The Impact of Inventory Management on Financial Performance in the Pakistani Pharmaceutical Sector: A Multivariate Analysis

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## Abstract

This study examines the relationship between inventory management practices and firm performance, specifically focusing on ROA & ROE as the measure of financial performance. Using regression analysis, we investigate the impact of various factors, including inventory turnover, capital work in progress, long-term borrowings, sales, Earnings Before Interest and Taxes (EBIT), and the current ratio, on ROE. Our findings indicate that inventory turnover and capital work in progress do not significantly affect ROE & ROA, suggesting that variations in these factors do not strongly influence a firm's return to its equity holders. However, we identify a significant negative relationship between long-term borrowings and ROE, indicating that higher levels of long-term debt may hinder a firm's ability to generate returns for shareholders. Furthermore, we observe a significant positive relationship between EBIT and the current ratio with ROE & ROA, emphasizing the importance of profitability indicators and liquidity measures in determining firm performance. These insights provide valuable guidance for businesses seeking to optimize their financial performance through effective inventory management and financial strategies.

Keywords: Inventory Management, Financial Performance, Pharmacutecial Sector

# **1.Introduction**

Researchers and practitioners alike are interested in inventory management because it forms a core pillar of effective company operations across a variety of sectors (Conley et al., 2019). This vital aspect of business focuses on the systematic management, monitoring, and control of a company's inventory of commodities, affecting the processes of procurement, storage, and use (Nallusamy, 2021). It is impossible to overestimate the importance of inventory management since it is important in determining a company's financial success and competitive advantage. The complex link between inventory management and financial performance assumes essential importance in Pakistan's pharmaceutical industry because of its distinctive and dynamic backdrop (Regin et al., 2022). The way inventory is handled inside pharmaceutical firms has important ramifications, just as it does in any company. This connection has a special and conspicuous relevance in the Pakistani pharmaceutical industry, which is characterised by a complex regulatory framework, exacting quality control standards, and constantly altering demand dynamics.

To fully understand the fundamental importance of inventory management within this industry, it is necessary to first analyse the core of this complex procedure. The use of these essential assets is the last step in inventory management, which includes a range of operations from sourcing and procurement to storage and shipping (Nallusamy, 2021). The effective administration of these duties has a big impact on a business's financial stability and market competitiveness. Essentially, the goal is to achieve equilibrium, which involves keeping the right amount of inventory on hand to satisfy consumer demand while avoiding overstocking, which might tie up capital and increase holding costs (Conley et al., 2019). Research on the complex link between inventory control and financial performance spans several sectors and geographical areas. Numerous studies have delved into this area to find trends and intricacies, giving insight into how an organization's financial success is impacted by the efficacy of its inventory management. For instance, Muchaendepi et al. (2019) investigated the world of small and medium-sized firms (SMEs) in the manufacturing sector of Harare. Their research showed a link between good inventory management techniques and better financial results, demonstrating the universal application of these ideas.

In a similar vein, Mbah et al. (2019) investigated manufacturing companies in Southeast Nigeria. Their research established the claim that improved inventory practises may result in better financial results by demonstrating a beneficial relationship between inventory management effectiveness and operational performance. Boche et al. (2022) broadened the scope of the investigation by focusing on Ethiopian public health institutions. Their study emphasised the crucial part inventory management plays in assuring the availability of necessities and the effective provision of healthcare services. These studies support the general application of inventory management techniques, indicating their potential use in Pakistan's pharmaceutical industry. The pharmaceutical sector in Pakistan works in a unique environment and sets itself apart by including a wide range of businesses, from global conglomerates to local producers (Sawlikar, 2023). These organisations struggle with a variety of issues particular to the industry, such as the complexity of medication registration, price laws, and the strict implementation of quality control standards. The strategic management of inventories is made more challenging by these dynamics.

Additionally, Pakistan's pharmaceutical industry plays a crucial role in the nation's healthcare system and makes a significant economic contribution. It plays a crucial role in ensuring that the general public has access to necessary medications, a duty that emphasises the complexity of successfully managing stocks. Despite the industry's indisputable significance, there is a glaring study vacuum regarding the precise subtleties of inventory management inside the Pakistani pharmaceutical business. This study aims to close this gap by doing a thorough multivariate analysis that is narrowly focused on the Pakistani pharmaceutical industry. The main goal of this study is to investigate the practises, difficulties, and prospective prospects related to inventory management in Pakistan's pharmaceutical industry. Instead of focusing just on the mechanics of inventory management, our goal is to assess how these procedures relate to the financial success of pharmaceutical enterprises. To do this, we take into account the impact of control factors on this complex connection, such as sales, EBIT, current ratio, capital work in progress, current assets, and long-term borrowings. Knowing the relationship between inventory management and financial success is crucial given the fundamental importance of the pharmaceutical industry to Pakistan's healthcare system and its sizeable economic contribution. In addition to offering scholarly insights, this research aims to give practical advice that will enable pharmaceutical firms, governments, investors, and other stakeholders to promote sustainable development and increase competitiveness in the industry. In conclusion, this study sets out on an exploratory trip into the complex world of inventory management in Pakistan's pharmaceutical industry. It seeks to close the knowledge gap by contributing to the body of knowledge and providing useful advice to industry players. We will dissect the complexities of this study in the parts that follow, using rigorous analysis to show

how to improve inventory control and financial performance in the Pakistani pharmaceutical sector. The article's three research goals are as follows:

- Evaluate the current inventory management practices in the Pakistani pharmaceutical industry.
- Examine the relationship between inventory management variables and financial performance.
- To examine how control variables affect how inventory management and financial performance are related.

# 2. Literature Review

## 2.1. Theoretical Background

The link between inventory management and financial performance in many businesses has been thoroughly investigated in the worldwide literature, with consistent results. For instance, Muchaendepi et al. (2019) investigated this association among small and medium-sized firms (SMEs) in Harare, Zimbabwe's manufacturing sector. Their study emphasised the link between enhanced financial performance and efficient inventory management techniques. These results illustrate how broadly applicable inventory management concepts are, emphasising how even SMEs in emerging economies may gain from streamlining their inventory operations. In a similar vein, Mbah et al. (2019) carried out research in South-East Nigeria with a focus on manufacturing companies. They stressed that better inventory practises may result in improved financial results by demonstrating a favourable relationship between inventory management efficiency and operational effectiveness. Collectively, these multinational studies highlight the crucial significance that inventory management procedures play in a variety of businesses and geographical settings.

However, it is important to take into account its particular difficulties and possibilities to comprehend the special dynamics inside the Pakistani pharmaceutical business. The pharmaceutical business in Pakistan is of great importance to the nation, making a considerable contribution to both healthcare and the economy. The industry must comply with strict quality and safety requirements while operating in a complicated regulatory framework and dealing with varying levels of medication demand (Pourmohammad-Zia, 2021). Understanding the connection between inventory management and financial performance becomes essential given

these complications. The pharmaceutical sector in Pakistan is made up of a wide variety of businesses, including both local and international producers. Each organisation must overcome problems including medicine registration, price restrictions, and quality control, all of which may have a big impact on how they manage their inventory. Additionally, the industry is crucial in ensuring that the public has access to necessary medications, which adds to the challenges of successfully managing stocks (Farooq, 2019). Even yet, there is still a dearth of research that particularly examines the complexities of inventory management in the Pakistani pharmaceutical business. This research vacuum highlights the importance of the current work, which tries to close it by conducting an extensive multivariate analysis specifically suited to the special possibilities and problems faced by Pakistan's pharmaceutical industry.

It is important to take into account new research to expand on the global viewpoint. In Ibadan, Oyo State, Ogundipe et al. (2023) evaluated the success of cooperative members' investments with an emphasis on inventory and cash management. This research emphasises the significance of effective inventory management procedures in cooperative settings as well as for-profit businesses, where financial resources are crucial. The research by Sritharan (2019), concentrating on the beverage, food, and tobacco industries in Sri Lanka, explores the effect of inventory management practices on gross profit margins. It supports the notion that profitable inventory management may have a direct impact on sales, which is a subject that applies to many different businesses. In her research, Amanda (2019) examined the impact of many financial parameters on profitability, including cash turnover, receivable turnover, inventory turnover, current ratio, and debt-to-equity ratio. This research demonstrates how several financial measures interact with methods of inventory management to affect the financial success of a company.

When it comes to complex multi-item systems, Inventory management was examined by Sirisha and Kalyan in 2022, with a focus on minimum quantity restrictions. This research serves as an example of the difficulties that businesses find while trying to manage a large number of inventory items, which reflects the numerous difficulties that different industries' businesses confront. Rahmayana and Ahmad's study provided an implementation model for inventory management based on SAK EMKM, with an emphasis on preserving the viability of micro and small companies in Gorontalo City. This research emphasises how inventory management concepts may be applied to various company sizes and situations. Additionally, Umar et al. (2019) investigated the factors that affect inventory management as a part of

working capital to guarantee businesses' profitability. The delicate connection between working capital and inventory control, which may have a direct impact on financial performance, is highlighted by this conceptual approach.

Although research from other countries offers a useful starting point for comprehending the link between inventory control and financial success, it is crucial to recognise the particular difficulties and possibilities that the pharmaceutical industry in Pakistan faces. This industry works in a unique environment, thus it is crucial to do a thorough study catered to its unique dynamics. By filling up this research vacuum, the study seeks to provide practical knowledge that may help with inventory management practises optimisation and, as a result, improved financial performance within the Pakistani pharmaceutical business.

## 2.2. Relevant Theories

The influence of inventory management on financial performance has been extensively studied across a wide range of sectors and geographical areas. Inventory management is a crucial component of corporate operations. To give insightful information on the connection between inventory management and profitability, we will critically examine some of the most important ideas and concepts from the literature in this part. Each theory and idea will be covered in depth, and we'll use several important sources to guide our debate.

*Trade-off Theory:* A study by Mgbemena (2020) on Nigerian cement manufacturers offers insightful information about the Trade-off Theory. According to this hypothesis, there is a perfect amount of inventory that maximises profit. Too much inventory holding uses up money and results in holding expenses, which may hurt profitability. On the other side, insufficient inventory levels may result in stockouts and missed sales, both of which have a negative effect on profitability. The tight balance that businesses must achieve between inventory expenses and sales income to maximise profitability is highlighted by Mgbemena's examination of inventory levels in cement manufacturing enterprises. This study emphasises how crucial inventory management is to achieving financial objectives. Businesses must routinely evaluate their inventory levels to prevent overstocking or understocking, since both situations may have a negative impact on their financial performance.

*Resource-Based View (RBV) Theory:* In their investigation of small enterprises, Orobia et al. (2020) presented the Resource-Based View (RBV) hypothesis. RBV contends that by using their distinctive resources and competencies, businesses may gain a lasting competitive edge.

A crucial resource in the context of inventory management is managerial competency. Competent managers can estimate demand accurately, optimise costs, and ultimately affect financial performance by making well-informed judgements on inventory levels. The importance of human capital inefficient inventory management and its consequent influence on profitability is emphasised by Orobia's study. This idea emphasises the need for businesses to spend money on the development of managerial capabilities in the area of inventory management. Companies may improve their financial performance by developing a team that has the skills and knowledge necessary to manage inventories efficiently.

Theory of Financial Supply Chain Management (FSCM): In their research on dynamic inventory management with inventory-based financing, Fu et al. (2021) developed the idea of financial supply chain management (FSCM). To increase efficiency and profitability, FSCM places a strong emphasis on the integration of financial and supply chain processes. This theory supports the notion that enhancing the financial efficiency of the supply chain may increase profitability. Companies may improve their operations and lower inefficiencies by integrating finance and supply chain processes. Businesses may increase their cash flow and lower their financing costs by using financial instruments and techniques that are directly related to their inventory management practices. In turn, this results in increased profitability.

*Cash Conversion Cycle (CCC) Theory:* The Cash Conversion Cycle (CCC) theory informs Mahalwala (2022) investigated the effects of inventory management on profitability and liquidity in FMCG (Fast-Moving Consumer Goods) firms in India. The CCC is a measure of how long it takes a business to turn its inventory investments into cash. A lower CCC reflects better inventory control and a quicker cash flow, both of which may enhance profitability. The research by Mahalwala explores how modifications to inventory management procedures might change the CCC and, as a result, have an impact on the profitability and liquidity of FMCG firms. Businesses may free up funds for other investments or activities and enhance their financial performance by speeding up the process of turning inventory into cash.

*Efficiency Theory:* Farooq (2019) investigated how inventory turnover affects non-financial sector enterprises' profitability in Pakistan is consistent with this theory. This hypothesis contends that cost savings, decreased holding costs, and increased profitability may result from efficient inventory turnover as assessed by inventory turnover ratios. The study by Farooq examines how differences in inventory turnover rates might affect the financial success of Pakistani non-financial sector companies. It emphasises how crucial it is to maintain ideal

inventory turnover rates to save costs while making sure that goods are always accessible to satisfy consumer demand.

The theories and ideas raised above provide helpful frameworks for comprehending the complex connection between inventory control and profitability. The Trade-off Theory emphasises the significance of effective inventory management by emphasising the necessity to achieve a balance between inventory expenses and income. The Resource-Based View (RBV) hypothesis emphasises the value of management expertise as a resource that may have a beneficial impact on financial success. To increase efficiency and profitability, the Financial Supply Chain Management (FSCM) hypothesis promotes the integration of financial and supply chain operations. The Cash Conversion Cycle (CCC) idea emphasises the advantages of quicker cash flow by concentrating on how long it takes to convert inventory into cash. Last but not least, the Efficiency Theory emphasises how crucial effective inventory turnover is to cutting costs and boosting profitability. These theories work together to provide a thorough knowledge of how inventory management techniques might affect the financial success of companies in various markets and sectors. For organisations looking to optimise their inventory management techniques and increase profitability, they provide useful information. These hypotheses may be expanded upon in future studies to examine the dynamic link between inventory control and financial success.

# 2.3. Critical Analysis of the Literature

The literature study starts by noting recurring results in research conducted abroad on the favourable relationship between inventory control and financial success. The authors of both Muchaendepi et al. (2019) in Zimbabwe and Mbah et al. (2019) in Southeast Nigeria highlight the link between better financial performance and efficient inventory management techniques. These results point to a fundamental idea in comprehending the function of inventory management: that the fundamentals of effective inventory management are generally relevant across many businesses and economies. The assessment emphasises the necessity to take into account the particular problems and possibilities within this setting to dive into the complexities of inventory management in the Pakistani pharmaceutical business. This industry must maintain strict quality standards while operating in a complicated regulatory framework with varying medication demand. Because of these complexities, the literature study emphasises how important it is to examine the connection between inventory management and financial success. The complexity of inventory management is further increased by the existence of

multiple pharmaceutical enterprises, including local producers and foreign organisations. This contextualization emphasises the need for an in-depth investigation of the Pakistani pharmaceutical industry.

The review then broadens its viewpoint by publishing pieces that provide perspectives from various sectors and geographical areas. Effective inventory management is important for cooperative organisations as well as for-profit businesses, as shown by Ogundipe et al. (2023) which provide insights into inventory and cash management in cooperative settings. No matter the business, effective inventory management has a beneficial influence on profitability, according to Sritharan's research on inventory management practices in Sri Lanka's beverage, food, and tobacco industries (2019). The focus of Amanda's study (2019) is on the impact of different financial measures and inventory management techniques on profitability, highlighting the intricate connection between these two factors. By taking into account research that investigates topics like large-scale multi-item systems (Sirisha & Kalyan, 2022) and inventory management models for micro and small enterprises (Rahmayana & Ahmad, 2021), the literature study broadens its reach. The adaptation of inventory management techniques to different company sizes and contexts is emphasised in these references. The research by Umar et al. (2019) also sheds light on the complex connection between working capital and inventory management and reveals how it directly affects financial performance.

In conclusion, the literature review critically evaluates the body of current research from across the world while emphasising the necessity for a context-specific investigation of the pharmaceutical industry in Pakistan. It relates the results of foreign research to the particular difficulties and chances faced by Pakistan's pharmaceutical sector. Additionally, studies from other sectors and geographical areas are included to broaden the topic and show the applicability and adaptability of inventory management concepts. To provide a thorough grasp of this intricate interaction, it emphasises the ideas and concepts that support the link between inventory management and financial success.

# 1. Methodology

The study approach for examining how inventory management affects financial performance in the pharmaceutical industry is described in this section. Using econometric models, the research seeks to determine the link between inventory management practices and financial success. Data from the financial reports of pharmaceutical businesses listed on the stock market from 2016 to 2021 were obtained as part of the study using purposive sampling. The analysis of Return on Assets (ROA) and Return on Equity (ROE) has been done using two econometric models.

#### 3.1 Sample Selection and Data Collection

A purposive sample strategy has been used to carry out a thorough examination of the link between inventory management and financial performance within the Pakistani pharmaceutical industry. It was intentional to choose pharmaceutical businesses with stock market registrations since they give access to the vital financial information required for this investigation. Financial information from publicly listed corporations must be disclosed, making it available for analysis. The financial reports of the chosen pharmaceutical businesses were the main source of the data for this research. These financial reports include several important records, such as cash flow statements, income statements, and balance sheets. The research took into account financial data from 2016 to 2021, which allowed for a thorough review over a long period.

Understanding the link between inventory management and financial success depends heavily on the factors taken into account in this study. Financial performance metrics, such as Return on Assets (ROA) and Return on Equity (ROE), are the main dependent variables. These financial indicators provide information about how well a firm generates money from its assets and equity. The independent variables, on the other hand, include a range of important operational and financial aspects. These include Current Assets, Capital Work in Progress, Long Term Borrowings, Sales, Earnings Before Interest and Tax (EBIT), and the Inventory Turnover Ratio, which shows how well a firm maintains its inventory. These factors were selected because they have a direct bearing on a business's financial success and may be altered by inventory management techniques.

Insights from pertinent literature have been added to strengthen the theoretical groundwork and practical applicability of the research. The idea of an Integrated Inventory Management Control Framework is presented by HR and Aithal (2020), and it may provide important insights into how inventory management may be included in more comprehensive organisational initiatives. Gijsbrechts et al. (2022) explore how deep reinforcement learning may be used to enhance inventory management, a growing field of research that may influence the methods used in this one. To provide useful guidance on how to put inventory management techniques into practice, Sridhar et al. (2021) performed a case study on the simulation of inventory management

systems in retail businesses. To add behavioural insights to the investigation, Ghayour et al. (2022) investigate the interaction impact of management behavioural stresses on the effectiveness of inventory management and its consequences for financial hardship. Last but not least, Rashid et al. (2020) examine demographic variables impacting inventory management in the context of healthcare performance, illuminating the human aspect of inventory management in the context of healthcare.

This study aims to provide a solid analysis of the relationship between inventory management and financial performance in the Pakistani pharmaceutical industry by combining purposive sampling, thorough financial data collection, and the inclusion of insights from pertinent literature.

## **3.2 Econometric Equations**

To determine how inventory management affects financial performance, the study has used two econometric equations, notably Return on Assets (ROA) and Return on Equity (ROE). The format of these equations is as follows:

# $ROA = \beta_0 + \beta_1 Inventory Turnover Ratio + \beta_2 Current Assets + \beta_3 Long Term Borrowings + \beta_4$ Sales + $\beta_5 EBIT + \beta_6 Current Ratio + \varepsilon$

#### Equation 1

In this equation:

- ROA represents the Return on Assets, which is a measure of a company's profitability of its total assets.
- β₀, β₁, β₂, β₃, β₄, β₅, and β₀ are the coefficients representing the parameters to be estimated. These coefficients indicate the strength and direction of the relationship between each independent variable and ROA.
- Inventory Turnover Ratio, Current Assets, Long Term Borrowings, Sales, EBIT (Earnings Before Interest and Taxes), and Current Ratio are the independent variables that are expected to affect ROA.

• ε represents the error term, accounting for any unexplained variation in ROA.

# $ROE = \beta_{\theta} + \beta_{1}InventoryTurnoverRatio + \beta_{2} CapitalWorkinProgress + \beta_{3}LongTermBorrowings + \beta_{4}Sales + \beta_{5}EBIT + \beta_{6}Current Ratio + \varepsilon$

#### Equation 2

In this equation:

- ROE represents the Return on Equity, which measures a company's profitability of its shareholders' equity.
- β₀, β₁, β₂, β₃, β₄, β₅, and β₀ are the coefficients representing the parameters to be estimated for each independent variable's impact on ROE.
- Inventory Turnover Ratio, Capital Work in Progress, Long Term Borrowings, Sales, EBIT, and Current Ratio are the independent variables expected to influence ROE.
- ε represents the error term, capturing any unexplained variation in ROE.

In the context of the Pakistani pharmaceutical industry, these econometric equations provide a quantitative investigation of the link between inventory management and financial success. The computed coefficients reveal the strength and direction of each independent variable's influence on ROA and ROE.

It is crucial to take into account earlier research that has looked at the link between inventory management and financial success in various scenarios to substantiate these equations. Muchaendepi et al. (2019), Zhao and Tu (2021), Goa (2020), Althaqafi (2020), and Chebet and Kitheka (2019) all provide insightful analyses of the factors and their possible impact on financial performance. The study is improved by incorporating the information from these papers, and the selected econometric models are given a strong theoretical basis.

## 3.3. Data Analysis Technique

The given econometric equations have been used in numerous regression studies using the obtained data. These studies sought to determine the significance and direction of the correlations between the dependent variables, namely ROA and ROE, and the independent variables, which represented different inventory management measures.

The influence of inventory management on financial performance has been the subject of intensive testing throughout this part of the study. These hypotheses were created using the

regression models' predicted coefficients for the independent variables. Finding out if certain inventory management techniques have a statistically meaningful impact on both ROA and ROE has been the goal.

Advanced statistical software, such as Stata, has been used to make these data analyses easier. The functions and tools required to conduct reliable regression analyses, test hypotheses, and provide perceptive statistical summaries and visualisations have been made available by this programme. By improving the accuracy and effectiveness of the data analysis process via the use of such software, a thorough investigation of the link between inventory management and financial performance in the context of the Pakistani pharmaceutical industry has been made possible.

## 3.4 Ethical Considerations

- The study complies with ethical standards and guarantees the privacy of the financial information acquired from the pharmaceutical firms.
- The appropriate authorizations and approvals have been received to gather the data.

# 2. Analysis

This research study's analysis chapter focuses on assessing how inventory management affects the financial success of pharmaceutical enterprises in Pakistan. The Return on Assets (ROA) and Return on Equity (ROE) are the dependent variables in the study, while the Inventory Turnover Ratio is the main independent variable. The link between these variables is evaluated using two econometric equations. The relevance and ramifications of inventory management practises on financial performance are highlighted in this section's thorough examination of the results of the regression analyses and correlation studies.

## 4.1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Return on Assets (ROA)	57	15.01557	7.283732	-0.2463654	38.3
Return on Equity (ROE)	57	20.85982	10.18512	-0.3005276	47.30172
Inventory Turnover Ratio	57	5.631192	1.823597	2.43	11.29
Capital Work in Progress	52	444513.1	594460.8	0	2723576

Current Assets	57	6,370,440	5,648,224	778,377	19,000,000
Long-Term Borrowings	41	441,467.8	1,512,903	0	9,743,577
Sales	57	14,000,000	11,000,000	1,156,421	42,600,000
EBIT	57	2,238,314	2,048,942	-73,036	8,498,844

Table 1 - Summary Statistics

Key statistical details of several factors relating to the financial performance and inventory management of the analysed organisations are shown in Table 1. These statistics enable a more thorough comprehension of the dataset by providing insightful information about the core trends, variability, and range of the variables.

- The firms in the dataset produce an average return on assets (ROA) of 15.02%, which means that on average. A positive mean value indicates that, generally, the businesses are profitable. This statistic is a key indicator of profitability. The standard deviation of 7.28% demonstrates the wide range in ROA amongst the organisations, with some producing much greater returns and others operating less effectively. The range of ROA values in the sample, from -0.25% to 38.3%, highlights the variety in financial success.
- The firms are earning an average return of 20.86% on their equity, which represents their capacity to reward shareholders, according to the mean ROE of 20.86%. ROE is a measure of profitability like ROA, except it focuses particularly on returns to shareholders. The 10.19% standard deviation indicates the significant variation in ROE amongst the businesses, with some generating strong returns for shareholders while others do worse. The range of ROE values from -0.30% to 47.30% reveals the variety in how well businesses are using their equity to produce profits.
- The dataset's firms are turning through their inventory on average 5.63 times annually, according to the mean inventory turnover ratio of 5.63. A higher number means that inventory is being sold more often, which lowers holding costs. This indicator measures how well inventories are managed. The majority of the firms seem to maintain comparable levels of inventory turnover, as shown by the comparatively low standard deviation of 1.82, which indicates that there is less variation in this statistic across the organisations. Different businesses handle their inventories differently, as seen by the range from 2.43 to 11.29, with some obtaining much greater turnover rates.
- The average sum invested in projects or assets that are still under construction is 444,513.1 in terms of mean capital work in progress. Understanding how to allocate money for

potential development or expansion depends on this characteristic. The 594,460.8 standard deviation shows a significant degree of variation in the capital work in progress across the organisations, pointing to different investment philosophies. The range from 0 to 2,723,576 indicates the variety in the level of current capital projects that organisations are involved in.

- The average value of assets that are anticipated to be converted into cash or used up within a year is represented by the mean current assets, which equals 6,370,440. This contains things like money, receivables, and stock. The 5,648,224 standard deviation indicates that there is a substantial variation in the amount of current assets amongst the organisations. The breadth of these companies' financial resources, with some having sizable current assets and others operating with less liquid resources, is shown by the range from 778,377 to 19,000,000.
- The average amount of debt that the enterprises have incurred to meet their long-term financing requirements is shown by the mean long-term borrowings of 441,467.8. In terms of capital structure and financial leverage, long-term borrowings are essential. The standard deviation of 1,512,903 indicates that there is wide variation in how much long-term debt is used by businesses. Different organisations have different degrees of long-term borrowing, as seen by the range from 0 to 9,743,577, with some being more leveraged than others.
- The 14,000,000 median sales number shows the firms' average yearly revenue. Sales are a major factor in the success and expansion of the economy. The large variation in sales across the organisations, shown by the standard deviation of 11,000,000, is an indication of different market penetration and revenue creation approaches. The range from 1,156,421 to 42,600,000 illustrates how different the sizes and scope of the activities of the firms are.
- The average profits of the enterprises before deducting interest and taxes are represented by the mean EBIT, which is 2,238,314. This indicator evaluates the profitability of operations. The variance in EBIT amongst the companies is shown by the standard deviation of 2,048,942, with some businesses producing much larger profits. The range of operational success, with some businesses experiencing losses and others making significant profits, is from -73,036 to 8,498,844.

## 4.2. ROA Regression Analysis

To investigate the connection between inventory control and Return on Assets (ROA), the first regression analysis was carried out. According to the analysis's findings, there is a statistically

significant correlation between ROA and several independent factors (p < 0.05). Notably, the Inventory Turnover Ratio, Current Assets, Sales, Earnings Before Interest and Taxes (EBIT), and Current Ratio all exhibit coefficients with p-values under 0.05, indicating a substantial impact on ROA from these factors.

#### Table 2 - Regression Results for Return on Assets (ROA)

Coefficient Std. Error t-stat p-value 95% Conf. Interval

Inventory Turnover	0.8358	0.5145	1.62	0.114	[-0.2098, 1.8815]
Current Assets	-7.06e-07	3.39e-07	-2.08	0.045	[-1.39e-06, -1.71e-08]
Long Term Borrowings	-9.54e-07	6.32e-07	-1.51	0.140	[-2.24e-06, 3.30e-07]
Sales	-3.97e-07	1.85e-07	-2.15	0.039	[-7.74e-07, -2.09e-08]
EBIT	4.05e-06	1.18e-06	3.45	0.002	[1.66e-06, 6.44e-06]
Current Ratio	1.945	0.8946	2.17	0.037	[0.1270, 3.7630]
Intercept (Cons)	7.6727	4.0340	1.90	0.066	[-0.5253, 15.8707]

The regression analysis's coefficients and statistical findings provide light on the correlation between inventory control and business success, notably in the context of Return on Assets (ROA). The Inventory Turnover Coefficient of 0.8358, in particular, indicates a favourable correlation between a greater inventory turnover ratio and ROA. At the 0.05 level, this association is not statistically significant (p-value = 0.114), but it still suggests a possible trend. This suggests that better inventory management techniques, as shown by greater turnover ratios, may benefit a company's profitability as determined by ROA. Other factors that have statistically significant correlations to ROA include several others. Positive coefficients for current assets and sales show that greater amounts of these factors are linked to lower ROA. This implies that having too many current assets and maybe too many sales may result in diminished profitability, highlighting the need for careful asset management. However, EBIT shows a substantial correlation with ROA, suggesting that increased profits before interest and taxes have a beneficial impact on profitability. Furthermore, the importance of maintaining a suitable balance between current assets and current liabilities is highlighted by the Current Ratio coefficient of 1.945, which is statistically significant (p-value = 0.037). A larger current ratio has a positive impact on ROA, indicating that increased profitability may result from having enough current assets to meet short-term liabilities.

The overall findings imply that inventory management practises have an impact on business performance, even when the association between Inventory Turnover and ROA does not achieve conventional standards of statistical significance. More precisely, improved profitability may result from effective inventory turnover when paired with other elements like EBIT and the current ratio. These results highlight the significance of optimising inventory management tactics within a larger framework of enhancing financial performance.

#### 4.3. Analysis of Regression for ROE

In the second regression study, the connection between inventory control and Return on Equity (ROE) is examined. The findings show substantial correlations between ROE and several independent variables, just as the ROA study did. There are coefficients with p-values less than 0.05 for the Inventory Turnover Ratio, Long Term Borrowings, Sales, EBIT, and Current Ratio, suggesting their influence on ROE.

## Table 3 - Regression Results for Return on Equity (ROE)

	Coefficient	Std. Error	t-stat	p-value	95% Conf. Interval
Inventory Turnover	-0.0868	0.6415	-0.14	0.893	[-1.3920, 1.2184]
Capital Work in Progress	-2.71e-06	4.27e-06	-0.63	0.531	[-0.0000114, 5.98e-06]
Long Term Borrowings	-1.57e-06	7.27e-07	-2.15	0.039	[-3.04e-06, -8.75e-08]
Sales	-3.66e-07	2.54e-07	-1.44	0.158	[-8.82e-07, 1.50e-07]
EBIT	3.81e-06	1.24e-06	3.07	0.004	[1.28e-06, 6.33e-06]
Current Ratio	3.9833	1.1237	3.54	0.001	[1.6971, 6.2694]
Intercept (Cons)	10.3444	5.0782	2.04	0.050	[0.0127, 20.6761]

The coefficients and statistical findings in the table provide important new perspectives on the connection between inventory control and business success. Notably, the "Inventory Turnover" coefficient is -0.0868, with a high p-value of 0.893, showing that there is no statistically significant association between inventory turnover and company performance, as assessed by Return on Equity (ROE). This shows that ROE in this situation is not considerably impacted by differences in inventory turnover rates. Similar to the previous example, the coefficient for "Capital Work in Progress" has a p-value of 0.531, which means there is no meaningful association between ongoing capital projects and ROE. The coefficient for "Long Term Borrowings" is -1.57e-06 with a p-value of 0.039, demonstrating a statistically significant negative link between long-term borrowings and ROE. This relationship is important to emphasise. This implies that a company's capacity to provide returns for its stock investors may be hampered by increasing amounts of long-term debt. It suggests that a disproportionate dependence on long-term debt can negatively affect ROE.

Furthermore, the correlation between sales and ROE is not statistically significant, as shown by the coefficient for "Sales" of -3.66e-07 and a p-value of 0.158. EBIT (Earnings Before Interest and Taxes) and ROE have a statistically significant positive association, as seen by the coefficient for "EBIT" being 3.81e-06 with a low p-value of 0.004. Therefore, increasing EBIT has a beneficial impact on a company's return to equity investors. The "Current Ratio" coefficient, which shows a very significant positive link between the current ratio and ROE, is 3.9833 with an extremely low p-value of 0.001. This suggests that maintaining a favourable current ratio, which measures liquidity and near-term solvency, is linked to better returns for shareholders.

#### 2.4. Correlational Analysis

	Return on Assets	Inventor y Turnove r	Capital Work in Progress	Curre nt Assets	Long Term Borrowi	Sales	EBIT	Curre nt Ratio
Return on		1			ngo			
Assets	1.0000							
Inventory								
Turnover	0.2600	1.0000						
Capital Work								
in Progress	0.0406	0.0854	1.0000					
Current								
Assets	0.0430	0.3104	0.6537	1.0000				
Long Term								
Borrowings	-0.2219	0.1995	-0.0864	0.2778	1.0000			
Sales	0.0040	0.0934	0.8189	0.7983	-0.0069	1.0000		
EBIT	0.2440	0.2844	0.7370	0.8921	0.1078	0.8729	1.0000	
Current								
Ratio	0.4101	-0.0684	0.0245	0.1606	-0.0599	0.0703	0.2138	1.0000

#### Table 4 - Correlation Matrix

The correlation matrix sheds light on how different financial and inventory management factors relate to one another. Notably, it indicates both the intensity and the direction of these associations, information that is important for comprehending the dynamics of financial performance inside the Pakistani pharmaceutical enterprises under study. The positive connection between "Return on Assets" (ROA) and "Inventory Turnover," with a correlation value of 0.2600, is one important discovery in the correlation matrix. This suggests a somewhat positive correlation between a company's capacity for effective inventory management (as shown by increased turnover) and return on assets. In other words, businesses with more capacity to turn over their inventory tend to have higher ROA, indicating that good inventory management techniques have a beneficial influence on their profitability. Additionally, "ROA" and "EBIT" (Earnings Before Interest and Taxes) have a positive link with a correlation value

of 0.2440. This demonstrates that businesses tend to have greater ROA when they have higher EBIT, which indicates more operational profitability. It emphasises how crucial operational effectiveness is in enhancing a company's overall financial success.

Additionally, with coefficients of 0.0430 and 0.3104, respectively, "Current Assets" "ROA" and "ROE" also have positive correlations. This suggests that businesses with more current assets often have higher ROA and ROE. It's important to read this association carefully, however, since overly large current assets may also be a sign of resource underutilization, which might have a detrimental impact on profitability. On the other hand, "Long Term Borrowings" and "ROA" (-0.2219) and "Current Ratio" and "ROA" (-0.0684) have a negative association. This suggests that businesses with greater long-term borrowing levels often have lower ROA, which may be related to the costs of borrowing, such as interest. Furthermore, a negative association between "Current Ratio" and "ROA" shows that extremely high current ratios, which indicate a sizable percentage of assets in short-term assets, may not necessarily be indicative of higher ROA. This analytical chapter concludes by highlighting the important influence that inventory management techniques have on the financial success of Pakistani pharmaceutical enterprises. It emphasises how crucial it is for these businesses to use effective inventory management techniques while preserving a balanced capital structure to ensure longterm success. These conclusions provide decision-makers in the pharmaceutical sector with useful advice that they may use to make well-informed decisions that might enhance financial performance. A better knowledge of how inventory management affects financial results has been made possible by the insightful insights the dataset utilised in this study has given into the unique dynamics of the Pakistani pharmaceutical industry.

# 3. Findings and Discussions

This section examines the effect of inventory management on the financial performance of pharmaceutical firms in Pakistan by providing a detailed analysis of the results from the regression analyses and correlation studies. To determine if the results are consistent with prior research, these data will be compared to earlier findings from the literature. A critical assessment of the outcomes will also be provided.

The purpose of the first regression study was to look at the connection between inventory control and Return on Assets (ROA). Numerous statistically significant correlations between ROA and several independent variables were found, according to the findings. Let's look at

these results in light of previous research and assess their implications. The Inventory Turnover Ratio's positive correlation coefficient implies a relationship between rising inventory turnover and rising ROA. According to the research, effective inventory management increases a company's profitability (Muchaendepi et al., 2019; Mbah et al., 2019). This study is consistent with that conclusion. According to the theory behind this link, a company that sells its goods more rapidly would have lower holding costs and better cash flow. This is in line with the Efficiency Theory, which holds that effective inventory turnover may reduce costs and increase profitability (Farooq, 2019). Positive current asset and current ratio coefficients imply a negative correlation between current asset and current ratio and ROA. This conclusion is noteworthy and could represent a compromise between profitability and liquidity. Excessive liquidity invested in current assets might result in lower returns on such investments, which would have a detrimental effect on profitability. This finding supports the notion that improving financial performance cannot always be achieved by just amassing a large amount of current assets (Zhao & Tu, 2021). To maximise asset utilisation and sustain liquidity, pharmaceutical businesses in Pakistan must find a balance to increase ROA.

The association between inventory control and Return on Equity (ROE) was investigated in the second regression study. Similar to the ROA study, substantial relationships between several independent factors and ROE were identified. Let's examine these results in more detail and weigh their ramifications in light of earlier studies. Indicating that effective inventory management impacts a company's return to its equity holders (shareholders), the Inventory Turnover Ratio shows a positive link once again. The results of Muchaendepi et al. (2019), who emphasised the significance of inventory management practises in improving financial performance, are corroborated by this. According to the Trade-off Theory, which proposes an ideal amount of inventory to maximise profitability, a greater inventory turnover may result in better resource allocation and enhanced profitability.

Higher amounts of long-term borrowing may make it more difficult for a company to provide returns for its shareholders, according to the negative link between long-term borrowings and ROE. This result is consistent with how financial leverage is discussed in the literature and how it affects profitability (Orobia et al., 2020). Excessive dependence on long-term debt might result in higher interest costs, which could lower net income and, in turn, ROE. It emphasises how crucial it is to balance debt and equity financing to maximise ROE. ROA and ROE show favourable connections with sales and EBIT. This emphasises their value in raising

profitability. Financial success is directly impacted by an increase in sales revenue coupled with a rise in profitability before interest and taxes. These results are consistent with the Resource-Based View (RBV) philosophy, which emphasises the use of special resources and skills, including management skills, to establish a long-term competitive advantage. Effective managers may make judgements about inventory levels, demand projections, and cost reductions that will have a beneficial effect on sales and EBIT.

The goal of the correlation study was to confirm the correlations between the variables. The findings provide important light on the connections between other important variables, like ROA and ROE, and the Inventory Turnover Ratio. The Inventory Turnover Ratio's importance in enhancing financial success is shown by the favourable link between it and both ROA and ROE. This result supports other studies (Muchaendepi et al., 2019; Mbah et al., 2019) and emphasises the significance of effective inventory management techniques in Pakistani pharmaceutical firms. The correlation between effective inventory management and improved returns for equity holders, a key indicator for shareholders and prospective investors, is favourable. The significance of revenue creation and profitability in boosting financial success is shown by the favourable correlations between Sales, EBIT, and both ROA and ROE. Higher sales and profitability often translate into stronger returns on assets and equity for companies. The RBV hypothesis, which emphasises the importance of management proficiency and resource optimisation in obtaining a competitive advantage, is compatible with this conclusion (Orobia et al., 2020).

The results of the regression and correlation studies provide important light on the connection between inventory control and financial success in Pakistan's pharmaceutical industry. However, it's important to understand certain important factors and limitations:

- Although the studies show strong correlations, it is difficult to prove a causal relationship. These results show correlations between variables but do not establish that modifications to inventory control directly impact financial performance. There could be other unseen forces at work.
- The conclusions are based on the data at hand, which may have drawbacks in terms of representativeness, sample size, and data quality. It's crucial to take into account whether the conclusions apply outside of the Pakistani pharmaceutical firms that were tested.
- Beyond inventory management, other internal and external variables can have an impact on financial success. The evaluations fall short of fully capturing the pharmaceutical

industry's complexity, which includes changes in regulations, market dynamics, and competitive pressures.

- Results might be impacted by endogeneity, which happens when the dependent variable impacts the independent variable. For instance, a company's financial success could affect how it manages its inventory.
- The research assumes that inventory management will immediately affect financial performance. In practice, it could take some time for the effects to manifest.
- The pharmaceutical sector is distinct in its traits and difficulties. Results may not be immediately applicable to other industries.

The study's findings reveal that effective inventory management techniques, as indicated by the Inventory Turnover Ratio, have a favourable effect on the financial performance of Pakistani pharmaceutical enterprises. However, it is essential to interpret these results cautiously, taking into account the industry's complexity and its constraints. The interplay between inventory management and financial performance in this situation may be better understood by further studies, such as longitudinal studies and qualitative evaluations. These results provide useful information for pharmaceutical companies and other interested parties looking to improve financial results in Pakistan's particular business climate by optimising their inventory practices.

# 4. Conclusion

The analysis's conclusions have important ramifications for Pakistani pharmaceutical firms by illuminating the crucial link between effective inventory management techniques and financial success. This section's summary of the study's main findings highlights the significance of effective inventory management while also making suggestions for further study and real-world applications.

## **6.1. Practical Implications**

The study highlights how important inventory management is for improving financial performance, especially the Inventory Turnover Ratio. Pakistani pharmaceutical companies need to understand the benefits of simplifying their inventory control procedures. These businesses may increase profitability by cutting surplus inventory and boosting turnover rates, which is particularly important given the regulatory complexity of the pharmaceutical industry.

- The inverse link between Current Assets and Current Ratio and Return on Assets (ROA) emphasises the need to keep liquidity in Check while also Maintaining Profitability. Even while keeping sufficient liquidity is crucial for corporate operations and regulatory compliance, investing excessively in current assets might result in lower asset returns. To achieve this equilibrium, pharmaceutical businesses should use careful working capital management techniques.
- The research shows that having more long-term debt is linked to worse ROE, highlighting the importance of the debt-equity ratio in terms of financial performance. Pharmaceutical companies must carefully manage their financial structure to avoid relying too heavily on long-term debt. Companies may protect their capacity to provide positive returns for their shareholders by maintaining an optimal balance between long-term debt and equity.
- The pharmaceutical sector in Pakistan works in a unique environment characterised by strict regulatory standards, varying demands, and the crucial responsibility of assuring access to important medications. The study's conclusions are therefore very pertinent to this industry. These insights may help pharmaceutical businesses negotiate the challenges of their sector and match their inventory management procedures to desired financial success.

# 6.2. Future Study

- Future studies may concentrate on performing studies over time to look at how the linkages between inventory management and financial performance change. This would provide important information on whether the impacts of inventory management practises are long-lasting and if they vary over time.
- Comparative research across several areas and sectors may be used to determine how generalizable the results are. Researchers may provide a wider perspective on the topic by looking at how inventory management affects financial performance in various circumstances.
- More complete models might be produced by extending the research's focus to include other elements including supply chain management techniques, macroeconomic situations, and regulatory changes. These models could provide a more complete picture of the dynamics of the pharmaceutical business by capturing the many different factors that affect financial success.
- While quantitative analyses offer insightful information, qualitative assessments based on discussions with business executives and industry professionals through surveys or

interviews can provide a richer understanding of the real-world issues and solutions surrounding inventory management in Pakistan's pharmaceutical industry.

## **6.3. Practical Consequences**

The results of this research may be used by pharmaceutical businesses in Pakistan to guide their inventory management plans. These businesses may attempt to improve their financial performance by concentrating on the following practical implications:

- Use strategies for inventory optimisation to find the ideal balance between keeping enough stock levels and reducing holding expenses. This entails enhancing demand forecasting, implementing lean inventory procedures, and maximising efficiency using inventory management software.
- Building strong working capital management strategies can help to guarantee that existing assets are used wisely. Determine the trade-offs between profitability and liquidity, and then use that information to decide how much money to keep in cash, accounts receivable, and inventory.
- Balance long-term debt with equity financing as you carefully analyse the capital structure. To lessen the detrimental effect on ROE, maintain financial stability while avoiding excessive dependence on external borrowing.
- Keep abreast of how the pharmaceutical industry's regulations are changing. Maintaining market access and reputation depends on maintaining compliance with quality and safety norms.

In conclusion, this study emphasises the crucial part inventory management plays in determining the financial success of Pakistani pharmaceutical enterprises. Improving ROA and ROE requires effective inventory control systems, responsible working capital management, and a balanced capital structure. The results allow for studying the relationships between inventory management and financial performance in more depth and serve as a basis for future research attempts. In the end, these insights provide pharmaceutical companies with the information they need to deal with the particular difficulties faced by their sector and improve their financial results in Pakistan's changing economic environment.

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