University of Tehran Press

Interdisciplinary Journal of Management Studies (IJMS)
Home Page: https://ijms.ut.ac.ir

Online ISSN: 2981-0795

Developing a Competitiveness Index for Manufacturing Firms: Insights from Pakistan

Muhammad Ehsan Javaid[1*] | Syed Hassan Raza[2]

1. Corresponding Author, Department of Business Administration, Allama Iqbal Open University Islamabad, Pakistan. E-mail: ehsan.javaid@aiou.edu.pk
2. Department of Business Administration, Allama Iqbal Open University Islamabad, Pakistan. E-mail: hassan_raza@aiou.edu.pk

ARTICLE INFO

Article type:
Research Article

Article History:
Received 13 June 2024
Revised 20 January 2025
Accepted 18 February 2025
Published Online 01 June 2025

Keywords:
Competitiveness,
Intellectual capital,
Principal component analysis,
Manufacturing,
Income diversification,
Composite index.

ABSTRACT

Assessing and improving the firm's competitiveness is essential in turbulent economic conditions. Factors of the APP model are treated to quantify the competitiveness of PSX-listed manufacturing firms using data from 2010 to 2021. Firstly, principal component analysis is applied to construct individual indices. In the second step, these indices are aggregated to develop a composite index. The results confirmed that each factor of the APP model contributes positively to a firm's competitiveness. However, asset factors are more prominent than process and performance factors. It is confirmed that firm competitiveness remains consistent as firms move from low to highly competitive zones over time.

Cite this article: Javaid, M. E. & Raza, H. (2025). Developing a Competitiveness Index for Manufacturing Firms: Insights from Pakistan. *Interdisciplinary Journal of Management Studies* (*IJMS*), 18 (3), 507-523. http//doi.org/10.22059/ijms.2025.378004.676806

 Publisher: University of Tehran Press.
DOI: http//doi.org/10.22059/ijms.2025.378004.676806

Introduction

In today's dynamic world, competitiveness helps firms to improve their production, quality, and employability, explore new markets, and outperform existing market conditions. It is defined as the potential to compete in the business successfully and do so better than others in a contemporary dynamic environment (Falciola et al., 2020; Porter, 2008). Competitiveness is one of the most important themes in strategic management studied over the past 30 years. The wave of globalization in the contemporary era necessitates the reconceptualization of all existing traditional concepts, such as firm-level competitiveness and related theories, to verify their authenticity in light of current dynamics (Falciola et al., 2020). This issue must be addressed because, with the increasing pace of change, it is crucial for firms to continuously examine the factors that contribute to competitiveness (Gupta et al., 2024; Sardana et al., 2016).

Problem Statement

In the existing literature, firm competitiveness is measured using proxies such as profitability and productivity as well as the indices based on these two measures, which fail to capture the dynamic nature of the concept holistically and do not give any control to the managers to sustain or improve firm competitiveness. This study will address this problem by developing a comprehensive firm competitiveness index based on the APP (asset, process and performance) model proposed by Momaya (2019). This index will also help managers of firms in developing economies like Pakistan systematically improve their competitiveness and overall economic performance.

Porter (1990) coined the term competitiveness, but at the national level. Krugman (1994) argued that the focus should be on firm-level competitiveness because it is the firm, not the nation, that is involved in manufacturing goods and services and developing a competitive advantage. For a country to maintain a dignified, competitive position in today's globalized world, it depends on the competitiveness of its manufacturing sector (Sardana et al., 2016). Gupta et al. (2024) confirmed that, over time, business dynamics change.

The existing literature explains firm-level competitiveness using independent measures, such as profitability, productivity, performance, efficiency and strategic alignment (Javaid & Afridi, 2015; Le et al., 2018; Porter, 1990; Sardana et al., 2016). Another stream of research assumes that competitiveness is not a simple but a dynamic concept extended beyond the boundaries of traditional independent measures. That is why there should be a composite index based on diverse aspects to capture the complete picture of the concept as efficiently as possible (Chikán et al., 2022; Falciola et al., 2020; Guo & Lu, 2023; Hurley, 2018 ; Sahoo et al., 2022; Voulgaris & Lemonakis, 2014). Voulgaris and Lemonakis (2014) developed a composite firm competitiveness index based on growth and profitability measures. Falciola et al. (2020) developed a composite firm index based on firm competing capabilities, linked to market information access capabilities and adaptable to changing conditions. Sahoo et al. (2022) developed a competitiveness index based on sales growth, productivity, and profitability. Chikán et al. (2022) established a firm competitiveness index based on market performance, as well as operational and adaptive capabilities. Guo and Lu (2023) developed a composite competitiveness index based on PCA for Chinese construction companies focused on selected firms' performance, process and potential aspects.

Moreover, Nonaka et al. (2000) argue that existing theories of competitiveness are incapable of countering the dynamic concept of firm competitiveness and do not provide any power to the management to control the situation. Momaya (2019) supported the stance of Nonaka et al. (2000). It is essential to design a theory that helps management quantify existing competitiveness and empowers them to either sustain their desired position or improve to a higher level of competitiveness (Momaya, 2019). Therefore, Momaya (2019) proposed the Asset Process and Performance (APP) model. This model explains that firm competitiveness is based on three firm-specific internal factors, as these factors guide management in relation to competitive positioning. Conversely, external environmental factors affect all firms similarly. Only those firms with better internal coordination of the APP will outperform in the external environment (Momaya, 1998, 2019; Momaya & Selby, 1998). A composite index based on the APP model must be developed, as it has an advantage over other competing concepts (Momaya, 1998, 2019; Momaya & Selby, 1998).

Research Question and Objective

The study aims to develop a comprehensive firm competitiveness index based on the firm's assets, processes and performance. Additionally, it seeks to identify which of the three APP factors contributes most significantly and to examine how firm competitiveness evolves over time. By achieving these objectives, the study aims to answer how assets, processes, and performance collectively influence firm competitiveness and how it changes over time.

Research Contribution

This study is contributing to the existing research in the following ways. First, this is the first study to develop a firm-level competitiveness index based on the APP model. Second, this study is the most comprehensive one based on authentic secondary data, which generalized its operationalization globally without compromising comprehension. The major limitation observed in previous literature is that existing indices are largely focused on primary data sources with limited operationalization. Third, this study is not only limited to identifying the firm's overall competitiveness but can also help to categorize the competitiveness of firms individually on asset, process and performance bases. Fourth, this study extends the scope of resource-based theory to explain firm-level competitiveness, as advancements in information technology enable firms to use processes and performance as a resource, similar to assets (including intellectual capital), which was previously impossible. Fifth, this study is contextually contributing as it is focused on manufacturing firms operating in Pakistan and helps to resolve the country's challenges, including severe economic issues, trade deficit due to low exports and high imports, high unemployment, low foreign exchange reserves and low GDP by identifying and improving the competitiveness of its firms.

The rest of the study is systematically divided into four sections. The first section covers the literature review, in which the theoretical evolution of competitiveness is discussed, along with the presentation of recent literature covering each aspect of APP individually. Then, in the data and methodology section, data sources, selected variables and analytical tool are discussed, which are used for result generation. Then comes the result and discussion section, in which each individually developed index and comprehensive competitiveness index are discussed, along with an analysis of firm performance. Lastly, the Conclusion section summarizes the overall study and provides recommendations.

Literature Review

The literature review in the study is divided into three sections. First, it explains the theoretical evolution of firm competitiveness in the contemporary era. Second, it highlights how assets, processes and performance have been previously studied. Third, it explains how limited versions of performance proxies are traditionally used in the literature.

Theoretical Evolution

The emergence of competitiveness is tracked from Smith (1863) absolute advantage theory to Ricardo (1817) comparative advantage theory. Still, some major issues were unaddressed, which were answered by Heckscher (1919) and Ohlin (1933). While Leontief (1953) rejected the stance of the comparative advantage theory by highlighting US trade flows, he noted that, despite being capital intensive, US exports are more labor intensive, whereas imports are capital intensive. To resolve Leontief's (1953) paradox, Linder (1961) and Corden (1970) presented the home market effect view, whereas Vernon (1979) proposed the product life cycle (PLC) theory, which explains that it is the life cycle stage of the product that sometimes results in exports from the producer and, at other times, the original producer importing the same product from other economies. However, after economies like Singapore and Hong Kong outperformed competing countries without abundant resources, the concept of competitiveness emerged, which was previously considered a synonym for comparative advantage (Porter, 1990).

The initial idea of competitiveness was proposed at the national level by Porter (1990), Rugman and D'cruz (1993), Moon et al. (1998), Moon and Cho (2000), and Cho et al. (2009). This idea was subsequently trickled down to the industry level by Schmalensee (1985), Momaya (1998), and Banwet et al. (2003). However, Krugman (1994) rejected the stance of competitiveness at the national level,

asserting that it is the firm involved in the competition, not the country. This rationale was so justified and logical that it opened the doors for firm-level competitiveness. The resource-based theory claims that if a firm holds more resources, it is more competitive (Barney, 1991; Wernerfelt, 1984). Hamel and Prahalad (1989) stated that core competencies provide a competitive advantage. Ajitabh and Momaya (2004) explained that competitiveness is not a simple phenomenon based solely on resources (assets) or competencies (processes). It is a complex phenomenon in which firm assets are utilized in different processes to generate outcomes on which performance is gauged. This, overall, results in competitiveness at the firm level (Momaya, 2019).

Assets Competitiveness

The literature highlighted different types of assets that significantly boost firm competitiveness. Liquidity potential helps firms enhance competitiveness by providing financial power and strategic stability through maintaining strong relationships with suppliers and creditors (Baby et al., 2024). This also gives the firm a competitive edge and increases firm negotiation power due to timely payments that reduces the firm's liquidity risk, ultimately enhancing investor's confidence (Baby et al., 2024; Habib & Dalwai, 2024; Hassan et al., 2023; Hatane et al., 2023; Hussain et al., 2021; Muhammad et al., 2015; Yameen et al., 2019).

Productive potential helps the firm meet growing demands and shape overall production. Firms inclined towards innovation strongly emphasize the firm's growing productive potential to achieve differentiation and cost leadership goals (Agazu & Kero, 2024). Effective and efficient productive assets help the firm maximize its capacity while maintaining quality output. It also proved to be a source of differentiation, which acts as a competitive edge for firms in the contemporary era (Agazu & Kero, 2024; Ahmad et al., 2023; Kamasak, 2017; Lazăr, 2016; Saif Ul Islam et al., 2022).

Large firms have an competitive edge over small firms as they can access more avenues of financial resource generation on easy terms and conditions (Shawat et al., 2024; Trisnawati et al., 2024). Due to this reason, large-size firms are in a better position to avail investment opportunities (Raditya et al., 2024). It is an essential aspect that enables firms to achieve economies of scale by diversified business activities across markets (Jung & Shegai, 2023; Linh, 2021; Noone et al., 2024; Rahman & Yilun, 2021).

Intellectual capital contributes notably to the firm's sustainable performance, growth, development, and resilience in retaining competitiveness (Ahmad, 2024). It is a diverse concept that includes human, structural, and relational capital (Abdallah et al., 2024). In various ways, all of these enable the firm to innovate in current dynamic business environments and sustainably adapt to the changing future market conditions (Thi Nhat Minh & Dinh Nguyen, 2024). In comparison to other balance sheet assets, these off-balance sheet assets are quite difficult to copy; that is why they provide a strong foundation for sustainable competitive advantage for the firm (Abdallah et al., 2024; Ahmad, 2024; Bayraktaroglu et al., 2019; Boso et al., 2023; Habib & Dalwai, 2024; Kurniawan & Muharam, 2021; Ovechkin et al., 2021; Thi Nhat Minh & Dinh Nguyen, 2024). The preceding discussion logically leads us to test the following hypothesis:

H1: Assets significantly contribute to firm competitiveness.

Processes Competitiveness

Firm processes are the significant pillar responsible for the firm's overall competitiveness, as confirmed by Momaya (2019). Agazu and Kero (2024) confirmed that firm processes are pivotal in extracting the best out of firm assets, which are responsible for sustainable competitiveness. As the firm outperforms the competition by reducing costs, improving adaptability and agility, enhancing quality, ensuring diversified income generation, it gains and sustains a competitive advantage over others (AlMulhim, 2023; Cheng et al., 2023; Momaya, 2019; Thakur & Arora, 2024; Wang et al., 2022).

The exiting literature confirms that production and administration activities substantially contribute to overall firm cost and often exhibit a sticky behavior in which increasing cost is experienced with increased production and administrative activities (Costa & Habib, 2023). However, a decrease in cost is not observed in the event of reduced production and administrative activities. Therefore, there is a negative relationship between cost stickiness and firm market value (Costa & Habib, 2023). When

firms focus on strategic cost management activities, they enable the adoption of both technological and environmental activities, which predominately reduces production and administrative costs, leading to improved overall firm competitiveness (AlMulhim, 2023; Cheng et al., 2023; Csiki et al., 2023; Gitau, 2021; Istan et al., 2021; Kisyeri, 2022; Lusiana & Kristianti, 2020; Rounaghi et al., 2021; Serrano-García et al., 2023; Walid, 2021).

Furthermore, inventory management is also a fundamental activity of business engagement for the smooth conduct of overall business operations. Proper inventory management reduces the cost of carrying required inventory and prevents stockout and excess inventory (Panigrahi et al., 2024). Costa and Habib (2023) confirmed that the operational efficiency of firms, especially SMEs, is directly associated with the firm's inventory management practices as it reduces the risk associated with inventory while facilitating the production process (Alam et al., 2024; Mahajan et al., 2024; Panigrahi et al., 2021; Panigrahi et al., 2024; Rashid & Rasheed, 2023).

Lastly, income diversification is a strategic approach, preventing the firm from having a smooth and stable inflow of earnings 24/7 despite facing any volatility or uncertainty in the business (Ben Lahouel et al., 2024). Jumah et al. (2024) confirmed that corporations involved in diversified investments during political uncertainty are in a better position compared to those firms in various economies that are reluctant to perform income diversification activities. The literature also confirms that income diversification enables the firm to effectively and efficiently mitigate risks while providing flexibility to adjust to dynamic economic conditions. It helps the firm to achieve financial stability and build investor confidence, maintaining a competitive edge over others (Githaiga, 2023; Kaur & Bansal, 2024; Phan et al., 2022; Thakur & Arora, 2024; Uddin et al., 2022; Wang et al., 2022). The preceding discussion logically leads us to test the following hypothesis:

H2: Processes significantly contribute to firm competitiveness.

Performance Competitiveness

Performance measures are also deemed highly important as they set the foundation for firm motivation to excel and confirm the achievement of overall objectives efficiently and effectively (Lebas, 1995). Demirbag et al. (2006) confirmed that firms need proper performance evaluation tools and techniques; otherwise, overall performance and competitiveness are hampered and derailed. There are various proxies to gauge the firm performance from different aspects; however, after classification, there remains two primary divisions: objective and subjective. The subjective or soft measures are qualitative and provide in-depth information; they lack generalizability (Al-Matari et al., 2014). Objective measures are more authentic and produce consistent and reliable results than subjective measures (Richard et al., 2009; Tayeh et al., 2015). Richard et al. (2009) highlighted that objective measures are further divided into accounting and market-based measures, which have pros and cons. Gentry and Shen (2010), and Al-Matari et al. (2014) confirmed that a mixture of accounting and market-based measures should be used to depict the true performance picture. Barton et al. (2010) argued that no single measure is efficient enough to capture the spectrum of firm performance. However, Aliabadi et al. (2013) confirmed that ROA is the most suitable single option to gauge firm performance. Looy and Shafagatova (2016) proposed different models to examine firm performance, but they are limited to hard measures. Rahman et al. (2017) stated that earning per share (EPS) provides important and highly focused information regarding firm performance, capturing firm insight for existing shareholders compared to ROA. Arbelo et al. (2021) claimed that stochastic frontier models are to be used to evaluate firm performance based on existing issues reported in the literature. Korhonen et al. (2023) highlighted that the firm's success in the current dynamic environment, as proxied by a metric, significantly shapes firm success and competitiveness. This underscores the importance of coherent performance measures in achieving the desired competitiveness. Sardi et al. (2023) provided extended support for developing a performance measurement system based on coherent factors by integrating big data sources. Rompho (2024) further supported the existing literature and confirmed that firms can achieve competitiveness if they use their objectives and key results to guide their performance-related decisions. All these findings support the notion proposed by Chen et al. (2015b) that an index based on mixed financial and market measures, such as ROA, EPS,

and market capitalization, addresses shareholders, investors, and stakeholders in the best possible manner (Korhonen et al., 2023; Rompho, 2024; Sardi et al., 2023).

On the contrary, Baby et al. (2024) believed that internal financial performance aspects are more important than external market or economic aspects for manufacturing sector performance measurement as the internal measures of performance are in control of the management, while the economic and market measures are beyond their control. On the other hand, Amarasuriya et al. (2024) confirmed that external environmental performance factors are more important as they lack bias or window dressing normally performed by firms while reporting internal financial performance.

This indicates that internal and market performance measures are considered to examine their contribution to firm competitiveness. The preceding discussion logically leads us to test the following hypothesis.

H3: Performance significantly contributes to firm competitiveness.

Data & Methodology

The data in this study is collected from the firm's annual reports, OSIRIS database, and the State Bank of Pakistan from 2010 to 2021. Those manufacturing companies incorporated before the study period and/or fall into the default section are not considered in this study (Javaid & Afridi, 2015). The reason for excluding the firms in the default section of PSX is that they do not meet the regulatory requirements of PSX and have ceased to be operational (in some cases), which puts them out of competition. Competitiveness is a long-term phenomenon among competing firms (Barney et al., 2001; Porter, 2008). In light of the default, firms often compromise the quality of the index (Voulgaris & Lemonakis, 2014). Additionally, firms incorporated during the study period lack adequate operational history, rendering them unsuitable for analysis, as they may distort the results. A total of 237 manufacturing firms were selected and listed on the Pakistan Stock Exchange during the study period, representing various sectors, including textile spinning, textile weaving, textile composite, chemicals, cement, sugar, fertilizers, and pharmaceuticals. These firms are located throughout Pakistan, primarily in Karachi, Lahore, Faisalabad, Gujranwala, and Sialkot.

Table 1. Factors and Measures

Factor	Variables	Measures
Asset	Liquid Potential (LP)	Current Ratio
	Productive Potential (PP)	Productive Asset to Total Assets
	Firm Size (FS)	Log of total sales
	Human Capital (HC)	HCE= VA to HC HC = Salaries and Wages VA= Operating Profit plus Employee Cost plus Depreciation and Amortization
	Structural Capital (SC)	SCE=SC to VA SC= VA minus HC
	Relational Capital (RC)	RCE= RC to VA RC=Marketing Cost
Processes	Inventory Management Activities (IMA)	Inventory Turnover
	Income Diversification Activities (IDA)	Log of Other Comprehensive Income
	Production Related Activities (PA)	Log of Cost of Goods Sold
	Administration Related Activities (AA)	Log of Selling, General & Administrative Expenses
Performance	Market Capitalization (MC)	Share market price multiplied by the total number of outstanding shares
	Return on Asset (ROA)	Operating income/ total assets
	Earnings Per Share (EPS)	Net Income/ No of Shares Outstanding

The steps for constructing the composite firm competitiveness index are guided by Voulgaris and Lemonakis (2014), and Falciola et al. (2020). In the first step, all asset, process and performance factors are identified along with their proxy measure (mentioned in Table 1) and standardized through z-score. In the second step, the principal component analysis (PCA) is used to extract the weights in

each APP index (Falciola et al., 2020; Guo & Lu, 2023). The PCA method explains the largest proportion of variation for firm competitive assets, processes and performance, separately (Guo & Lu, 2023). In the third step, weight (loading) is multiplied by their raw value to construct the index. In the fourth step, a composite index of the firm competitive index is calculated by taking the arithmetic mean of the above-constructed three indices (Mazziotta & Pareto, 2020; Union & Centre, 2008).

In the last step, the newly developed firm competitive index is standardized to get a value between 0 and 100, in which 0 indicates no competitiveness while 100 indicates the maximum competitiveness of the firm using Fischer and Schornberg (2007) directions.

$$SFCII_{i,t} = ((\text{RFCI}_{i,t} - \text{Min RFCI}) / (\text{Max RFCI} - \text{Min RFCI})) * 100$$

Here, SFCI indicates a standardized firm competitiveness index, whereas RFCI represents raw firm competitiveness index values for the firm; Min RFCI represents minimum raw firm competitiveness index values. Max RFCI represents the maximum raw firm competitiveness index values for the firm, i represents the firm, and t represents the year.

Furthermore, firms are classified based on their competitiveness using the Voulgaris and Lemonakis (2014) approach, as mentioned below.

- Highly Competitive Firms (>+1 S.D)
- Average Competitive Firms (-1S. D and +1 S.D)
- Low Competitive Firms (<-1 S.D)

Result and Discussion

All the raw variables selected to measure each index are first standardized. Due to this transformation, all the values get equal importance as the outliers are transformed. The next step is to run a PCA analysis, which checks the correlation among the variables (Guo & Lu, 2023). Table 2 presents the correlation between asset, process, and performance variables, separately. The results confirm that a positive association exists among all variables. Typically, a moderate to high correlation is observed between the variables, which is desirable as it indicates a similar concept (Guo & Lu, 2023).

Subsequently, the suitability of the data is examined for all three indices using the Kaiser-Meyer-Olkin (KMO) test. The value of the KMO test ranges from 0 to 1, with desirable values exceeding 0.5. The KMO values presented in Table 3 confirm the suitability of the data for conducting PCA individually for the three indices. Similarly, Bartlett's test of sphericity is performed, which is significant at the 1% level for all three indices, confirming that the variables are correlated and rejecting the existence of an identity matrix.

Table 2(a). Correlation of Assets

	LP	**PP**	**HC**	**SC**	**RC**	**FS**
LP	1					
PP	0.678	1.000				
HC	0.703	0.651	1.000			
SC	0.561	0.407	0.538	1.000		
RC	0.261	0.148	0.349	0.216	1.000	
LP	0.706	0.694	0.709	0.629	0.338	1.000

Table 2(b). Correlation of Processes

	AA	**PA**	**IDA**	**IMA**
AA	1.000			
PA	0.773	1.000		
IDA	0.553	0.518	1.000	
IMA	0.242	0.427	0.154	1.000

Table 2(c). Correlation of Performance

	MC	**ROA**	**EPS**
MC	1.000		
ROA	0.371	1.000	
EPS	0.283	0.402	1.000

Table 3. Sample Adequacy & Sphericity Test

	Asset	Process	Performance
KMO	0.844	0.662	0.631
Bartlett's Test	12021.457***	4349.869 ***	992.763***

Table 4 extracts the commonalities for each variable in each specific index. High extracted communalities are desired as they represent the variance in explaining their concept or variable. Table 5 indicates that one factor is extracted in each PCA on the eigenvalue criteria. It explains that the factors indicating the maximum variance are selected. Normally, the higher the eigenvalue, the higher the explained variance of the factor will be, which is desirable (Guo & Lu, 2023).

Table 6 presents the component loadings for each index. It illustrates the contribution of each specific variable, with values ranging between -1 and +1. The signs indicate the direction, while the number represent the magnitude of the contribution. The results confirm that FS, LP, HC, and PP are the most influential variables for asset competitiveness. Similarly, PA, AA, and ID are the variables that contribute the most to process competitiveness. Although all three variables are important for performance competitiveness, ROA is the most contributing variable.

Table 4. Communalities

Variables	Extraction
Asset Communalities	
LP	.849
PP	.614
FS	.897
HC	.797
SC	.501
RC	.164
Process Communalities	
AA	.773
PA	.829
IDA	.544
IMA	.259
Performance Communalities	
ROA	.639
EPS	.552
MC	.515

Table 5. Factor Extraction

Asset Factor							
Comp	**Total**	**Percentage of Variance**	**Cumulative Percentage**	**Comp**	**Total**	**Percentage of Variance**	**Cumulative Percentage**
1	3.822	63.695	63.695	2	.906	15.098	78.793
Process Factor							
1	2.405	60.117	60.117	2	.893	22.336	82.453
Performance Factor							
1	1.706	56.880	56.880	2	.719	23.951	80.831

The variable loadings are multiplied by the raw values to calculate the individual indices. Subsequently, the mean of these indices is taken to calculate the composite firm competitive index (Mazziotta & Pareto, 2020; Union & Centre, 2008). The reason for calculating the mean is to give equal weight to asset, process and performance indices, as supported by Momaya (2019), Barney et al. (2001), Porter (1990), and Prahalad and Hamel (1997), who emphasized the equal importance of each APP aspect for firm competitiveness. The loadings of variables in the composite firm competitiveness index are presented in Table 7. A higher loading in the composite index indicates the contribution of that variable to the overall competitiveness of the firm. FS has the highest value of 0.315351, followed by the LP is in second place with 0.306693, and PA in third place with 0.30303. HC scored fourth with 0.297369, while AA ranked fifth with a loading of 0.292707. This clearly indicates that management needs to focus on these factors collectively to improve their production and administrative activities, thereby achieving cost leadership through economies of scale and scope.

Additionally, increasing liquidity and the size of the business will help create barriers for new entrants while reducing the bargaining power of suppliers and customers.

Table 6. Loadings & Rotation

Component	Loading
Asset Index Loading	
LP	.921
PP	.784
FS	.947
HC	.893
SC	.708
RC	.404
Process Index Loading	
AA	.879
PA	.910
IDA	.738
IMA	.509
Performance Index Loading	
ROA	.800
EPS	.743
MC	.718
Rotation: Varimax PCA 1 Factor	

Table 7. Firm Competitiveness Index Loading

Variables	Composite Loading in FCI
LP	0.306693
PP	0.261072
FS	0.315351
HC	0.297369
SC	0.235764
RC	0.134532
AA	0.292707
PA	0.30303
IDA	0.245754
IMA	0.169497
ROA	0.2664
EPS	0.247419
MC	0.239094

Note: Individual loadings are multiplied by 0.333 to obtain the loadings in FCI

The results from Tables 6 and 7 confirm that assets-related factors like the size of the firm, liquidity potential, and human capital are the most important contributors to firm competitiveness (Boso et al., 2023; Gunawan et al., 2022; Habib & Dalwai, 2024; Hassan et al., 2023; Hatane et al., 2023; Jung & Shegai, 2023). Higher individual and composite loadings of these asset factors support the literature, confirming that assets contribute more than process and performance; however, they reject the stance of Momaya (2019) that processes are more influential components than assets and performance. These results align with the resource-based theoretical approach (Barney, 1991; Barney et al., 2001). Moreover, in economies such as Pakistan, firms face financial volatility, operational risks and resource limitations (Boso et al., 2023; Jung & Shegai, 2023). It is critically important for manufacturing firms to maintain effective management of overall firm resources, especially focusing on its liquidity and human capital to gain and maintain a competitive advantage (Habib & Dalwai, 2024; Hassan et al., 2023; Noone et al., 2024).

Furthermore, productive and administrative activities or processes are the most important aspects that management should consider in manufacturing firms across all economies, particularly in Pakistan. By effectively managing these processes, firms can achieve cost-effectiveness, efficiency in resource utilization, improved quality, reduced delays, and flexible adaptability to changing market conditions, ultimately leading to sustainable growth and development (AlMulhim, 2023; Cheng et al., 2023; Csiki et al., 2023; Gitau, 2021; Istan et al., 2021; Kisyeri, 2022; Lusiana & Kristianti, 2020; Serrano-García et al., 2023; Walid, 2021). Additionally, previous studies relying on single measures

cannot completely capture the true picture of the firm's performance (Barton et al., 2010; Chen et al., 2015a). Moreover, Korhonen et al. (2023) and Sardi et al. (2023) confirmed that considering coherent factors helps management make more accurate decisions by creating robust frameworks for decision-making. Integrating ROA, EPS, and MC enables firms to evaluate the performance of manufacturing firms regarding their operational efficiencies and market position from both shareholder's and stakeholder's perspectives (Rompho, 2024).

The results align with the theoretical aspect of the APP model (Momaya, 2019). However, due to Pakistan's stringent financial and economic conditions, manufacturing firm managers must pay more attention to assets than process and performance. Effective management of assets, both tangible and intangible, (Boso et al., 2023; Habib & Dalwai, 2024; Hassan et al., 2023; Hatane et al., 2023) helps in efficiently operationalizing the firm processes through administrative and productive activities (Cheng et al., 2023; Csiki et al., 2023; Kisyeri, 2022; Serrano-García et al., 2023; Walid, 2021), leading to achieving performance objectives evaluated through coherent means (Khidmat & Rehman, 2014; Korhonen et al., 2023; Rompho, 2024; Sardi et al., 2023). It confirms that, here, all the three hypotheses are accepted.

Additionally, the calculated composite firm competitiveness index values are transformed according to the guidelines of Fischer and Schornberg (2007) for better understanding, as the index values range from 0 to 100. Firms are then categorized into Highly Competitive Firms (HCF), Average Competitive Firms (ACF), and Low Competitive Firms (LCF), using the approach outlined by Voulgaris and Lemonakis (2014).

Table 8 displays the year-wise categorization of firms based on their competitiveness. The results indicate that over the years, firm competitiveness improves as the number of HCF increases while the number of LCF decreases. Similarly, ACF numbers also decline. Figure 1 illustrates this phenomenon.

Moreover, the rationale behind the observed trend is that over the years, firms have developed strategies to sustain and enhance their competitiveness by mimicking top performers. As firms learn proper asset handling, process optimization, and performance improvement, they not only sustain themselves but also enhance their competitiveness over time. This may explain the increase in HCF and the decrease in LCF.

Falciola et al. (2020) developed an index based on various dummy variables. Voulgaris and Lemonakis (2014) developed a competitiveness index based only on profitability measures covering the growth aspect while ignoring the assets and processes aspects, which are the foundational factors behind generating a firm's performance. Guo and Lu (2023), in a recent study, based the competitiveness index on factors of potential, processes, and performance, using PCA analysis. However, assets (both balance sheet and off-balance sheet) are completely ignored, despite providing essential input for processes that generate performance, which defines overall firm competitiveness (Ajitabh & Momaya, 2004; Mohammad Shafiee et al., 2024; Momaya, 2019). The index developed in the current study has an advantage over these indices because it establishes the logical link that firms typically use to develop and sustain their competitiveness (Momaya, 2019). It empowers managers, who are the key individuals in the field, to design strategies for utilizing firm assets to produce output, thereby enhancing firm competitiveness (Mohammad Shafiee et al., 2024; Momaya, 2019).

Table 8. Firm Categorization Based on Competitiveness

Year	HCF	ACF	LCF	Total Firms
2010	15	174	48	237
2011	21	175	41	237
2012	20	178	39	237
2013	24	179	34	237
2014	33	170	34	237
2015	36	167	34	237
2016	40	162	35	237
2017	47	153	37	237
2018	49	150	38	237
2019	54	149	34	237
2020	50	147	40	237
2021	63	145	29	237

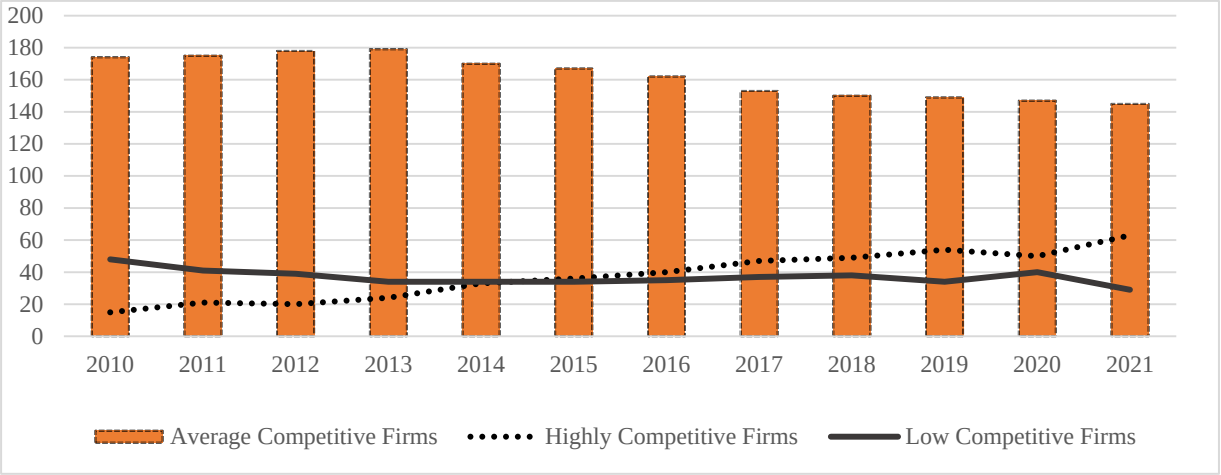

Fig. 1. Segregation of Firms on the SFCI Basis

Furthermore, this index provides a holistic concept by considering all three aspects which are already proved in the literature to be responsible for firm competitiveness. This index is based only on the latest secondary audited financial data measures, which makes it more generalizable, accurate, and authentic. This index is grounded in both Resource-Based View (RBV) theory and the integration of the Asset-Process-Performance (APP) model, while other indices lack such theoretical foundations. Moreover, this index provides actionable insights for enhancing a firm's competitiveness by focusing on specific assets, processes, and performance aspects to improve overall competitiveness. It aims to address the real-time challenges faced by Pakistan's manufacturing sector and other emerging or developing economies. This study employed Principal Component Analysis (PCA) to capture a comprehensive conceptualization of assets, processes, and performance separately, assigning equal proportionate weight to all three aspects, as each is deemed equally important for firm competitiveness according to the available literature.

The results from this study reveal that a firm's competitiveness in an emerging economy, such as Pakistan, significantly depends on its assets, processes, and performance. These results are aligned with Barney et al. (2001); Helfat and Peteraf (2003); Wernerfelt (1984), and Arbelo et al. (2021). However, these results contradict the findings of Guo and Lu (2023), which confirm that processes are a more important factor in firm competitiveness than assets. These results were made after examining Chinese construction firms. The contradiction between the results is due to contextual differences between Pakistani and Chinese economies, specifically in regulatory requirements, resource availability, and infrastructure development.

This study confirmed the multidimensional nature of firm competitiveness, as confirmed by Falciola et al. (2020) and Guo and Lu (2023). The result confirmed that human capital contributes significantly to the manufacturing sector for the firm's competitiveness in emerging economies, productive assets, and liquidity. These results align with the study of Voulgaris and Lemonakis (2014). Furthermore, as suggested by Chen et al. (2015b), accounting and market-based measures capture a true and complete broader picture of firms' performance. Our results also emphasized Chen et al. (2015b) suggestion while opposing the use of single performance measures due to their inability to represent firm performance in its true spirit (Al-Matari et al., 2014; Barton et al., 2010; Rompho, 2024). Moreover, the results of this study align with those of Korhonen et al. (2023) and Rompho (2024), confirming that coherent performance measures are essential for gaining, maintaining and improving firm competitiveness.

Conclusion

Competitiveness is a multidimensional concept responsible for the firm's growth and sustainability in the current dynamic global environment. This study develops a comprehensive composite index based on the APP model for Pakistan's manufacturing sector firms, using data from 2010 to 2021. The results confirmed that all three dimensions of the APP model are positively related to firm competitiveness.

However, asset factors are the most significant contributors to the competitiveness of Pakistan's manufacturing sector firms, supporting the RBV approach.

This study highlights that Pakistan's manufacturing sector firms must prioritize asset optimization to develop and sustain their competitive advantage. The firms need to enhance their liquidity position and productive capability. They also need to focus on their employee development, which ultimately leads to giving the firm operational and strategic excellence compared to their competitors (Ramzan & Lau, 2023). This study also pointed out that management needs to improve not only their production activities but also their administrative processes that enable the firm to get cost efficiency, agility and resilience in dynamic working conditions (Cheng et al., 2023; Fan & Liu, 2017; Lusiana & Kristianti, 2020). It advises firm management to base their performance evaluation mechanism on ROA, EPS and market capitalization, as these are collective comprehensive measures that address all the stakeholders' internal and external performance aspects (Rahman et al., 2017; Sardi et al., 2023).

Furthermore, this study suggests that policymakers and regulators must provide an environment where firm management should engage in capacity development activities and improve resource access. Establishing public-private partnerships would be a beneficial approach, as they provide security access to funds and resources, optimize production and administrative processes, enhance performance output, and confer a competitive advantage.

Despite this, the APP model provides a robust concept for gauging and improving firm competitiveness. A significant gap exists in theory and practice. The major reason for this in Pakistan and other emerging economies is attributed to challenges such as resource constraints (Barney et al., 2001), political and economic instability (Hussain et al., 2021), operational inefficiencies (Panigrahi et al., 2024), and lack of infrastructure support, which limit the applicability of the theoretical concept in its true letter and spirit. Moreover, while this concept is logically appealing and comparatively new, firm executives are unwilling to delegate management authority (Momaya, 2019). This gap is quite evident in emerging economies like Pakistan.

References

Abdallah, A. S., Amin, H., Abdelghany, M., & Elamer, A. A. (2024). Antecedents and consequences of intellectual capital: a systematic review, integrated framework, and agenda for future research. *Management Review Quarterly*, 1-52. https://dx.doi.org/10.1007/s11301-024-00454-9

Agazu, B. G., & Kero, C. A. (2024). Innovation strategy and firm competitiveness: a systematic literature review. *Journal of Innovation and Entrepreneurship*, *13*(1), 24. https://dx.doi.org/10.1186/s13731-024-00381-9

Ahmad, F. (2024). The Relationship Between Intellectual Capital, Financial Stability, Firm Performance, Market Value, and Bankruptcy Risk: Empirical Evidence from Pakistan. *Journal of the Knowledge Economy*, 1-49. https://dx.doi.org/10.1007/s13132-024-02055-z

Ahmad, N., Shah, F. N., Ijaz, F., & Ghouri, M. N. (2023). Corporate income tax, asset turnover and Tobin's Q as firm performance in Pakistan: Moderating role of liquidity ratio. *Cogent Business & Management*, *10*(1), 2167287. https://dx.doi.org/10.1080/23311975.2023.2167287

Al-Matari, E. M., Al-Swidi, A. K., & Fadzil, F. H. B. (2014). The measurements of firm performance's dimensions. *6*(1), 24. http://dx.doi.org/10.5296/ajfa.v6i1.4761

Alam, M. K., Thakur, O. A., & Islam, F. T. (2024). Inventory management systems of small and medium enterprises in Bangladesh. *Rajagiri Management Journal*, *18*(1), 8-19. https://dx.doi.org/10.1108/RAMJ-09-2022-0145

Aliabadi, S., Dorestani, A., & Balsara, N. (2013). The most value relevant accounting performance measure by industry. *13*(1), 22-34.

AlMulhim, A. F. (2023). The impact of administrative management and information technology on e-government success: The mediating role of knowledge management practices. *Cogent Business & Management*, *10*(1), 2202030. https://dx.doi.org/10.1080/23311975.2023.2202030

Amarasuriya, S., Burke, G., & Hsu, T. K. (2024). Operational Competitiveness and the Relationship between Corporate Environmental and Financial Performance. *Journal of Risk and Financial Management*, *17*(8), 364. https://dx.doi.org/https://dx.doi.org/10.3390/jrfm17080364

Arbelo, A., Arbelo-Pérez, M., & Pérez-Gómez, P. (2021). Profit efficiency as a measure of performance and frontier models: a resource-based view. *24*(2), 143-159. https://dx.doi.org/10.1177/2340944420924336

Baby, A., Mia, M. A., & Pitchay, A. A. (2024). A systematic review of financial performance in the manufacturing industry. *Future Business Journal*, *10*(1), 1-20. https://dx.doi.org/10.1186/s43093-024-00353-1

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99-120. https://dx.doi.org/10.1177/014920639101700108

Barney, J., Wright, M., & Ketchen Jr, D. J. J. J. o. m. (2001). The resource-based view of the firm: Ten years after 1991. *27*(6), 625-641. https://dx.doi.org/10.1177/014920630102700601

Barton, J., Hansen, T. B., & Pownall, G. (2010). Which performance measures do investors around the world value the most—And why? , *85*(3), 753-789. https://dx.doi.org/10.2308/accr.2010.85.3.753

Bayraktaroglu, A. E., Calisir, F., & Baskak, M. (2019). Intellectual capital and firm performance: an extended VAIC model. https://dx.doi.org/10.1108/JIC-12-2017-0184

Ben Lahouel, B., Taleb, L., Ben Zaied, Y., & Managi, S. (2024). Financial stability, liquidity risk and income diversification: evidence from European banks using the CAMELS–DEA approach. *Annals of Operations Research*, *334*(1), 391-422. https://dx.doi.org/10.1007/s10479-022-04805-1

Boso, R. K., Adusei, E., & Demah, E. (2023). How does green intellectual capital affect environmental performance? Evidence from manufacturing firms in Ghana. *Social Responsibility Journal*, *19*(7), 1178-1195. https://dx.doi.org/10.1108/SRJ-12-2021-0503

Chen, C. M., Delmas, M. A., & Lieberman, M. B. (2015a). Production frontier methodologies and efficiency as a performance measure in strategic management research. *Strategic management journal*, *36*(1), 19-36. https://dx.doi.org/10.1002/smj.2199

Cheng, B., Guo, Z., Xiong, T., & Qiu, B. (2023). Does the administrative approval reform impact firm's investment decisions? *International Review of Economics & Finance*, *88*, 1052-1067. https://dx.doi.org/10.1016/j.iref.2023.07.034

Costa, M. D., & Habib, A. (2023). Cost stickiness and firm value. *Journal of Management Control*, *34*(2), 235-273. https://dx.doi.org/10.1007/s00187-023-00356-z

Csiki, O., Demeter, K., & Losonci, D. (2023). How to improve firm performance?–The role of production capabilities and routines. *International Journal of Operations & Production Management*, *43*(13), 1-26. https://dx.doi.org/10.1108/IJOPM-03-2022-0221

Demirbag, M., Tatoglu, E., Tekinkus, M., & Zaim, S. (2006). An analysis of the relationship between TQM implementation and organizational performance: evidence from Turkish SMEs. https://dx.doi.org/10.1108/17410380610678828

Falciola, J., Jansen, M., & Rollo, V. (2020). Defining firm competitiveness: A multidimensional framework. *World Development*, *129*, 104857. https://dx.doi.org/10.1016/j.worlddev.2019.104857

Fan, Y., & Liu, X. (2017). Misclassifying core expenses as special items: Cost of goods sold or selling, general, and administrative expenses? *Contemporary Accounting Research*, *34*(1), 400-426. https://dx.doi.org/10.1111/1911-3846.12234

Fischer, C., & Schornberg, S. (2007). Assessing the competitiveness situation of EU food and drink manufacturing industries: An index-based approach. *Agribusiness: An International Journal*, *23*(4), 473-495. https://dx.doi.org/10.1002/agr.20139

Gentry, R. J., & Shen, W. (2010). The relationship between accounting and market measures of firm financial performance: How strong is it? *Journal of Managerial Issues*, 514-530. https://www.jstor.org/stable/25822528

Gitau, B. N. (2021). Effect of Cost Management on Financial Performance of Agribusiness Enterprises in Kenya.

Githaiga, P. N. (2023). Intellectual capital and bank performance: the moderating role of income diversification. *Asia-Pacific Journal of Business Administration*, *15*(4), 509-526. https://dx.doi.org/10.1108/APJBA-06-2021-0259

Guo, H., & Lu, W. (2023). Measuring competitiveness with data-driven principal component analysis: A case study of Chinese international construction companies. *Engineering, Construction and Architectural Management*, *30*(4), 1558-1577. https://dx.doi.org/10.1108/ECAM-04-2020-0262

Habib, A. M., & Dalwai, T. (2024). Does the efficiency of a firm's intellectual capital and working capital management affect its performance? *Journal of the Knowledge Economy*, *15*(1), 3202-3238. https://dx.doi.org/10.1007/s13132-023-01138-7

Hassan, M. K., Aysan, A. F., Kayani, U. N., & Choudhury, T. (2023). Working capital as a firm performance savior? Evidence from Scandinavian countries. *Research in International Business and Finance*, *65*, 101959. https://dx.doi.org/10.1016/j.ribaf.2023.101959

Hatane, S. E., Winoto, J., Tarigan, J., & Jie, F. (2023). Working capital management and board diversity towards firm performances in Indonesia's LQ45. *Journal of Accounting in Emerging Economies*, *13*(2), 276-299. https://dx.doi.org/10.1108/JAEE-11-2018-0130

Heckscher, E. F. (1919). *The effect of foreign trade on the distribution of income*.

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic management journal*, *24*(10), 997-1010. https://dx.doi.org/10.1002/smj.332

Hurley, C. O. (2018). MSME competitiveness in small island economies: a comparative systematic review of the literature from the past 24 years. *Entrepreneurship & Regional Development*, *30*(9-10), 1027-1068. https://dx.doi.org/10.1080/08985626.2018.1515822

Hussain, S., Nguyen, V. C., Nguyen, Q. M., Nguyen, H. T., & Nguyen, T. T. (2021). Macroeconomic factors, working capital management, and firm performance—A static and dynamic panel analysis. *Humanities and Social Sciences Communications*, *8*(1), 1-14. https://dx.doi.org/10.1057/s41599-021-00778-x

Istan, M., Husainah, N., Murniyanto, M., Suganda, A., Siswanti, I., & Fahlevi, M. (2021). The effects of production and operational costs, capital structure and company growth on the profitability: Evidence from manufacturing industry. *Accounting*, *7*(7), 1725-1730.

Javaid, M. E., & Afridi, M. A. (2015). Determinants of competitiveness in textile industry of Pakistan. *61*, 105-115. https://dx.doi.org/10.18052/www.scipress.com/ILSHS.61.105

Jumah, Z., Safdar, N., Younas, Z. I., Islam, T. U., & Manzoor, W. (2024). The effect of corporate diversification on corporate investment during economic policy uncertainty: global evidence. *Managerial Finance*. https://dx.doi.org/10.1108/MF-04-2024-0246

Jung, S.-U., & Shegai, V. (2023). The impact of digital marketing innovation on firm performance: Mediation by marketing capability and moderation by firm size. *Sustainability*, *15*(7), 5711. https://dx.doi.org/10.3390/su15075711

Kamasak, R. (2017). The contribution of tangible and intangible resources, and capabilities to a firm's profitability and market performance. *European Journal of Management and Business Economics*. https://dx.doi.org/10.1108/EJMBE-07-2017-015

Kaur, P., & Bansal, A. (2024). Income diversification patterns and their impact on bank risk. *Australian Economic Papers*. https://dx.doi.org/10.1111/1467-8454.12339

Khidmat, W., & Rehman, M. J. E. m. i. (2014). Impact of liquidity & solvency on profitability chemical sector of Pakistan. *6*(3), 34-67.

Kisyeri, D. M. (2022). The Influence of Administration Expenses on the Profitability of the Listed Manufacturing Companies in Tanzania. *International Journal of Technology and Management*, *7*(1), 15-15.

Korhonen, T., Jääskeläinen, A., Laine, T., & Saukkonen, N. (2023). How performance measurement can support achieving success in project-based operations. *International Journal of Project Management*, *41*(1), 102429. https://dx.doi.org/10.1016/j.ijproman.2022.11.002

Kurniawan, R. I., & Muharam, H. (2021). The effect of Intellectual Capital on profitability with Firm size as moderating variable (Empirical research on state-owned enterprise in Indonesia 2012-2020). *3*(3), 263-267.

Lazăr, S. (2016). Determinants of firm performance: evidence from Romanian listed companies. *9*(1), 53-69. https://dx.doi.org/10.1515/rebs-2016-0025

Lebas, M. J. (1995). Performance measurement and performance management. *International Journal of Production Economics*, *41*(1-3), 23-35. https://dx.doi.org/10.1016/0925-5273(95)00081-X

Linh, D. P. M. (2021). Determinants of Profitability: Case Study of Real Estate Companies in Hochiminh Stock Exchange. *Journal of Social and Political Sciences*. https://dx.doi.org/10.31014/aior.1991.04.03.297

Looy, A. V., & Shafagatova, A. (2016). Business process performance measurement: a structured literature review of indicators, measures and metrics. *5*(1), 1-24. https://dx.doi.org/10.1186/s40064-016-3498-1

Lusiana, L., & Kristianti, I. (2020). Sticky cost behavior in selling, general, and administrative costs in Indonesian manufacturing companies. *Jurnal Keuangan dan Perbankan*, *24*(2), 214-224. https://dx.doi.org/10.26905/jkdp.v24i2.3195

Mahajan, P. S., Raut, R. D., Kumar, P. R., & Singh, V. (2024). Inventory management and TQM practices for better firm performance: a systematic and bibliometric review. *The TQM Journal*, *36*(2), 405-430. https://dx.doi.org/10.1108/TQM-04-2022-0113

Mazziotta, M., & Pareto, A. (2020). Composite indices construction: The performance interval approach. *Social indicators research*, 1-11. https://dx.doi.org/10.1007/s11205-020-02336-5

Momaya, K. (2019). The past and the future of competitiveness research: A review in an emerging context of innovation and EMNEs. *International Journal of Global Business and Competitiveness*. https://dx.doi.org/10.1007/s42943-019-00002-3

Momaya, K., & Selby, K. (1998). International competitiveness of the Canadian construction industry: a comparison with Japan and the United States. *Canadian journal of civil engineering*, *25*(4), 640-652. https://dx.doi.org/10.1139/l98-004

Muhammad, S., Jibril, R., Wambai, U. S. K., Ibrahim, F. B., Ahmad, T. H. J. A. F., & Accounting. (2015). The effect of working capital management on corporate profitability: Evidence from Nigerian Food Product Firms. *Applied Finance and Accounting*, *1*(2), 55-63. http://dx.doi.org/10.11114/afa.v1i2.842

Nonaka, I., Toyama, R., Nagata, A. J. I., & change, c. (2000). A firm as a knowledge-creating entity: a new perspective on the theory of the firm. *Industrial and Corporate Change*, *9*(1), 1-20. https://dx.doi.org/10.1093/icc/9.1.1

Noone, B. M., Lin, M. S., & Sharma, A. (2024). Firm performance during a crisis: Effects of adhocracy culture, incremental product innovation, and firm size. *Journal of Hospitality & Tourism Research*, *48*(1), 153-183. https://dx.doi.org/10.1177/10963480221086846

Ohlin, B. G. (1933). Interregional and international trade.

Ovechkin, D. V., Romashkina, G. F., & Davydenko, V. A. (2021). The Impact of Intellectual Capital on the Profitability of Russian Agricultural Firms. *Agronomy*, *11*(2), 286. https://dx.doi.org/10.3390/agronomy11020286

Panigrahi, R. R., Jena, D., Tandon, D., Meher, J. R., Mishra, P. C., & Sahoo, A. (2021). Inventory management and performance of manufacturing firms. *International Journal of Value Chain Management*, *12*(2), 149-170. https://dx.doi.org/10.1504/IJVCM.2021.116400

Panigrahi, R. R., Shrivastava, A. K., & Nudurupati, S. S. (2024). Impact of inventory management on SME performance: a systematic review. *International journal of productivity and performance management*. https://dx.doi.org/10.1108/IJPPM-08-2023-0428

Phan, D. T., Nguyen, T. T., & Hoang, T. T. (2022). Impact of income diversification on the business performance of Vietnamese commercial banks. *Cogent Business & Management*, *9*(1), 2132592. https://dx.doi.org/10.1080/23311975.2022.2132592

Porter, M. E. (1990). The Competitive Advantage of Nation" New York The Free Press. *PorterThe Competitive Advantages of Nations1990*.

Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard business review*, *86*(1), 78.

Prahalad, C. K., & Hamel, G. (1997). The core competence of the corporation. In *Strategische Unternehmungsplanung/Strategische Unternehmungsführung* (pp. 969-987). Springer. https://dx.doi.org/10.1007/3-540-30763-X_14

Raditya, M. F., Hermawan, B., & Dalimunthe, N. (2024). Investment Opportunity and Size: Do They Matter for Firm Performance? Proceedings of the 7th International Conference of Economics, Business, and Entrepreneurship, ICEBE 2024, 4-5 September 2024, Shah Alam, Selangor, Malaysia, http://dx.doi.org/10.4108/eai.4-9-2024.2353957

Rahman, J. M., & Yilun, L. (2021). Firm Size, Firm Age, and Firm Profitability: Evidence from China. *Journal of Accounting, Business and Management*, *28*(1), 101-115. https://dx.doi.org/10.31966/jabminternational.v28i1.829

Rahman, M. H. U., Ibrahim, M. Y., & Che Ahmad, A. (2017). Accounting profitability and firm Market valuation: A panel data analysis. *Global Business and Management Research: An International Journal*, *96*(1S), 679-689. http://www.gbmrjournal.com/vol9no1s.htm

Ramzan, M., & Lau, W. Y. (2023). Impact of asset preferences on firm performance over its life cycle: Is agency theory or neo-classical theory more relevant? *Managerial and Decision Economics*, *44*(1), 595-607. https://dx.doi.org/10.1002/mde.3702

Rashid, A., & Rasheed, R. (2023). Mediation of inventory management in the relationship between knowledge and firm performance. *Sage Open*, *13*(2), 21582440231164593.

Ricardo, D. (1817). On the Principles of Political Economy and Taxation, London, 1817. *Bell & Sons*. https://dx.doi.org/10.4324/9780429349447

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: Towards methodological best practice. *Journal of management*, *35*(3), 718-804. https://dx.doi.org/10.1177/0149206308330560

Rompho, N. (2024). Do objectives and key results solve organizational performance measurement issues? *Benchmarking: An International Journal*, *31*(3), 669-682. https://dx.doi.org/10.1108/BIJ-07-2022-0464

Rounaghi, M. M., Jarrar, H., & Dana, L.-P. (2021). Implementation of strategic cost management in manufacturing companies: overcoming costs stickiness and increasing corporate sustainability. *Future Business Journal*, *7*, 1-8. https://dx.doi.org/10.1186/s43093-021-00079-4

Saif Ul Islam, M., Meo, M. S., & Usman, M. (2022). The relationship between corporate investment decision and firm performance: Moderating role of cash flows. *Journal of Public Affairs*, *22*(2), e2445. https://dx.doi.org/10.1002/pa.2445

Sardana, D., Terziovski, M., & Gupta, N. (2016). The impact of strategic alignment and responsiveness to market on manufacturing firm's performance. *International Journal of Production Economics*, *177*, 131-138. https://dx.doi.org/10.1016/j.ijpe.2016.04.018

Sardi, A., Sorano, E., Cantino, V., & Garengo, P. (2023). Big data and performance measurement research: trends, evolution and future opportunities. *Measuring Business Excellence*, *27*(4), 531-548. https://dx.doi.org/10.1108/MBE-06-2019-0053

Serrano-García, J., Llach, J., Bikfalvi, A., & Arbeláez-Toro, J. J. (2023). Performance effects of green production capability and technology in manufacturing firms. *Journal of Environmental Management*, *330*, 117099. https://dx.doi.org/10.1016/j.jenvman.2022.117099

Shawat, R. S., Zamel, A., Otake, T., Sabry, S., & Badawy, H. (2024). How Firm Size Shapes the ESG and Financial Performance Nexus: Insights from The MENA Region. *Journal of Accounting and Auditing: Research & Practice*. https://dx.doi.org/10.5171/2024.145355

Smith, A. (1863). *An Inquiry into the nature and causes of the Wealth of Nations... New edition, revised, corrected and improved*.

Tayeh, M., Al-Jarrah, I. M., & Tarhini, A. (2015). Accounting vs. market-based measures of firm performance related to information technology investments. *INTERNATIONAL REVIEW OF SOCIAL SCIENCES AND HUMANITIES*, *9*(1), 129-145.

Thakur, N., & Arora, S. (2024). Determinants of income diversification: empirical evidence from Indian banks. *International Journal of Law and Management*, *66*(2), 195-215.

Thi Nhat Minh, T., & Dinh Nguyen, P. (2024). The impact of intellectual capital and market capitalization on corporate investment decisions: exploring the mediating and moderating effect of knowledge sharing and the COVID-19 pandemic. *Journal of intellectual capital*, *25*(5/6), 1237-1258. https://dx.doi.org/10.1108/JIC-04-2024-0111

Trisnawati, A., Ummah, I., & Parlina, N. D. (2024). Financial ratio and firm value: the role of firm size. *Manajemen dan Bisnis*, *23*(2), 284-295. https://dx.doi.org/10.24123/mabis.v23i2.788

Uddin, M. J., Majumder, M. T. H., Akter, A., & Zaman, R. (2022). Do the diversification of income and assets spur bank profitability in Bangladesh? A dynamic panel data analysis. *Vilakshan-XIMB Journal of Management*, *19*(2), 177-194. https://dx.doi.org/10.1108/XJM-01-2021-0023

Union, E., & Centre, J. R. (2008). *Handbook on constructing composite indicators: methodology and user guide*. OECD publishing.

Voulgaris, F., & Lemonakis, C. (2014). Creating a business competitiveness index: an application to Greek manufacturing firms. *Journal of Transnational Management* *19*(3), 191-210. https://dx.doi.org/10.1080/15475778.2014.929921

Walid, T. (2021). Cost Stickiness: Analysis and Determinants. Case Study of Saudi Companies. *Theoretical Economics Letters*, *11*(2), 239-248. https://dx.doi.org/10.4236/tel.2021.112017

Wang, Y., Shan, Y. G., He, Z., & Zhao, C. (2022). Other comprehensive income, corporate governance, and firm performance in China. *Managerial and Decision Economics*, *43*(1), 262-271. https://dx.doi.org/10.1002/mde.3382

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*, *5*(2), 171-180. https://dx.doi.org/10.1002/smj.4250050207

Yameen, M., Farhan, N. H., & Tabash, M. I. (2019). The impact of liquidity on firms' performance: Empirical investigation from Indian pharmaceutical companies. *Academic Journal of Interdisciplinary Studies*, *8*(3), 212-212. https://dx.doi.org/10.36941/ajis-2019-0019