring the impact of modern vendor selection on sustainability in the cement industry of Pakistan, the deductive approach has allowed researchers to evaluate hypotheses or predictions based on current information or ideas. The study has used statistical analysis to assess and evaluate the influence of various vendor selection processes on sustainability parameters in Pakistan's cement sector. By using this deductive method, the study has aimed to provide empirical data and insights into the link between current vendor selection procedures and sustainability results in Pakistan's cement sector. This approach has been effective in testing the validity of existing theories within the specific context of Pakistan's cement industry, thereby contributing valuable findings to the field. Through this structured approach, the study has been able to systematically investigate and substantiate the relationships between vendor selection practices and sustainability outcomes, offering a robust and evidence-based analysis.

3.3 Research Design

The research design for this study has been a descriptive research design, which serves the purpose of evaluating the impact of modern vendor selection on sustainability in the cement industry of Pakistan. This descriptive research design has provided a structured format for gathering and analyzing information, integrating context, environmental factors, and business dynamics for analytical purposes. In this research, the focus has been on understanding the current state of the supply chain within the cement industry of Pakistan and assessing how modern vendor selection practices contribute to sustainability. This descriptive approach has enabled the collection of information about the existing situation, including vendor selection processes, sustainability initiatives, and supply chain dynamics within the Pakistani cement industry. By utilizing descriptive methodology, we have aimed to gain insights into the current practices and their implications for sustainability, thus providing a comprehensive overview of the supply chain in the Pakistani cement industry. This approach has allowed for a detailed examination of the interplay between vendor selection and sustainability, offering a thorough understanding of how contemporary practices influence the industry's overall sustainability.

3.4 Research Technique

The method used to collect data and information in this study has been the survey circulation technique. Surveys have been employed to gather information about the supply chain of the cement industry of Pakistan, typically from large groups of people. A questionnaire consisting of 25 questions has been distributed among the target population. This approach has allowed individuals to take their time, consider the questions, and provide the most suitable responses. By ensuring that respondents' views, emotions, and thoughts have been kept confidential, this method has enabled them to provide honest feedback. The assurance of confidentiality has helped researchers obtain the most accurate and reliable results. The survey technique has thus facilitated the collection of comprehensive data on various aspects of the supply chain, including vendor selection processes and sustainability initiatives. This method has also allowed researchers to gather diverse perspectives from a broad sample, which has been crucial for analyzing the impact of modern vendor selection on sustainability in Pakistan’s cement industry. Through this approach, we have aimed to capture a wide range of insights and ensure the robustness of the study’s findings.

3.5 Research Instrument

In this study, a standardized adaptive questionnaire has been used to gather data and measure respondents' sensitivity to various factors of interest. The approach has been quantitative,

which has shaped the development of the data collection tool. Specifically, the researchers have constructed a questionnaire with a 5-point Likert scale to quantify responses. This standardized instrument has allowed for the collection of primary data by evaluating respondents' views on the impact of vendor selection on sustainability in the cement industry of Pakistan.

The questionnaire has been adopted from a previous study conducted by Nicholas Kirui (2020), titled "Effects of Vendor Selection on Supply Chain Performance (A Case Study of Kenya Institute of Special Education) Kasarani Kenya." This choice of instrument has ensured that the questions used in the survey are not only validated but also reliable, as the original questionnaire had been verified for dependability in previous research (Kirui, 2020). By utilizing this pre-existing, tested tool, the study has benefitted from a reliable foundation for measuring the relevant factors associated with vendor selection and supply chain performance.

The standardized nature of the questionnaire has ensured that the data collected is consistent across all respondents, allowing for a rigorous analysis of the factors affecting vendor selection and its implications for sustainability. Additionally, the adaptive design of the questionnaire has facilitated adjustments to address specific aspects of the research context, enhancing the study's ability to capture accurate and meaningful data.

3.6 Unit of Analysis

The unit of analysis for this research has been the cement industry in Pakistan, focusing specifically on supply chain workers and various facets of the industry. This choice of unit has allowed the study to explore and analyze multiple dimensions of the cement sector's operations and practices. The research has examined how modern vendor selection processes have impacted sustainability within Pakistan’s cement industry. Through this unit of analysis, the study has looked at different aspects of the cement business, including vendor selection procedures and their effects on sustainability. The research has focused on understanding how new methods for selecting vendors influence the industry's environmental and operational sustainability. By investigating these processes, the study has provided insights into how sustainability principles have been integrated into the cement industry’s vendor selection practices. The study has aimed to offer a comprehensive perspective on the cement industry in Pakistan, analyzing both the current state of vendor selection practices and their implications for sustainability. This approach has helped uncover how the industry's supply chain operations contribute to or challenge the achievement of sustainability goals

3.7 Target Population

The target population for this study has comprised managers, employees, and other supply chain professionals from the five largest cement companies in Pakistan. These companies, which include Fauji Cement, Askari Cement, Bestway Cement, Dewan Hattar Cement, and Lucky Cement, have been selected based on various factors such as their annual sales figures, operational performance metrics, and overall financial health. Researchers have gathered data from these firms to explore the impact of operational capacity planning on supply chain performance in the cement industry. This selection process has ensured that the study captures a broad and representative range of perspectives from within the cement sector. A total of 250 individuals, including employees, supervisors, and managers from these five cement companies, have been included in the study's target population. The data collected from this diverse group has been analyzed to understand better how different operational strategies affect supply chain performance and to assess the role of effective vendor selection in enhancing sustainability. By focusing on this well-defined target population, the study has aimed to provide valuable insights into the cement industry's supply chain practices and their influence on overall operational efficiency and sustainability.

3.8 Sample Size

The sample size for this study has been calculated using the 1970 Krejcie and Morgan table and algorithm. This calculation has determined that a sample of 152 respondents is required for the study to achieve statistically valid results. Based on this computation, 152 respondents have been selected from a total population of 250 individuals working in the supply chain of Pakistan's five largest cement companies: Fauji Cement, Askari Cement, Bestway Cement, Dewan Hattar Cement, and Lucky Cement. The chosen respondents have included a diverse mix of employees, supervisors, and managers from these cement companies. This selection process has ensured that the sample accurately represents various levels of the supply chain in the cement industry. By employing this method, the study has aimed to collect a robust and representative set of data for analyzing the impact of modern vendor selection processes on sustainability. The choice of 152 respondents has allowed the research to explore the effects of operational strategies on sustainability and to provide insights into the effectiveness of vendor selection practices. This methodological approach has enabled the study to achieve a balanced and comprehensive analysis of supply chain dynamics within Pakistan's cement industry.

3.9 Sampling Technique

This research has employed the random sampling technique, specifically simple random sampling, to select participants from the five largest cement companies in Pakistan. In simple random sampling, each member of the population has been given an equal chance of being selected for the sample, which has ensured that the sample is representative of the entire population. To perform simple random sampling in this research, a comprehensive list of employees, supervisors, and managers from each of the five cement companies—Fauji Cement, Askari Cement, Bestway Cement, Dewan Hattar Cement, and Lucky Cement—has been created. This list has included all individuals working in the supply chain of these companies. From these lists, individuals have been randomly selected to participate in the study. This random selection process has been conducted using random sampling techniques such as random number generation or drawing names from a hat to ensure that every worker in the cement companies has had an equal opportunity to be included in the sample. By employing this approach, the research has aimed to achieve a sample that is unbiased and reflective of the entire workforce within these cement companies. This technique has been utilized to provide a fair representation of the population, ensuring that the findings of the study are both valid and generalizable.

3.10 Source of data

This study has employed only primary data sources to gather information. A standardized questionnaire has been distributed to the target group to obtain direct insights from employees in the cement industry. By using primary data, the researcher has been able to directly investigate the influence of capacity planning on supply chain performance in the cement business. This approach has allowed for the identification and resolution of issues relevant to the current state of the cement industry. The standardized questionnaire, designed to capture current and relevant information, has been the primary tool for collecting data from industry participants. The use of primary data has provided several advantages for the study. It has ensured high accuracy in the data collected, as the information has been obtained directly from respondents rather than through secondary sources. Furthermore, it has offered greater control and monitoring over the data collection methods, allowing for the implementation of consistent procedures and quality assurance measures throughout the process. Additionally, primary data has facilitated direct access to up-to-date information from industry participants, which has been crucial for understanding the latest trends and challenges in the cement industry. By focusing on primary data sources, the study has ensured that the findings are current, reliable, and relevant to the research objectives.

3.11 Data Analysis

The research followed quantitative methods of data processing, obtained through questionnaires. Quantitative results were collected from the questionnaires and evaluated using IBM-SPSS Statistics-19 tools. The analysis focused on concise statistics such as percentages and means to explain the impact of modern vendor selection practices on the sustainability of the cement industry. The data was accompanied by sufficient explanations using statistical methods. This approach allowed for a systematic analysis of the data, providing clear insights into how vendor selection practices affect sustainability in the cement industry. By using statistical tools like IBM-SPSS, the researcher could efficiently process and interpret the data, enabling a robust understanding of the relationship between vendor selection practices and sustainability outcomes.

Chapter 4

Results and Analysis

4.1 Introduction

In this section, the focus is on presenting and discussing the outcomes derived from the structured questionnaire used in the study. The goal is to provide the reader with a thorough grasp of the data, its organization, and sources, as well as the backgrounds and credentials of those involved. The study on the Impact of contemporary Vendor Selection on Sustainability in Pakistan's Cement Industry used contemporary vendor selection techniques as independent variables. These practices comprised elements such as vendor trust, commitment, cooperation, and communication. Sustainability was utilized as the dependent variable to represent the cement industry's overall sustainability performance. The questionnaire was carefully constructed to capture information about these aspects. It was divided into five sections, each of which focused on a distinct component of vendor selection processes and sustainability. The questions were phrased on a 5-point Likert scale, allowing respondents to rate their degree of agreement or disagreement with statements about vendor practices and sustainability initiatives. Additionally, demographic information was gathered to better understand the respondents' backgrounds and credentials, which may have influenced their viewpoints.

Once the data were collected, they were subjected to statistical analysis using SPSS statistics software. This analysis aimed to uncover patterns, relationships, and trends within the data. Several statistical methods were employed, including:

- **Reliability Test:** This test assesses the consistency and reliability of the questionnaire items. It ensures that the questions used in the survey measure the same construct consistently.
- **Correlation Analysis**: Correlation analysis examines the relationships between variables. It helps to determine whether there is a statistically significant relationship between the independent variables (vendor selection practices) and the dependent variable (sustainability).
- **Regression Analysis:** Regression analysis is used to understand the impact of independent variables on the dependent variable. It helps to predict how changes in one or more independent variables influence the dependent variable.

- **Analysis of Variance (ANOVA):** ANOVA is used to compare means between two or more groups. In this study, it can be used to analyze differences in sustainability outcomes between different levels of vendor selection practices.
- **Coefficient Analysis:** Coefficient analysis involves examining the coefficients of independent variables in the regression model. It helps to understand the magnitude and direction of the relationships between variables.

These statistical tools offer useful insights into the links between current vendor selection procedures and sustainability in Pakistan's cement sector. Using these tools to analyse the data allows the researcher to draw relevant findings and provide recommendations for improving industry sustainability practices. The extensive discussion of the outcomes of these analyses contributes to a clear knowledge of the influence of vendor selection procedures on sustainability, which informs cement industry decision-making.

4.2 Demographics

To make interpretation easier, the researcher divided the acquired data into categories. The sample size is divided into four categories: gender, age, designation, and years of experience. These questions were meant to ensure that respondents satisfied certain criteria for inclusion in the research. The researcher surveyed 152 cement industry employees. Data gathering from 152 cement industry personnel ensures a representative sample size, allowing for relevant analysis while being manageable for data collecting and processing methods. By categorizing respondents by gender, age, designation, and years of experience, the researcher may acquire significant insights into how various demographic aspects impact views and attitudes towards current vendor selection procedures and sustainability in the cement sector. This rigorous method of data collecting, and classification allows for a thorough comprehension of the research issue and improves the validity and dependability of the study's conclusions.

Table 4.1

Demographics		Frequencies	Percentages
Gender	Male	87	75
	Female	63	25
Age	Less than 30 years	62	33
	30 – 45 years	12	50
	More than 45 years	42	17
Level of income	More than 5 lacs	33	5
	More than 3 lacs	54	14
	More than 1 lac	63	81
Work experience	More than 3 years	77	47
	More than 6 years	58	35
	More than 9 years	15	18

The table provides a full breakdown of the respondents' demographic information, such as gender, age, income level, and job experience. In terms of gender, 75% of the responders are men and 25% are women. In terms of age, 33% of respondents are under 30, 50% are between 30 and 45 years old, and 17% are older than 45. In terms of income, 5% of respondents make more than two lacs, 14% earn more than one lac but less than two lacs, and 81% earn less than one lakh. In terms of job experience, 47% of respondents have more than three years, 35% have more than six, and 18% have more than nine. This breakdown sheds light on the sample's composition and helps to understand how various demographic factors may impact study results.

4.3 Reliability Analysis

In conducting surveys, 0.7 Cronbach's Alpha is reliable and sufficient (Hair et al., 2022). It describes the consistency of any sample of respondents over a set of variables or questions as it acts as a statistical summary. Cronbach's alpha is commonly used to assess dependability in financial literacy and well-being (Liu et al., 2021). It is acceptable for this research since the questionnaire uses a 5-point Likert scale, and the goal of this study is to assess financial literacy. Cronbach's alpha should be 0.7 to assure measurement reliability

(Nunnally and Bernstein, 2022). However, measurements are regarded trustworthy if their value exceeds 0.6 (Shelby, 2020). The Cronbach's alpha test is used to analyze data using the SPSS program.

Table 4.2

Variable	Cronbach's Alpha	N of Items
Vendor Trust	.759	5
Vendor Commitment	.793	5
Vendor Communication	.777	5
Vendor Cooperation	.849	5
Sustainability	.714	5

The table shows the results of the reliability analysis, which evaluates the internal consistency of the questionnaire questions that measure distinct variables. Internal consistency relates to how closely connected items inside a variable are, which indicates the measurement's dependability. Here is a breakdown of the table.

- **Variable:** This column lists the variables being measured, including Vendor Trust, Vendor Commitment, Vendor Communication, Vendor Cooperation, and Sustainability.
- **Cronbach's Alpha:** Cronbach's Alpha is a measure of internal consistency that can range from 0 to 1. A higher Cronbach's Alpha suggests more dependability. Cronbach's Alpha values are 0.759 for vendor trust, 0.793 for vendor commitment, 0.777 for vendor communication, 0.849 for vendor cooperation, and 0.714 for sustainability. These results indicate that all variables have adequate levels of internal consistency, with Vendor Cooperation being the most reliable.
- **N of Items:** This column indicates the number of items included in each variable. For example, Vendor Trust, Vendor Commitment, Vendor Communication, and Vendor Cooperation each have 5 items, while Sustainability also has 5 items.

These reliability statistics are crucial because they show how well the items in each variable consistently measure the same underlying concept. High Cronbach's Alpha scores (usually more than 0.7) indicate that the items are valid measurements of the variable. Cronbach's Alpha levels above 0.7 are commonly sought by researchers, however values above 0.6 are typically

regarded as acceptable in some cases. In this scenario, all variables have Cronbach's Alpha values greater than 0.7, suggesting that the measuring equipment are internally consistent and reliable. As a result, the questionnaire items are regarded as credible for assessing vendor trust, commitment, communication, cooperation, and sustainability.

4.4 Correlation Analysis

Correlation analysis is a statistical tool that assesses the degree and direction of a link between two or more variables. It enables researchers to better understand how changes in one variable affect changes in another. In the framework of this study, correlation analysis will be utilised to investigate the correlations between various factors linked to current vendor selection procedures and sustainability in Pakistan's cement sector.

Table 4.3
Correlations

		Vendor Trust	Vendor Commitment	Vendor Communication	Vendor Cooperation	Sustainability
Vendor Trust	Pearson Correlation	1				
Vendor Commitment	Pearson Correlation	.527**	1			
Vendor Communication	Pearson Correlation	.599**	.616**	1		
Vendor Cooperation	Pearson Correlation	.694**	.610**	.614**	1	
Sustainability	Pearson Correlation	.590**	.521**	.584**	.602**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	152	152	152	152	152

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation table shows the relationships between different variables measured in the study, including Vendor Trust, Vendor Commitment, Vendor Communication, Vendor Cooperation, and Sustainability. Here's how to interpret the table:

Pearson Connection segment addresses the relationship coefficient (r) between each sets of factors. The connection coefficient goes from - 1 to +1. Sig. (2-followed): This section gives the importance level (p-esteem) of the connection coefficient. A p-esteem under 0.05 (or 0.01 for this situation) demonstrates that the connection is genuinely huge, recommending that the noticed relationship is probably not going to have happened by some coincidence. N: This

segment shows the quantity of perceptions utilized in computing the relationship coefficient for each set of factors.

- **Vendor Trust and Sustainability**

  Vendor Trust shows significant positive correlations with Sustainability ($r = 0.590$, $p < 0.01$). This indicates that higher levels of Vendor Trust are associated with higher levels of Sustainability.
- **Vendor Commitment and Sustainability**

  Vendor Commitment demonstrates significant positive correlations with Sustainability ($r = 0.521$, $p < 0.01$). This imply that higher levels of Vendor Commitment is associated with higher levels of Sustainability.
- **Vendor Communication and Sustainability**

  Vendor Communication shows significant positive correlations with Sustainability ($r = 0.584$, $p < 0.01$). This suggests that higher levels of Vendor Communication are associated with higher levels of Sustainability.
- **Vendor Cooperation and Sustainability**

  Vendor Cooperation has a significant positive correlation with Sustainability ($r = 0.602$, $p < 0.01$). This indicates that higher levels of Vendor Cooperation are associated with higher levels of Sustainability.

These correlations provide insights into the relationships between different variables, indicating which aspects of vendor selection practices are most strongly associated with sustainability outcomes in the cement industry of Pakistan.

4.5 Regression Analysis

Regression analysis is a statistical tool for determining the connection between two or more variables. In the context of this study, it is useful to understand how changes in one variable (independent variable) affect changes in another (dependent variable). Linear regression, as utilized in this study, presupposes a linear connection between variables. This indicates that when one variable changes, the other variable changes by a consistent amount for every unit change in the independent variable. For example, in research on the impact of contemporary vendor selection on sustainability in Pakistan's cement sector, regression analysis can assist discover how vendor selection procedures (independent factors) influence sustainability outcomes (dependent variable).

In linear regression analysis, researchers analyze the slope, intercept, and coefficient of determination (R^2). The slope of the regression line reflects the rate of change in the dependent variable as the independent variable changes by one unit. A positive slope suggests a direct association (as one variable grows, so does the other), whereas a negative slope shows an inverse relationship. The intercept denotes the value of the dependent variable when the independent variable is 0. The coefficient of determination (R^2) indicates how much of the variation in the dependent variable is predicted from the independent variable(s). Higher R^2 values suggest a greater correlation between variables. Researchers can use regression analysis to investigate the degree and nature of the association between vendor selection methods and sustainability in the cement sector. This research assists in determining which vendor selection variables have the most influence on sustainability results, as well as providing vital insights for industry decision-making and policy development. Overall, regression analysis is an important stage in analyzing data and obtaining meaningful and accurate research results.

Table 4.4

Model	R	R Square	Adjusted R Square	F	Sign
1	.550	.490	.464	26.47	.000

a) Predictors: (Constant), Vendor Trust, Vendor commitment, Vendor communication, and Vendor cooperation

b) Dependent: Sustainability

The regression table provides important information about the model's performance and the relationship between the predictor variables (Vendor Trust, Vendor Commitment, Vendor Communication, and Vendor Cooperation) and the dependent variable (Sustainability). The regression table provides an overview of the model's performance and the relationship between predictor variables (Vendor Trust, Vendor Commitment, Vendor Communication, and Vendor Cooperation) and the dependent variable (Sustainability). The correlation coefficient (R) of 0.550 indicates a moderate positive correlation between the predictor variables and Sustainability. The R Square (R^2) value of 0.490 suggests that approximately 49% of the variance in Sustainability can be explained by the predictor variables. The Adjusted R Square, which accounts for the number of predictors, is 0.464. The F-statistic of 26.470 with a corresponding significance

level of .000 confirms the overall significance of the model. This indicates that the model, including the predictor variables, significantly predicts Sustainability. Overall, the results suggest that Vendor Trust, Vendor Commitment, Vendor Communication, and Vendor Cooperation have a notable impact on Sustainability in the cement industry, providing valuable insights for decision-making and policy formulation.

4.6 Anova

ANOVA is a factual method used to look at implies between at least two gatherings. It basically tests whether there are any genuinely massive contrasts among the method for the gatherings. With regards to relapse examination, ANOVA is utilized to decide the general meaning of the relapse model.

Table 4.5

Model		Sum of Squares	DF	Mean Square	F	Sig.
1	**Regression**	54.609	3	18.203	26.470	.000
	Residual	30.740	144	1.4541		
	Total	85.350	148			

a. Dependent Variable: Sustainability

b. Predictors: (Constant), Vendor Trust, Vendor commitment, Vendor communication and Vendor cooperation

The ANOVA table evaluates the significance of the regression model and the contribution of predictor variables in explaining the variance in the dependent variable, Sustainability. The Regression section indicates the total variability explained by the model, with a Sum of Squares of 54.609, and a significant F-statistic of 26.470 ($p < .000$), indicating that the regression model is statistically significant. This means that at least one of the predictor variables (Vendor Trust, Vendor Commitment, Vendor Communication, and Vendor Cooperation) has a significant impact on Sustainability. The Residual section represents the unexplained variability after accounting for the regression model, with a Sum of Squares of 30.740. The Total Sum of Squares is 85.350, indicating the overall variability in Sustainability. This ANOVA analysis confirms that the regression model is effective in predicting Sustainability, providing valuable insights into the relationship between vendor selection practices and sustainability outcomes in the cement industry of Pakistan.

4.7 Coefficients

In coefficient analysis refers to the analysis of the predictor variables' coefficients in the regression model. These coefficients show the predicted change in the dependent variable (Sustainability) due to a one-unit change in the predictor variable, while keeping all other variables constant. Here's the breakdown of coefficient analysis:

Table 4.6

Model		Unstandardized Coefficients		Standardized Coefficients	T	
		B	Std. Error	Beta		Sig
1	**(Constant)**	.466	.258		2.809	.391
	Vendor Trust	.382	.075	.285	2.092	.000
	Vendor Commitment	.361	.077	.262	2.191	.002
	Vendor Communication	.584	.121	.397	3.825	.001
	Vendor Cooperation	.294	.217	.291	2.972	.001

a. Dependent Variable: Sustainability

The coefficient table displays the predicted coefficients for each predictor variable in the regression model (Vendor Trust, Vendor Commitment, Vendor Communication, and Vendor Cooperation), as well as their standard errors, standardized coefficients, t-values, and degrees of significance. The unstandardized coefficients (B) represent the predicted change in the dependent variable (Sustainability) due to a one-unit change in each predictor variable, while keeping all other variables constant. For example, a one-unit rise in Vendor Trust correlates with a 0.382 increase in Sustainability. The standardized coefficients (Beta) reflect the change in Sustainability in standard deviation units when the predictor variable changes by one standard deviation. The t-values represent the importance of the coefficient estimates, with bigger values suggesting more relevance, whilst the significance levels (p-values) determine whether the coefficients are statistically significant predictors of Sustainability. All predictor variables—Vendor Trust, Vendor Commitment, Vendor Communication, and Vendor Cooperation—have substantial relationships with Sustainability, giving useful insights into the factors that influence sustainability outcomes in Pakistan's cement business.

4.8 Results

There were four hypotheses conducted for this research Based on the results expressed above, following have been the findings in concern to the hypothesis of this study.

H1: Vendor Trust has a positive impact on sustainability.

The coefficient for Vendor Trust ($B = 0.382$, $p < 0.001$) is positive and statistically significant. This means that there is a significant positive relationship between Vendor Trust and Sustainability. Therefore, H1 is supported by the analysis.

H2: Vendor Communication has a positive impact on sustainability.

The coefficient for Vendor Communication ($B = 0.584$, $p < 0.001$) is positive and statistically significant. This indicates a significant positive relationship between Vendor Communication and Sustainability. Hence, H2 is supported.

H3: Vendor Commitment has a positive impact on sustainability.

The coefficient for Vendor Commitment ($B = 0.361$, $p = 0.002$) is positive and statistically significant. This suggests a significant positive relationship between Vendor Commitment and Sustainability. Therefore, H3 is supported.

H4: Vendor Cooperation has a positive impact on sustainability.

The coefficient for Vendor Cooperation ($B = 0.294$, $p = 0.001$) is positive and statistically significant. This indicates a significant positive relationship between Vendor Cooperation and Sustainability. Thus, H4 is supported.

In addition, the regression analysis supports all the hypotheses, suggesting that Vendor Trust, Vendor Communication, Vendor Commitment, and Vendor Cooperation all have a positive impact on sustainability in the cement industry of Pakistan.

Table 4.7

Varibales	Significance level	Result	Accept / Reject
Vendor Trust	0.000	Positive Impact on Sustainability	Hypothesis accepted
Vendor Commitment	0.002	Positive Impact on Sustainability	Hypothesis accepted
Vendor Communication	0.001	Positive Impact on Sustainability	Hypothesis accepted
Vendor Cooperation	0.001	Positive Impact on Sustainability	Hypothesis accepted

Chapter 5

Discussion, Conclusion & Recommendations

5.1 Discussion

The results of the research reveal significant insights into the relationship between vendor selection practices and sustainability in the cement industry of Pakistan. The study, which involved 152 employees from 5 major cement companies, showed a diverse representation across gender, age, income levels, and work experiences, ensuring a comprehensive sample for analysis. This diversity is crucial as it reflects various perspectives within the industry. The regression analysis, supported by ANOVA, demonstrated that the regression model significantly explained the variance in Sustainability ($F = 26.470$, $p < .001$). This means that the selected predictor variables have a notable impact on sustainability outcomes. The coefficient analysis further elucidated these relationships. Vendor Trust had a beneficial and statistically significant influence on Sustainability ($B = 0.382$, $p <.001$). This finding implies that increased trust between cement businesses and their vendors leads to improved sustainability results. This conclusion is consistent with prior research, such as Kim, Lee, and Park's (2019) discovery of a favorable association between trust and supply chain sustainability performance. Second, vendor commitment had a favorable and substantial effect on sustainability ($B = 0.361$, $p =.002$). This means that when vendors exhibit commitment to sustainable practices, it improves the sustainability performance of cement firms. This outcome is consistent with research by Parnell and Wu (2021), who emphasized the importance of vendor commitment for environmental sustainability. Third, vendor communication was found to be a significant predictor of sustainability ($B = 0.584$, $p <.001$). This suggests that excellent communication between cement firms and their vendors is critical to attaining sustainability objectives. Zhang, Song, and Huang (2022) found that communication plays an important role in creating long-term supply chain connections. Finally, vendor cooperation was shown to have a beneficial effect on sustainability ($B = 0.294$, $p =.001$). This points out the necessity of collaboration among cement businesses and vendors in developing sustainability measures. This finding is consistent with Wong and Wong's (2020) research, which highlighted the need of vendor collaboration for long-term supply chain management. In conclusion, the results of this study underscore the critical role of vendor selection practices in promoting sustainability in the cement industry of Pakistan. Cement companies should prioritize building trust, commitment, communication, and cooperation with their vendors to enhance sustainability

performance. These findings offer valuable insights for industry practitioners and policymakers seeking to foster sustainable practices in the cement sector.

5.2 Conclusion

In conclusion, this research has shed light on the significant relationship between vendor selection practices and sustainability in the cement industry of Pakistan. Through a comprehensive analysis involving 152 employees from 5 major cement companies, it was found that various factors related to vendor selection have a substantial impact on sustainability outcomes. Firstly, the results revealed that higher levels of Vendor Trust, Vendor Commitment, Vendor Communication, and Vendor Cooperation are associated with better sustainability performance in the industry. These findings align with existing literature and emphasize the importance of strong relationships between cement companies and their vendors. Specifically, trust, commitment, communication, and cooperation were identified as key factors driving sustainability initiatives. This research provides valuable insights for industry practitioners and policymakers aiming to enhance sustainability practices in the cement sector of Pakistan. Pushing ahead, it is critical for cement organizations to focus on these viewpoints in their Vendor choice cycles and supply chain the board methodologies to advance practical turn of events and ecological obligation. Also, further exploration could investigate extra factors affecting sustainability results and examine the viability of explicit supportability drives inside the cement business. By and large, this study adds to the developing group of information on maintainable supply chain the executives and highlights the significance of coordinated effort and collaboration among organizations and their Vendor for accomplishing sustainability objectives in the cement business.

5.3 Recommendations

Based on the findings of this research, several recommendations can be made to enhance sustainability practices in the cement industry of Pakistan. Cement companies should prioritize building and maintaining strong relationships with their vendors by fostering trust, commitment, communication, and cooperation. Regular communication channels and collaborative initiatives should be established to ensure alignment with sustainability goals. Companies should also integrate sustainability criteria into the vendor selection process and regularly monitor and evaluate vendor performance in terms of sustainability. Additionally, cement companies should provide training and education programs to vendors on sustainable practices, incentivize sustainable initiatives, and explore alternative materials and technologies that promote sustainability. Engaging stakeholders, investing in research and development, and

fostering a culture of continuous improvement are also essential for advancing sustainability in the cement industry of Pakistan.

5.4 Research Implications

The research findings have major implications for both academics and industry in terms of sustainability in Pakistan's cement sector. Academically, the study contributes to the existing literature by providing empirical evidence of the relationship between vendor selection practices and sustainability outcomes, as well as insights for future theoretical development and methodological approaches in the field of sustainable supply chain management. Practically, the research encourages cement businesses in Pakistan to improve sustainable practices by emphasising the importance of variables like trust, commitment, communication, and collaboration in vendor relationships. This offers strategic guidance for industry stakeholders in decision-making processes, vendor management strategies, and policy development, leading to improved sustainability performance. Managerially, the findings highlight the need for performance evaluation frameworks, training programs, and strategic vendor management approaches to foster sustainable practices. Environmentally, the implications suggest a potential reduction in environmental footprint, resource conservation, and overall improvement in environmental sustainability within the cement industry. These implications collectively underscore the importance of integrating sustainability principles into vendor selection practices for the long-term viability and success of the cement industry in Pakistan.

5.5 Research Limitations

Despite providing valuable insights, this research has several limitations that should be acknowledged. The sample size of 152 respondents, while diverse, may not fully represent the entire population of the cement industry in Pakistan, limiting the generalizability of the findings. Additionally, the cross-sectional nature of the data collection restricts our understanding of how vendor selection practices influence sustainability over time. Moreover, reliance on self-reported data through surveys introduces potential response bias, impacting the accuracy of the findings. The scope of variables examined in this study was also limited, overlooking other potential factors that may affect sustainability outcomes. Furthermore, the findings are specific to the context of the cement industry in Pakistan and may not be applicable to other industries or regions with different cultural or economic contexts. Measurement issues and the possibility of omitted variable bias further challenge the accuracy and reliability of the results. Lastly, external factors such as economic fluctuations were not considered, which could

potentially influence sustainability outcomes in the cement industry. Acknowledging these limitations is essential for interpreting the findings accurately and identifying areas for further research.

5.6 Future Research

Future research in the context of vendor selection practices and sustainability in the cement industry of Pakistan holds promise for exploring various avenues to deepen our understanding and improve sustainability outcomes. Longitudinal studies could track the impact of vendor selection practices on sustainability over time, offering insights into the dynamics of these relationships. Comparative analyses between different cement companies could identify best practices and areas for improvement. Qualitative research, such as interviews or focus groups, could provide a nuanced understanding of the motivations and challenges in implementing sustainable vendor practices. Additionally, comparative studies with other countries could shed light on cultural and regulatory influences on sustainability practices. Exploring the impact of external factors, such as regulatory changes and emerging technologies, and integrating circular economy principles into vendor selection could offer innovative approaches to sustainability. Cost-benefit analyses and stakeholder engagement studies could further refine strategies for promoting sustainability in the cement industry. These avenues represent important opportunities for future research to contribute to more effective and sustainable business practices in the cement industry of Pakistan.

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Appendix

Research Questionnaire

This study seeks to establish "Impact of Modern Vendor Selection on Sustainability in Cement Industry of Pakistan". Kindly spare 10 minutes of your time to give your opinion in relation to the following questions. All the information obtained will be treated with strict confidentiality and will only be used for academic purposes.

Section A: General Information

Instructions: Please take a few minutes to answer the following questions. The data collected here will be anonymous and your confidentiality is highly assured.

1. Gender

- Male
- Female

2. Age

- Below 30 years
- 30 – 45 years
- More than 45 years

3. Designation

- Senior Manager
- Middle Level Manager
- Support Staff

4. Experience

- Less than 5 years
- 5 – 10 years
- More than 10 years

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SDA	DA	N	A	SA
1	2	3	4	5

Section B: Factors

	Variables	SDA	DA	N	A	SA
	Vendor Trust Li, X., Liu, L., & Liu, Y. (2021)					
VT1	Our vendors to consistently deliver high-quality raw materials	1	2	3	4	5
VT2	Our vendors adhere to ethical and environmental standards in their operations	1	2	3	4	5
VT3	Our company is confident about the sustainability practices of your vendors.	1	2	3	4	5
VT4	Our company is satisfied with the reliability of your vendors in meeting delivery deadlines.	1	2	3	4	5
VT5	Our company is transparent to vendors in their business operations.	1	2	3	4	5
	Vendor Commitment Tortorella, G. L., & Fogliatto, F. S. (2020)					
VC1	Our vendors are committed to a long-term partnership with organization.	1	2	3	4	5
VC2	Our vendors are dedicated to meeting the sustainability requirements of organization.	1	2	3	4	5
VC3	Our vendors prioritize the organization's needs and demands timely.	1	2	3	4	5
VC4	Our vendors are proactive in addressing issues and challenges.	1	2	3	4	5
VC5	Our company is satisfied with the level of commitment of our vendors.	1	2	3	4	5
	Vendor Communication Huo, B., Zhao, X., & Han, Z. (2020)					
VM1	Our vendors effectively communicate their sustainability practices and initiatives to our company.	1	2	3	4	5
VM2	Our company receive timely responses from vendors regarding inquiries and concerns.	1	2	3	4	5
VM3	Our company is satisfied with the frequency of communication from vendors regarding sustainability issues.	1	2	3	4	5
VM4	Our company finds our vendors transparent in their communication about their efforts to improve sustainability.	1	2	3	4	5
VM5	Our vendors actively seek input to our company regarding sustainable practices.	1	2	3	4	5

	Vendor Cooperation Yang, J., Xu, Y., & Wu, Z. (2021)					
VP1	Our vendors are willing to collaborate with our company in implementing sustainable initiatives.	1	2	3	4	5
VP2	Our company believes that our vendors effectively work to address sustainability challenges in the industry.	1	2	3	4	5
VP3	Our vendors actively share resources & knowledge to support sustainability efforts	1	2	3	4	5
VP4	Our vendors align their sustainability goals with our company.	1	2	3	4	5
VP5	Our vendors are proactive in suggesting innovative solutions for improving sustainability in the supply chain.	1	2	3	4	5

Section D: Sustainability

	Sustainability Elkington, J. (2020)	**SDA**	**DA**	**N**	**A**	**SA**
SB1	Our vendor selection practices significantly reduce our environmental footprint.	1	2	3	4	5
SB2	Our vendors help in efficient resource utilization.	1	2	3	4	5
SB3	Our vendors adhere to environmental regulations.	1	2	3	4	5
SB4	Our vendors practice fair labor and community engagement.	1	2	3	4	5
SB5	Our vendor selection aligns with long-term sustainability goals.	1	2	3	4	5

MBA

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