Is there an Association between Firm Size and Financial Performance?

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ABSTRACT
Formulating organisational objectives and strategies such as 'growing the firm' and 'improving financial performance' is a common practice. This paper reiterates that the concepts of 'firm size' and 'financial performance' are not singular ideas. The study aimed to answer the research question: Is there an association between firm size and the financial performance of selected companies? A descriptive research design was applied, and quantitative analysis was performed. Secondary data were extracted from financial statements through IRESS. The research set out predetermined sampling criteria for sample selection. Correlations were measured between financial ratios and different proxies of firm size. Frequencies of the different significant correlations were counted. The findings indicated that firm size proxies and measures of financial performance were either directly or inversely related. Profitability measures were inversely related to total assets and sales. Liquidity measures were associated with sales, while solvency measures were associated with sales and number of employees. Measures of market performance were inversely associated with market capitalisation. This paper contributes to academic knowledge by indicating that financial data of sampled South African companies deliver associations between firm size proxies and financial performance measures. These associations are not identical to the findings obtained by other researchers in different locations. The practical implications of this research entail that managers of South African companies need to select financial performance indicators and base the firm size estimation on proxies associated with such financial performance indicators. Limitations included that findings cannot be generalised, that the researchers relied on the integrity of audited financial statements and that IRESS did not make a full set of data available for all sampled entities. Limitations may inspire further research as the methodology may be mimicked by selecting another research sample.

Keywords: financial performance; ratio analysis; firm size; JSE listed companies; financial ratios

1. INTRODUCTION

Organisational strategies and objectives are often linked to firm size and financial performance. Companies such as Naspers Ltd, Pepkor Holdings Ltd and the Mr Price Group Ltd indicate that future growth is fundamental to their business strategy (Naspers, 2022; Pepkor, 2022; Mr Price Group, 2022). South32 Ltd indicates that they are committed to delivering financial results (South32, 2022), while Redefine Properties Ltd indicates their primary goal is to improve cash flow and deliver quality earnings (Redefine, 2022). Considering this, Correia, Flynn, Uliana, and Wormald (2019) posited that the top-performing firms listed on the Johannesburg Stock Exchange (JSE) are typically considered larger firms.

According to Marx, de Swardt, Pretorius and Rosslyn-Smith. (2017), there exists an assumption that firms employ economies of scale based on size. Hence, it is assumed that firm size affects the potential to perform financially. Several problems arise from this assumption, including (Marx *et al*., 2017):

- Firm size can be measured in several ways;
- The concept of financial performance is broad and can refer to several performance measures of firms and
- Larger firm size in monetary terms does not necessarily constitute growth prospects for investors.

Hashmi, Gulzar, Ghafoor and Naz (2020) posited that 'firm size' remains an essential area of research in corporate finance, as managers intend to understand how businesses should be scaled. In addition, management should not select firm size measures without providing the necessary logic. Consequently, it is essential to examine the sensitivity of firm size in relation to financial performance. If management aims to focus on particular financial performance areas, the selected measure for firm size should be well associated with such financial performance measures (Hashmi *et al.,* 2020). Much international research has been done on how firm size and financial performance can be measured and how these concepts relate to each other (refer to Table 1). Unfortunately, South African researchers have, to a large extent, not researched the relatedness of these variables. From a South African perspective, it is unclear how firm size is associated with financial performance. Consequently, the objectives set out by firms such as Naspers Ltd, Pepkor Holdings Ltd and the Mr Price Group Ltd, may seem vague and immeasurable if it is unclear which financial performance measures are associated with growth and changes in firm size. The study aims to determine which firm size measures, if any, associate best with selected financial performance measures when the top 40 companies listed on the Johannesburg Securities Exchange (JSE) are populated. Thus, the research sets out to answer the research question: "Is there an association between firm size and financial performance?"

Following this introduction, the paper presents a literature review, followed by the research methods used to undertake the study. Thereafter, research results are presented and discussed. Lastly, conclusions are drawn from the results, research limitations are identified, and areas for further research are pointed out.

2. LITERATURE REVIEW

This section focuses on the theoretical exploration of 'firm size' and 'financial performance'. Paragraph 2.1 is directed towards providing explanations around firm size, while paragraph 2.2 turns attention to the theoretical analysis of financial performance. Paragraph 2.3 provides and

overview of similar previous research.

2.1. Measurement of firm size

Mule, Mukras and Nzioka (2015) define 'firm size' as "the value and assortment of services and products an entity can provide concurrently to its customers." According to Dang and Li (2013) and Farahnaz and Alireza (2012), firm size can be measured in four different ways, namely through total assets, which measure total organisational resources; market capitalisation, which involves growth opportunities and capital market conditions; total revenue which measures product market opposition and the number of employees, which are utilised when the core measures are unavailable or are irrelevant. Each of these firm size measurements is briefly discussed in sections to follow.

2.1.1 Total Assets

The Conceptual Framework defines an asset as "a present economic resource, controlled by the entity as a result of past events" (Service 2018). Assets are categorised into non-current assets and current assets. Total assets are calculated as current assets plus non-current assets. McKeith and Collins (2013) explained that current assets are expected to be realized in cash during the normal operating cycle of the organisation. In terms of non-current assets, it may be observed that they consist of property, plant and equipment, long term investments and intangible assets and will not become liquid within 12 months or less. Total assets are often a proxy for firm size, as used in the studies of Dogan (2013), Akinyomi and Olagunju (2013) and Gunu and Adamade (2015).

2.1.2 Market Capitalisation

The Oxford English Dictionary (OED) (2020) defined market capitalization as an aggregate valuation of the company based on its current share price and the total number of outstanding shares. Market capitalization is a key characteristic that assists the investor in determining the returns and the risk associated with the share. It also assists the investors in choosing the stock that can meet their risk criterion (Brigham & Ehrhardt, 2017). Researchers such as Pratama and Ciptani (2018) and Astrakhov, Havranek and Novak (2019) have applied market capitalization as a quantitative proxy for firm size in their research.

2.1.3 Total revenue

IFRS 15 states that "revenue arises from a transaction with a customer, whereby the entity transfers goods or services that are an output of the entity's ordinary activities; revenue includes sales, fees and royalties" (IFRS, 2018). Revenue is often examined more closely than profits when assessing the firm's growth. Investors want to see that a business can perpetually generate more sales over time and be promoted to an expanding audience. Flat or declining sales growth suggests that the company has stalled and offers limited growth (Lovemore & Brummer, 2013). In their studies, researchers such as Asimakupoulos, Samitas and Papadogonas (2009) and Yazdanfar (2013) have quantified firm size in terms of total revenue.

2.1.4 Number of employees

The term 'number of employees' is defined as the average number of employees employed at the place of business each regular working day during the previous financial year. In calculating such number, each regular full-time employee shall be counted as one employee, and each part-time employee shall be counted by means of dividing the hours worked by the part-time employee by the total number of hours worked by a full-time employee (Law Insider, 2013). Researchers such as Becker-Blease, Kaen, Etebari and Baumann (2010) and Khazali and Zoubi (2005) included the

number of employees as a measurement of firm size, in their respective studies. For the purpose of empirical analysis (refer to paragraph 4), all four possible proxies for firm size were included for quantitative testing. As alluded to in paragraph 2, this study also intends to obtain a theoretical understanding of the concept of 'financial performance'. This concept is explored in paragraph 2.2, hereafter.

2.2 Analysis of financial performance

Marx *et al.* (*2017*) posited that the primary function of financial analysis is to analyse an entity's financial performance and financial position during a preceding financial year. Such historical data is then assumed to predict future performance. Ratio analysis is one of the most popular methods for performing financial analysis (Correia, 2019). Ratio analysis is defined as the method of computing and interpreting financial ratios to examine and monitor an entity's performance (Gitman, 2009). According to Correia (2019), there are different categories of ratios. Figure 1 was constructed as an explanation.
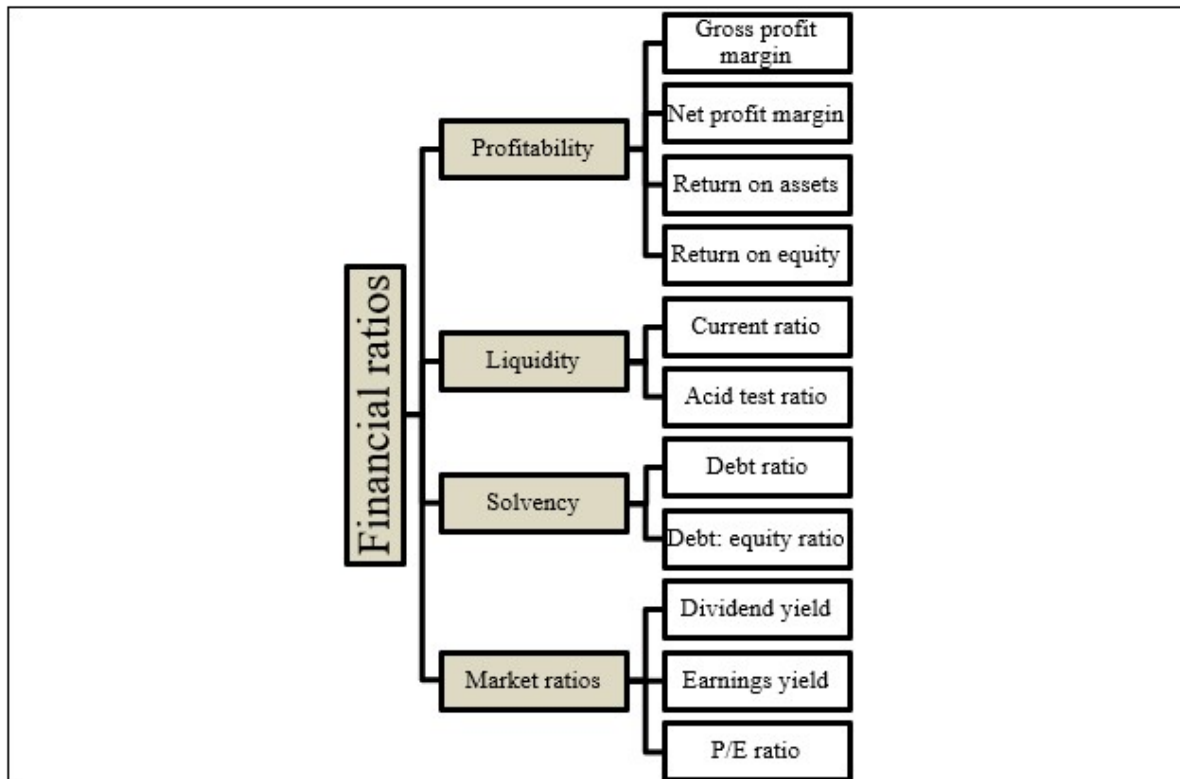

Figure 1. Financial ratios
Reference: Adapted from Correia (2019), Marx et al. (2017), Ngwenya, Marx and Grebe (2020)

Figure 1 indicates that financial analysis measures profitability, liquidity, solvency and market performance of an entity. Profitability ratios allow analysts to evaluate the effectiveness and efficiency of the firm's management and employees in generating profit through applying the assets and capital of the owners (Marx *et al.*, 2017). Profitability ratios consist of the gross profit margin, net profit margin, return on assets (ROA) and return on equity (ROE) (Ngwenya *et al.*, 2020).

The liquidity of a business is measured by its ability to satisfy short-term debts as it falls due (Gitman, 2009). Gitman (2009) further explained that liquidity expresses the organisation's overall

immediate financial position and the ease with which it can pay outstanding bills. Liquidity ratios consist of the current and acid test ratios (Correia, 2019). Solvency refers to whether the entity has enough assets to repay all of its liabilities. An entity is assessed as solvent where its balance sheet reports surplus assets or positive equity (Lubbe & Watson, 2014). Solvency ratios consist of debt and debt-to-equity ratios (Ngwenya *et al.,* 2020). Market ratios are ratios that focus on the firm's share price, earnings and dividends (Brigham & Houston, 2016). Market ratios consist of the dividend yield, dividend payout, earnings yield, and price-earnings (P/E) ratios (Ngwenya *et al.,* 2020). In paragraph 2.3, hereafter, seven research papers are analysed to demonstrate how the concepts of firm size and financial ratios measures have been interpreted and concluded in published research papers.

2.3 Current Research

Table 1 summarises similar research published within the last five years, which applied financial ratios and firm size measures as quantitative variables. Studies were ordered by date.

Table 1: Similar research

Researcher(s)	Year	Location	Finding(s)	Firm size measure	Ratio category	Ratio name
Bolarinwa and Obembe	2017	Nigeria	A positive relationship exists between firm size and profitability.	Total assets	Profitability	ROA; ROE
Ramin, Lizam, Zabri and Ahmad	2017	Malaysia	The study confirmed that a positive correlation exists between market capitalization and the debt ratio, while a direct relationship also exists between total assets and the current ratio.	Total assets; Market capitalization	Liquidity; Solvency	Current ratio; Debt ratio
Ramachandran and Packkirisamy	2018	India	The researchers studied the association between firm size and dividend behaviour and concluded that firm size and dividend yields are positively related.	Total assets	Market ratio	Dividend yield
Doan	2019	Vietnam	The study found that the association between firm size and ROA is statistically significant.	Total sales	Profitability	ROA
Yadav, Pahi and Gangakhedkar	2021	Asia-Pacific	Researcher found a negative, significant correlation between profitability and firm size measures.	Total assets; Total sales	Profitability	ROA; ROE
Hung, Vinh and Thai	2021	Vietnam	There is a direct relationship between firm size and profitability	Total assets; Number of employees	Profitability	ROA

Reference: Researchers as listed in the table

From Table 1, it can be observed that different findings were obtained by different researchers in different locations, and that different types of proxies relating to firm size and financial ratios were selected for testing purposes. Although the listed findings agree that there are possible links between firm size and financial variables, South African researchers have not attempted to obtain clarity around this phenomenon, and thus no South African research appears in Table 1. This study intends to perform similar research to generate findings based on JSE-listed firms. This is done to address ambiguousness regarding the relatedness of firm size and financial performance of South African companies. Regarding the quantitative approach to this study, all ratios in Figure 1 were included for empirical testing (refer to paragraph 4). Paragraph 3, hereafter, provides a holistic overview of the applicable methodology.

3. METHODOLOGY

The study employed a descriptive research design to determine whether a quantitative relationship exists between variables. This study sampled the top 40 JSE-listed companies for the following reasons:

- The top 40 JSE-listed firms represent a fair reflection of trends within the South African stock market and, in addition, these firms, combined, hold 80% of the total market capital issued by the JSE (Courtney Capital, 2023);
- According to Neethling (2023), the top 40 JSE-listed firms are historically good financial performers and it is reasonable to infer that investors prefer to invest in these firms. It seems rational to perform research on firms that investors prefer to invest in, for findings pertaining to such firms may be useful to a wider range of investors; and
- Other researchers such as De Villiers (2012) and Saunders (2016) have both successfully populated the top 40 JSE listed firms in their research.

For sampling selection, judgement sampling was applied. Judgement sampling requires of the researcher to establish reasons or criterion for sample selection (Denscombe, 2010). The following criteria were applied for the purpose of the sample selection:

- Criterion 1: All the applicable data and the ratios need to be made available by IRESS for consistency;
- Criterion 2: The companies must provide data for 2014 to 2018;
- Criterion 3: Companies trading in the financial sector were excluded from the sample, as general ratios are not measured for such companies by IRESS (Chabalala, 2015).

After applying the preceding criteria, a total of 17 companies were sampled. As can be deduced, this is a small sample. The majority of the sample reduction occurred due to criterion 1. Unfortunately, IRESS did not make all applicable financial data available for the top 40 JSE-listed companies. Two sets of data were collected: firm size proxies (assets, market capitalisation, sales, and number of employees) and financial ratios (profitability, liquidity, solvency and market ratios). Secondary, numeric data were collected for five years, namely 2014 to 2018. Field (2017) advised that data should be collected for a minimum of five years to ensure accurate statistical patterns are identified.

Statistical analysis was performed to measure the relationship between variables (firm size and financial performance). Association was tested by means of applying Spearman rho correlation testing. The SPSS software package (version 26) was used for this purpose.

4. RESULTS

The empirical results presented in the section include the Spearman correlation coefficient (r), the number of included observations (n), the level of statistical significance (p) and the R square (R^2). Table 2 was used to exemplify the statistical findings for the year 2014.

Table 2 shows that seven significant correlations were obtained for 2014, where n = 17 and p < 0,05. The first medium correlation was obtained for the net profit margin and market capitalisation. ROA correlated inversely with total assets (r = 0,311). A medium inverse correlation was calculated for ROE and total assets (r = -0,292). The acid test and sales figure correlated significantly (r = 0,227), while the acid test also correlated slightly better with market capitalisation (r = 0,246). The debt ratio correlated significantly with both market capitalisation (r = 0,309) and number of employees (r = 0,437).

Table 2: Correlation results 2014

	Sales			Market capitalisation			Number of employees			Total assets		
	r	n	R^2	r	n	R^2	r	n	R^2	r	n	R^2
Gross profit margin	-.203	17	.041	.172	17	.030	.147	17	.022	.074	17	.005
Net profit margin	-.216	17	.047	.250*	17	.061	-.275*	17	.076	.140	17	.020
Return on assets	-.115	17	.013	.137	17	.019	.179	17	.032	-.311*	17	.097
Return on equity	-.022	17	.004	-.047	17	.002	.002	17	.000	-.292*	17	.085
Current ratio	.114	17	.013	.090	17	.008	.052	17	.003	-.083	17	.007
Acid test	.227*	17	.052	.246*	17	.061	.049	17	.002	.141	17	.020
Debt ratio	-.026	17	.0007	.309*	17	.095	.437*	17	.191	-.110	17	.012
Debt to equity	.100	17	.01	.017	17	.000	.199	17	.040	-.064	17	.004
Dividend yield	.034	17	116.	.002	17	.000	.051	17	.003	.000	17	.000
Earnings yield	.105	17	.011	.164	17	.027	-.162	17	.026	.179	17	.032
PE ratio	-.105	17	.011	.164	17	.027	.162	17	.026	-.179	17	.032

Note: *Correlation is significant at the 0.05 level (2-tailed).
Reference: Authors

Table 3 indicates the results for 2015. In terms of 2015 data, 11 significant correlations were obtained, where n = 17 and p < 0,05. A significant inverse correlation can be observed between gross profit margin and sales (r = -0,453). Secondly, a significant association was obtained between the net profit margin and market capitalisation (r = 0,521). ROA and total assets were inversely

associated (r = -0,375), while the current ratio correlated negatively with total assets (r = -0,478).

The current and acid ratios correlated inversely with market capitalisation (r = -0,403 and r = -0,272, respectively). Individually, the acid ratio correlated with sales (r = 0,381). The debt ratio and number of employees were positively associated (r = 0,290), and the debt-to-equity ratio and sales were also positively associated (r = 0,360). Earning yield and the PE ratio both correlated with the market capitalisation, earnings yield inversely (r = -0,553) and PE ratio (r = 0,553).

Table 3: Correlation results 2015

	Sales			Market capitalisation			Number of employees			Total assets		
	r	n	R^2	r	n	R^2	r	n	R^2	r	n	R^2
Gross profit margin	-.453*	17	.205	.065	17	.004	-.204	17	.042	-.069	17	.005
Net profit margin	.218	17	.048	.521*	17	.271	-.068	17	.005	.179	17	.032
Return on assets	.174	17	.030	.159	17	.025	.061	17	.004	-.375*	17	.141
Return on equity	.066	17	.004	.344*	17	.118	.200	17	.040	-.174	17	.030
Current ratio	-.127	17	.016	-.403*	17	.162	-.036	17	.001	-.478*	17	.228
Acid test	.381*	17	.145	-.272*	17	.074	-.318*	17	.005	-.061	17	.004
Debt ratio	.144	17	.021	.536*	17	.287	.290*	17	.084	-.049	17	.001
Debt to equity	.360*	17	.130	.412*	17	.170	.211	17	.044	.137	17	.002
Dividend yield	-.126	17	.016	-.379*	17	.144	-.244	17	.060	-.029	17	.001
Earnings yield	-.007	17	.000	-.553*	17	.306	-.175	17	.031	.022	17	.000
PE ratio	-.007	17	.000	.553*	17	.306	.175	17	.301	-.022	17	.000

*Correlation is significant at the 0.05 level (2-tailed).
Reference: Authors

Table 4 shows that 10 significant correlations were obtained for data relating to 2016, where n = 17 and p < 0,05. The gross profit margin correlated negatively with both sales (r = -0,309) and number of employees (r = -0,596, where R^2 = 35,5%). The net profit margin is also inversely associated with two different firm size measures: total assets (r = -0,329) and sales (r = -0,300).

ROA and ROE are inversely correlated with total assets. For ROA and total assets (r = -0,564) an r^2 of 31,8% was obtained, while ROE and total assets (r = -0,593) resulted in a r^2 = 35,1%. Debt-to-equity correlated positively with the market capitalisation (r = 0,385). As data relates to dividend yield, correlations were obtained for sales (r = 0,253) and total assets (r = 0,257). Lastly, earnings yield correlated inversely with the market capitalisation (r = -0,566), which resulted in the shared

variance of 32%.

Table 4: Correlation results 2016

	Sales			Market capitalisation			Number of employees			Total assets		
	r	n	R²	r	n	R²	r	n	R²	r	n	R²
Gross profit margin	-.309*	17	.095	-.268*	17	.072	-.596*	17	.355	-.053	17	.003
Net profit margin	-.300*	17	.009	-.462*	17	.213	-.236	17	.055	-.329*	17	.108
Return on assets	-.012	17	.000	.377*	17	.142	-.076	17	.006	-.564*	17	.318
Return on equity	-.041	17	.002	-.446*	17	.199	.215	17	.046	-.593*	17	.351
Current ratio	.018	17	.000	-.123	17	.015	.018	17	.000	-.277	17	.077
Acid test	-.085	17	.007	-.080	17	.006	-.246	17	.061	-.038	17	.001
Debt ratio	.172	17	.030	.372*	17	.138	.378*	17	.143	-.137	17	.019
Debt to equity	.288	17	.083	.385*	17	.148	.371*	17	.137	.140	17	.020
Dividend yield	.253*	17	.064	.020	17	.000	.066	17	.004	.257*	17	.066
Earnings yield	-.009	17	.000	-.566*	17	.320	-.053	17	.003	-.093	17	.009
PE ratio	.053	17	.003	-.135	17	.018	.091	17	.008	-.066	17	.004

*Correlation is significant at the 0.05 level (2-tailed).
Reference: Authors

During 2017, as can be seen in Table 5, 18 different significant correlations were identified, where n = 17 and p <0,05. The gross profit margin correlated inversely significantly with sales (r = -0,382). Net profit margin associated negatively with sales (r = -0,575 and shared variance of 33,1%) and number of employees (r = -0,574 and shared variance of 32,9%). ROA was associated positively with sales (r = 0,414), market capitalisation (r = 0,517 and shared variance of 26,7%) and number of employees (r = 0,585 and shared variance of 34,2%). ROE correlated with the number of employees (r = 0,509 and shared variance of 25,9%).

The debt ratio correlated positively with market capitalisation (r = 0,277), number of employees (r = 0,368) and total assets (r = 0,255). The debt-to-equity ratio is associated positively and significantly with sales (r = 0,382), market capitalisation (r = 0,284) and number of employees (r = 0,552 and a shared variance of 30,5%). Earnings yield correlated significantly with market capitalisation (r = -0,261) and total assets (r = 0,261). The PE ratio correlated positively with market capitalisation (r = 0,261) and total assets (r = -0,261). Finally, the dividend yield ratio correlated inversely with number of employees (r = -0,273).

Table 5: Correlation results 2017

	Sales			Market capitalisation			Number of employees			Total assets		
	r	n	R^2	r	n	R^2	r	n	R^2	r	n	R^2
Gross profit margin	-.382*	17	.146	.150	17	.023	-.169	17	.029	.236	17	.056
Net profit margin	-.575*	17	.331	-.054	17	.003	-.574*	17	.329	.321*	17	.103
Return on assets	.414*	17	.171	.517*	17	.267	.585*	17	.342	.233	17	.054
Return on equity	.121	17	.015	.132	17	.017	.509*	17	.259	-.137	17	.019
Current ratio	.234	17	.055	.116	17	.019	-.003	17	.000	-.221	17	.049
Acid test	.179	17	.032	-.002	17	.000	-.106	17	.011	-.238	17	.057
Debt ratio	.046	17	.002	.277*	17	.052	.368*	17	.135	.255*	17	.065
Debt to equity	.382*	17	.146	.284*	17	.081	.552*	17	.305	.128	17	.016
Dividend yield	-.244	17	.060	-.174	17	.030	-273*	17	.075	.155	17	.024
Earnings yield	-.155	17	.024	-.261*	17	.068	.013	17	.000	.261*	17	.068
PE ratio	.155	17	.024	.261*	17	.068	-.013	17	.000	-.261*	17	.068

*Correlation is significant at the 0.05 level (2-tailed).
Reference: Authors

Table 6 indicates findings as it relates to 2018, where 18 significant correlations were obtained and n =17, p < 0,05. The gross profit margin correlated inversely with both sales (r = -0,509 and shared variance of 24,1%) and number of employees (r = -0,511 and shared variance of 26,1%). The net profit margin correlated inversely significantly with sales (r = -0,697 and shared variance of 48,6%) and also with the number of employees (r = -0,636 and shared variance of 40,4%).

ROA associated well but inversely with total assets (r = -0,458 and share variance of 21%), while ROE correlated inversely with sales (r = -0,309) and total assets (r = -0,505 and shared variance of 25,5%). The current ratio and acid test correlated inversely with total assets (r = -0,499 and r = -0,270 respectively). The acid test further correlated inversely with both sales (r = -0,344) and number of employees (r = -0,376).

The debt ratio was positively associated with the number of employees (r = 0,371), while debt-to-equity correlated positively with number of employees (r = 0,319), sales (r = 0,331) and total assets (r = 0,319).

Lastly, both dividend yield and earning yield correlated inversely with the market capitalisation (r =

-0,279 and r = -0,436 respectively). The PE ratio correlated positively with market capitalisation (r = 0,436 and a shared variance of 19%).

Table 6: 2018 Correlation results

	Sales			Market capitalisation			Number of employees			Total assets		
	r	n	R^2	r	n	R^2	r	n	R^2	r	n	R^2
Gross profit margin	-.509*	17	.259	.241	17	.058	-.511*	17	.261	.088	17	.008
Net profit margin	-.697*	17	.486	-.050	17	.003	-.636*	17	.404	-.015	17	.000
Return on assets	-.224	17	.050	.201	17	.040	.003	17	.000	-.458*	17	.210
Return on equity	-.309*	17	.095	-.140	17	.012	-.179	17	.032	-.505*	17	.255
Current ratio	-.200	17	.040	.039	17	.002	-.165	17	.027	-.449*	17	.202
Acid test	-.344*	17	.118	.029	17	.000	-.376*	17	.141	-.270*	17	.073
Debt ratio	.224	17	.050	.055	17	.003	.371*	17	.138	.149	17	.022
Debt to equity	.331*	17	.110	.022	17	.000	.319*	17	.102	.319*	17	.102
Dividend yield	-.138	17	.019	-.279*	17	.078	-.256	17	.066	-.096	17	.009
Earnings yield	-.232	17	.054	-.436*	17	.190	-.032	17	001	-.098	17	.010
PE ratio	.232	17	.054	.436*	17	.190	.032	17	.001	.098	17	.010

*Correlation is significant at the 0.05 level (2-tailed).

Tables 2 to 6 indicate that, in terms of profitability, the gross profit margin and net profit margin were most often inversely associated with sales. Furthermore, ROA and ROE were inversely associated with total assets. Profitability ratios were inversely related to firm size measures. Regarding liquidity, the acid test was positively related to sales. Liquidity ratios were least likely to be associated with firm size measures and only associated inversely with sales. For solvency, the debt ratio was best and positively associated with the number of employees, while the debt-to-equity ratio was positively related to sales. The solvency ratios were most often associated with sales and number of employees. Lastly, the findings related to market ratios are presented. In terms of market ratios, the earnings yield was best associated with market capitalisation. From the preceding descriptions, it can be posited that financial ratios were most often associated (inverse or positively) with sales and total assets.

5. DISCUSSION OF RESULTS
Table 7 was constructed as a summary of the research results demonstrated in paragraph 4.

Table 7: Summary of correlation findings

Correlation category	Finding	Years
Profitability:		
Gross profit margin and sales	Inversely related	2015, 2016, 2017, 2018
Net profit margin and sales	Inversely related	2016, 2017, 2018
ROA and total assets	Inversely related	2014, 2015, 2016, 2018
ROE and total assets	Inversely related	2014, 2016, 2018
Liquidity:		
Acid test and sales	Positively related	2014, 2015, 2018
Solvency:		
Debt ratio and number of employees	Positively related	2014, 2015, 2017, 2018
Debt to equity ratio and sales	Positively related	2015, 2017, 2018
Market ratios:		
Earnings yield and market capitalisation	Inversely related	2015, 2016, 2017, 2018

Per synopsis, it is put forward that profitability, firm size, and market ratios and firm size were inversely related in the current study. In contrast, liquidity ratios and firm size, and solvency ratios and firm size were positively related. It is also apparent that each financial performance measure is associated with a specific firm size measure. These findings entail two consequences:

- The entities need to identify financial performance measures that serve as key performance indicators (KPIs); and

- When the sampled firms set out company objectives relating to growth or firm size, insight needs to be given with regards to how 'growth' and 'firm size' are measured by the entity. Such firm size measures need to be selected based on their association with KPIs. The investor can then prioritise firm size indicators to monitor growth prospects.

When focus is placed on specific firm size proxies and their relatedness to financial performance, it was found that profitability measures are inversely related to firm size proxies of sales and total assets. For the liquidity measure, liquidity was directly related to the firm size proxy of sales. Financial measures related to solvency were directly related to firm size proxies of sales and number of employees. Finally, the financial measures related to market performance were indirectly related to market capitalisation. The implications of these findings are that:

- If management applies profitability as a KPI, the inverse of total assets or the inverse of sales can be applied as firm size proxy, as these items are inversely related;

- If management applies liquidity as a KPI, sales can be applied as a firm size proxy;

- Should management apply solvency as a KPI, sales and the number of employees can be considered as proxy for firm size; and

- If management applies market performance as a KPI, the inverse of market capitalisation can be applied as firm size proxy, as these items are inversely related.

When comparing findings of this study to that of other research, findings related to profitability measures, oppose the views of Bolarwinwa and Obembe (2017), Doan (2019) and Hung *et al.* (2021), who argued that profitability and firm size are positively and directly related. The finding of this paper is supported by the results obtained by Yadav *et al.* (2021). As it was observed that liquidity was positively related to the firm size measure, these findings are similar to the findings of Ramin *et al.* (2017), despite these researchers defining firm size by means of total assets. In terms of solvency, findings are again supported through research done by Ramin *et al.* (2017), who indicated that solvency and firm size are directly related. Finally, the market ratio was inversely correlated to the firm size measure. Ramachandran and Packkirisamy (2018) made a dissimilar observation and posited that return measures and firm size are positively related.

From Table 7, it can be concluded that findings of this study differed from the findings of two other current research articles (as tabled in Table 1), in the sense that profitability was inversely related to firm size, for the sampled companies. One study by Yadav *et al.* (2021) obtained similar findings to that reported in this article. As it relates to market ratios, findings based on this sample also differed. Unlike other current studies, findings in this paper indicated that the market ratio was inversely related to the firm size proxy. Findings contained in this paper shared similarity with other current studies, as it pertains to liquidity and solvency. Shared findings indicated that the liquidity measure was positively related to the firm size proxy, while the solvency measures were also positively associated with the firm size proxy.

6. CONCLUSION

This research was undertaken to determine which firm size measures, if any, associate best with selected financial performance measures when the top 40 companies listed on the Johannesburg Securities Exchange (JSE) are sampled. The research set out to answer the research question: "Is there an association between firm size and financial performance?"

Per a literature analysis, it was indicated that 'firm size' can be measured by means of total assets, sales, market capitalisation or number of employees. It was further indicated that financial performance can be monitored by means of financial ratio analysis. The quantitative analysis in this paper demonstrated that firm size proxies were related to financial performance measures in the case of the sampled companies. Findings indicated that profitability measures were inversely related to total assets and sales. Liquidity measures were associated with sales, while solvency measures were associated with sales and number of employees. Measures of market performance were inversely associated with market capitalisation. This paper contributed to the body of knowledge by indicating that financial data relating to sampled South African companies prove to deliver associations, directly or inversely, between financial performance measures and firm size proxies. These associations were not identical to findings obtained by other researchers who performed similar research in other locations (Table 1). The practical implications of this research entail that managers of South African companies need to select financial performance indicators and base the firm size estimation on proxies associated with such financial performance indicators. This can be helpful to investors, as they can prioritise the applicable firm size measure when monitoring growth.

Limitations of this research include that the sample size is small and that findings are not generalisable. Furthermore, the researchers relied on the integrity of audited financial results. In addition, IRESS did not provide a complete set of necessary data for all populated companies, and the sample was consequently reduced. Further research can be undertaken to determine whether concepts of 'firm size' and 'financial performance' can be measured in more possible ways. This paper did not focus on possible firm size measures such as net assets or earnings before interest and taxes. The practicality of alternative financial performance analysis, such as the free cash flow method or common size analysis, was also not investigated here and remains a topic for further research.

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