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Innovation and organisational performance: A critical review of the instruments used to measure organisational performance

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Background: Innovation is recognised as one of the most important determinant of organisational performance. Yet, the results of studies that investigate the relationship between innovation and organisational performance are inconclusive. The inconsistency has been attributed to a number of factors, which include, among others, the measures used to evaluate organisational performance.

Aim: This study was set out to identify, categorise and critically analyse the instruments used to assess organisational performance when investigating the relationship between innovation and organisational performance.

Setting: The study focuses on all scientific publications reporting on organisational performance, inclusive of both financial and non-financial indicators of performance, and are not limited to any specific country or industry.

Methods: The systematic literature review methodology was used to identify studies which investigated the relationship between innovation and organisational performance. Once identified, articles were analysed on the way organisational performance was measured. Classification was done with reference to financial and non-financial indicators, accounting and market-based, as well as objective and subjective measures.

Results: The findings show that profitability, sales growth and return on assets (ROA) are the most preferred accounting-based financial measures of organisation performance. In addition, Tobin's Q was found to be the most favoured market-based financial measure of organisational performance. The study further reveals that market share, customer satisfaction and productivity are the most popular non-financial-based measures of organisational performance.

Conclusion: The use of measures of organisational performance is often left to the discussion of the researcher, which is not implicitly wrong, but does little to contribute to the body of knowledge on this important topic. Researchers are firstly urged to clearly define which aspects of organisational performance they intend to study, secondly to use established instruments or often used indicators of organisational performance, and thirdly to combine both objective and subjective measures of organisational performance. This would allow for researchers to build on the work of other and strengthen the body of knowledge in this area.

Introduction

Organisational performance is an important indicator of organisational success (Stegerean & Gavrea 2010). Apart from organisational performance, organisational success also relates to employee skills levels, personnel development, quality of strategic planning and the ability to understand and adapt to the nature and dynamics of the business environment (Carvalho *et al*. 2016). However, organisational performance is arguably the most important indicator of organisational success and one of the most important variables in management research (Stegerean & Gavrea 2010).

Research indicates that organisational performance is influenced by innovation (Durán-Vázquez, Lorenzo-Valdés & Moreno-Quezada 2012; Likar, Kopa & Fatur 2014; Nybakk & Jenssen 2012; Oke, Walumbwa & Myers 2012; Yen 2013). Undertaking research on these constructs is important to organisations as managers should be aware of the impact of different variables on organisational performance in order to manage them in an effective manner (Bigliardi 2013; Ndregjoni & Elmazi 2012). Yen (2013), for example, states that the facilitation of innovation is an important management function that can be directly linked to organisational performance.

An important aspect to consider when evaluating innovation efforts and organisational performance is the time factor, given that there is a time lag between innovation initiatives and the outcome that follows (Likar *et al*. 2014). In fact, O'Connor *et al*. (2008) state that the time lag between innovation and its impact on organisational performance ranges from 3 to 6 years. It is important to note this, as a focus on short term indicators (e.g. return on investment [ROI], sales growth and operating income) may be inappropriate and may indicate that innovation strategies are not working, while the effect may only be visible in the longer term (Ndregjoni & Elmazi 2012).

Although the study of organisational performance has been at the core of management research, very little has been done with regard to appropriate measures to assess the effectiveness of innovation initiatives. In addition, a cursory review of the literature shows that researchers focus on the discussion around typologies of organisational performance on financial and non-financial aspects, with very little attention to other dimensions, such as objective and subjective measures. The present study, therefore, aims primarily to investigate the most frequently used instruments. The results of this investigation will then be used as a lens through which to investigate which typologies (financial vs. non-financial; objective vs. subjective) of organisational performance were adopted and further to investigate whether the instruments selected played a role in the outcome of the study. This will result in the compilation of a more comprehensive and updated literature review that can form the basis for future research when selecting measures of organisational performance.

Problem statement and objective

The results of studies that investigate the relationship between innovation and organisational performance are inconclusive, with some studies (Carvalho *et al*. 2016; Cortez *et al*. 2015; Mafini 2015) showing a positive relationship, while others showed mixed results or no relationship with no definite conclusion (Hervas-Oliver, Sempere-Ripoll & Boronat-Moll 2014; Simachev, Kuzyk & Feygina 2015). This inconsistency has been attributed to a number of factors, including, among others, the measures used to evaluate organisational performance.

In an attempt to understand these inconsistences, Rubera and Kirca (2012) conducted a meta-analysis in a quest to better understand a firm-innovativeness-performance relationship, drawing on the chain-of-effects model as a unifying framework. The study revealed that the size of the firm, the sector in which the firm operates and the nature of innovation (radical innovation, for example) adopted can influence the relationship between innovation and organisational performance. However, although Rubera and Kirca's study is significant in many ways, the study did not investigate whether the type of instruments used to measure organisational performance can also influence the relationship between these constructs. This reveals a gap in the literature and shows the need for a critical review of the influence of the type of instruments used to measure organisational performance on the reported relationship between innovation and organisational performance.

Therefore, the objective of this study is twofold: firstly, the study seeks to investigate the most frequently used instruments and, secondly, the study will investigate whether the type of instruments used does influence the nature of the relationship between these constructs.

Measures of organisational performance

The construct of organisational performance is central to the understanding of organisational success and the factors responsible for that variation (Hoopes, Hadsen & Walker 2003). In order to get an accurate and comparative gauge of the variation mentioned, valid and reliable measures are necessary (Saunders 2012). Although several methods for measuring organisational performance exist, these methods can be classified into two main categories, namely financial and non-financial performance measurement (Maltz, Shenhar & Reilly 2003; Shin *et al*. 2015).

Financial performance measurement

Despite the general consensus among scholars that a firm's performance is a multidimensional construct, one of the most extensively used measures is the financial component – the fulfilment of the economic goal of the organisation (Gentry & Shen 2010). This is in line with Davidson's (2003) argument that the primary goal (aim) of management is to generate profit and to maximise shareholder value. Important to note is that scholars who embark on empirical studies employ a number of different measures to evaluate financial performance (Berger & Bonaccorsi di Patti 2003; Davidson 2003).

The literature research reveals that to assess the financial aspects of organisational performance, researchers generally use either accounting-based measures, such as profitability, sales growth, return on assets (ROA), return on sales (ROS), return on equity (ROE) and/or ROI, or stock market measures, such as Tobin's Q and price earning (P/E) ratio (Hult *et al*. 2008; Likar *et al*. 2014; Nawaz, Hassan & Shaukat 2014; Tsao & Lien 2013).

In the 1980s, researchers primarily used accounting-based measures of financial performance (Hoskisson *et al*. 1999). However, with the rise of shareholder activism in the late 1980s and early 1990s, organisations started adopting shareholder value maximisation as a measure of financial performance (Useem 1993). This paradigm shift promoted the adoption of market-based performance measures in management research (Hoskisson *et al*. 1999).

Despite its limitations, profit maximisation remains one of the key measures of organisational performance (Garg, Joubert & Pellissier 2004). Various researchers use growth as a sole measure of performance, while others choose to combine growth and profitability (Likar *et al*. 2014). However, most researchers prefer to combine ROS, ROA, ROE and ROI

because they complement one another. The use of a single ratio generally does not provide sufficient information to allow investors to judge the overall performance of the firm (Marx 2004). For instance, ROA allows analysts to evaluate the effectiveness and efficiency of the firm's management and employees in generating profit by productively using assets (Firer *et al*. 2008). On the contrary, ROS allows analysts to evaluate the effectiveness and efficiency of the firm's management and employees in generating profit by means of sales (Karanja 2011; Marx 2004).

For the sake of clarity, a short explanation of the aforementioned measures has been provided in Table 1.

According to Campbell and Mínguez-Vera (2008), accounting-based measures are useful because they provide useful objective measures of organisational performance. However, various authors (Fernandez 2001; Frigo 2003; Smith 2007) argue that accounting measures only reflect the history, both in terms of income statements, which explain what happened in a certain year, and those of the balance sheet, which reflects the state of the firm's assets and liabilities at a certain point in time. As such, it is impossible for accounting-based measures to measure value creation.

The challenge of uncovering the true financial value of innovation is a result of practices such as international financial reporting standards (IFRS) not adequately reflecting innovation expenditure (Frigo 2003; Smith 2007). IFRS forces the recording of the immediate expense of investment and thus creates a challenge owing to the time lag between innovation expenditure and the effect it has on financial performance. This leads to a situation in which researchers will need to correlate initial expenditure with a product that will only emerge a few years later (Selby 2010).

Despite the need to measure the effects of innovation, Morris (2008) convincingly argues that measuring innovation presents a problem in itself, because innovation involves venturing into the unknown. Therefore, if one tries to pin down these unknowns too quickly, they may become harder to recognise. In addition, when measuring the impact of innovation, the innovation lifespan should also be put into perspective (Eggink 2011). For instance, sustaining innovation is continuous in nature and as such there is no beginning and no end to the innovation process (OECD/Eurostat 2005). Moreover, different types of innovation will have different lifespans. For example, some innovations will last for a very long time while others may have a short lifespan.

Several market-related measures are proposed in order to account for the long-tern benefits of innovation in an organisation. These include Tobin's Q and price earning (P/E):

- Advocates of Tobin's Q argue that stock market measures incorporate all relevant information and thus, unlike accounting-based measures, are not limited to a single aspect of financial performance (Lubatkin & Shrieves 1986). Tobin's Q is a ratio that indicates the market value of the firm in relation to the replacement cost of the tangible assets (Tobin 1969). Tobin's Q is computed by dividing market capitalisation by the replacement cost of the firm's assets (Cho & Pucik 2005). Tobin's Q is based on the idea that stock markets, if the takeover market for companies was efficient, would operate at a Tobin's Q of 1 (Karanja 2011). In other words, the value of 1 for Tobin's Q indicates that the market value of the firm is greater than the value of the recorded assets in the book of accounts. High Tobin's Q value is an indication of higher capital investment. In contrast, a Tobin's Q value of less than 1 indicates that the market value of the firm is less than the recorded assets in the book of accounts.
- Price earning (P/E), on the contrary, is calculated by dividing share price by earnings per share (EPS). In this method, the relationship between the market share price of a share of stock and the stock's current EPS is often stated in terms of P/E ratio (Garrison *et al*. 2008). The strength of the P/E ratio is its ability to use current and historical data to predict the future. Consequently, investors widely use the P/E ratio as an indicator of future prospects. A high P/E ratio means that investors are willing to pay a premium for a company stock, mainly because the company is expected to have higher than average future earnings growth. According to Selby (2010), when the company's outlook holds the likelihood of future profit, a generic investor will be more inclined to buy that stock.

Despite the intuitive appeal of the above-mentioned measures of the stock market (Lubatkin & Shrieves 1986), the assumption of market-efficiency has been questioned by prominent scholars in finance (Tobin 1969). Bettis (1983) argues that, even if the market-efficiency theory holds, stock price does not necessarily reflect its fundamental value because it is influenced by what management chooses to disclose to the investors. Acknowledging that neither accounting nor market-based measures are perfect, management researchers have accepted measures based on both accounting and stock

TABLE 1: Financial instruments.

Instrument	Description
Return on assets	ROA is an accounting measure of a firm's financial performance based on income before tax and interest, and it indicates how profitable a firm is in relation to its assets (Alexander & Nobes 2010). It shows how effective managers are at generating revenue from the invested assets.
Return on sales	ROS is a performance variable used to evaluate the firm's operational efficiency (Karanja 2011). It indicates how much profit is being generated for each rand of sales.
Return on investment	ROI is defined as net operating income divided by average operating assets (Garrison, Noreen & Brewer 2008). ROI measures how efficiently the organisation utilises its available assets to generate income. Thus, the greater the return on investment, the better (Marx 2004).
Return on equity	ROE, on the contrary, measures the return earned on the owner's investment. It relates to the return generated for shareholders with finance made available by the shareholders (Alexander & Nobes 2010). It is calculated by dividing the net profit after tax by the shareholders' equity. Generally, the owners are better off with a higher ROE.

market as valid for assessing organisational performance (Hoskisson *et al*. 1999). In support of this view, Shook *et al*. (2004) agree and argue that in order to improve the quality of construct measurement, a stream of management researchers prefer using multiple indicators to measure key constructs and then use the structural equation modelling technique (SEM) to do the analysis. For instance, Tsao and Lien (2013) used both ROA and Tobin's Q whereas Talke, Salomo and Kock (2011) and Padgett and Moura-Leite (2012) decided to use Tobin's Q exclusively, mainly because of its ability to capture the value of long-term investment such as innovation.

Non-financial performance measurement

According to Ndregjoni and Elmazi (2012), non-financial measures must also be assessed in order to evaluate overall performance, for two main reasons. Firstly, several interest groups are involved in the business and they all have particular goals and expectations related to the organisation. Secondly, the strategic business areas are not necessarily financial in nature. As a result, several approaches to non-financial indicators exist, such as customer satisfaction and retention, market share, productivity, operational effectiveness and efficiency, reputation, branding and quality (Battor & Battor 2010; Tsai & Tsai 2010; Oke *et al*. 2012; Ul Hassan *et al*. 2013).

Alam (2003), after examining the literature on new product performance measures, proposes three performance dimensions for determining the success of new products, namely financial criteria, customer criteria and opportunity criteria. As indicated by other scholars, financial criteria include financial indicators of new products such as profitability, sales, cost, ROI and market share. The second dimension (customer criteria) refers to customer satisfaction and how new products attract new customers and create new market opportunities. The third dimension (opportunity criteria) is much broader in scope as it relates to overall opportunity that can be created by new products. These include, among others, unlocking opportunities for existing products, providing a platform for developing other new products and acquiring skills and experience, as a result of new product development projects.

More recently, Gentry and Shen (2010) conducted an extensive literature review on organisational performance with the aim of contributing to the debate concerning appropriate measures of organisational performance. They concluded that the use of both financial and non-financial measures is the most appropriate and sound approach to measure organisational performance. However, the authors further argue that the use of financial aspects of performance as a sole measure is not necessarily wrong, but they emphasise that researchers should always clearly define which aspects of organisational performance they intend to study, and then develop and test the hypotheses around that. All of the above should be viewed against the background research against which organisational performance is measured, namely objectively and subjectively.

Objective versus subjective measures

Objective measures are the absolute values of a firm's actual performance (Battor & Battor 2010) and subjective measures generally ask respondents to assess their company's performance relative to that of their competitors (Greenley 1995). For instance, objective financial measures are audited financial data such as sales, profit or asset values (Rajan & Reichelstein 2009). By contrast, the term 'subjective measure' is used to mean that the company's performance is derived from direct observations by management, financial analysts or employee perceptions about organisational performance (Dawes 1999). By virtue of its nature, objective measures are verifiable whereas subjective measures cannot be verified (Rajan & Reichelstein 2009).

Method

This study adopted two generic steps central to the systematic review methodology (Nightingale 2009), namely defining the search strategy, and then selecting relevant studies by applying the inclusion and exclusion criteria. Originating in medical science, a systematic review differs from conversional reviews in that it aims at synthesising research in a systematic, transparent and reproducible manner (Tranfield, Denyer & Smart 2003). A systematic literature review uses explicit, thorough methods to identify, select, appraise and synthesise a set of research studies on a well-defined topic (Robson *et al.* 2007). The primary aim of this review was to identify and report on the instruments used in prior studies that investigated the relationship between innovation and organisational performance, and to identify the most frequently used instruments as well as the rationale behind choosing those instruments.

The keywords 'innovation' (innov*) and 'performance' (perform*) were used in the search. The options (criteria) selected for the search were full text, peer-reviewed and scholarly journals. Target articles needed to match both keywords in a title. Fifty-eight databases on the major database (presented in Box 1-A1), EBSCOhost, were searched for articles and 120 articles were retrieved. Articles whose abstract indicated that either financial or non-financial performance was used as a measure of organisational performance, which were published in English in the last 5 years and where the full text was available were included in the study. Only 71 articles (Table 1-A1) met these criteria.

Findings and discussion

In the sample of 71 studies, five studies (Articles 10; 17; 19; 40 and 46) focused exclusively on non-financial measures, 29 studies (Articles 2; 6; 7; 9; 11; 12; 15; 20; 25; 26; 27; 30; 32; 34; 36; 39; 43; 45; 47; 51; 52; 55; 56; 60; 61; 65; 69; 70 and 71) focused exclusively on the financial component and 37 studies (Articles 1; 3; 4; 5; 8; 13; 14; 16; 18; 21; 22; 23; 24; 28; 29; 31; 33; 35; 37; 38; 41; 42; 44; 48; 49; 50; 53; 54; 57; 58; 59; 62; 63; 64; 66; 67 and 68) combined both the financial and non-financial instruments to measure organisational performance. The financial (accounting and market) measures are discussed first, followed immediately by the non-financial measures.

Financial measures

The different instruments used to measure financial performance in the sample of 71 studies are presented in Table 2. From the sample of 71, a total of 16 financial instruments (profit, sales growth, ROA, ROI, turnover, ROE, ROS, Tobin's Q, operating costs, market to book, income, cash flow, basic earning power, long-term debt, inventory turnover and EPS) were used to measure financial performance.

In support of the argument by Cho and Pucik (2005), Table 2 shows that profitability, despite its weaknesses in measuring long-term investment, is by far the most preferred financial indicator used to measure financial performance, with a staggering 29 studies opting to use this measure, followed by sales growth with 28 studies. The most cited reason for using profitability and sales growth to measure organisational performance is twofold. Firstly, authors argue that innovative behaviour leads to improved operational performance such as cost efficiency, quality improvement and speed to market, which ultimately results in higher profitability and sales growth (Cambra-Fierro *et al*. 2011; Ul Hassan *et al*. 2013). Secondly, authors (Basterretxea & Martinez 2012; Cortez & Cudia 2010; Forsman & Temel 2011) argue that both profitability and sales growth are the most common indicators used in prior studies to measure organisational performance and, as such, enable a comparison between the output of prior studies and the study in question.

In agreement with literature, ROA completes the top three most commonly used instruments to measure financial performance. Consistent with the rationale for using profitability and sales growth instruments, ROA, ROS, ROI and ROE are generally selected for their popularity in prior studies that investigated innovation and organisational performance (Postruznik & Moretti 2012; Rubera & Kirca 2012). Similarly, revenue is preferred because it can be directly linked to innovation activities and it is also a commonly used indicator in prior studies (Eris & Ozmen 2012; Likar *et al*. 2014).

Tobin's Q is the most preferred market-based measure of financial performance, with five studies opting to use this measure. In contrast to the reasons provided for using accounting-based measures, Tobin's Q is used mainly because of its ability to capture the value of long-term investment, such as innovation investment (Padgett & Moura-Leite 2012; Sivakumar *et al*. 2011; Talke *et al*. 2011). Furthermore, Table 2 illustrates that financial instruments, such as operating cost, market to book, income, cash flow, basic earning power, inventory turnover and EPS are not so popular among innovation scholars, despite Selby (2010) presenting a good argument for the use of EPS as a measure of organisational performance, owing to its strength in capturing future expected earnings.

TABLE 2: Financial instruments used to measure organisational performance.

Number	Financial instruments	Article reference number	Number of articles
1	Profitability	3, 4, (7), 8, 12, 13, 14, 16, 24, (25), (26), (27), 28, 31, 37, (39), 42, (43), 44, 53, (55), (56), 57, 59, 62, 66, (68), (69), (70)	29
2	Sales/sales growth	(2), 3, 4, (11), 13, 14, 24, (25), (27), 28, (30), 31, 35, 38, 41, 42, 44, 48, 49, 53, (55), (56), 58, (60), 62, (69), (71)	28
3	Return on assets	(6), (9), (11), (15), 18, (20), (26), 31, 48, 49, 52, 58, (65), (69), (70), (71)	16
4	Return on investment	3, 4, (6), (27), 33, (34), 38, 41, (56), (70)	10
5	Revenue/turnover	5, 18, 23, 41, (45), 47, (61), 63, (69), (71)	10
6	Return on equity	(6), (15), 18, (20), (26), (69), (71)	7
7	Return on sales	(9), (34), (56), 66, (69), (71)	6
8	Tobin's Q	(34), (36), (51), (65)	4
9	Operating costs	58, 64	2
10	Income	(6), 18	2
11	Cash flow	18, 66	2
12	Market to book	(9)	1
13	Basic earning power	21	1
14	Risk/long-term debt	(6)	1
15	Inventory turnover	29	1
16	Earnings per share	(20)	1
Total	-	-	**127**

Note: Numbers in brackets represent studies that exclusively used financial measures.

Non-financial measures

Table 3 presents the instruments used to measure non-financial aspects of organisational performance when investigating the relationship between innovation and organisational performance. From the sample of 71 studies, a total of 10 instruments (market share, customer satisfaction, productivity, operational efficiency, employment growth, quality, competitiveness, reputation or branding, product attractiveness and quick to market) were used to measure non-financial aspects of organisational performance. Table 3 reveals that market share (14 studies), customer satisfaction and retention (12 studies) and productivity (10 studies) are the most popular instruments used to measure non-financial components of organisational performance. Interesting to note is that there are no reasons provided for why the measures were selected. However, one can infer that market dominance, customer satisfaction and productivity were chosen because they are easy to measure and they provide useful information to gauge whether a company is doing well or not.

TABLE 3: Non-financial instruments used to measure organisational performance.

Number	Non-financial instruments	Article reference number	Number of articles
1	Market share	1, 3, 4, 8, 18, 24, 27, 33, 35, 38, 41, 53, 591, 67	14
2	Customer satisfaction or retention	2, 13, 18, (19), 23, 29, (40), 44, 50, 62, 64, 66	12
3	Productivity	(10), (17), 21, 22, 35, 42, 58, 64, 66, 68	10
4	Operational efficiency	17, 18,(19), 23, 29, 60	6
5	Employment growth	5, 22, 23, 35, 58, 71	6
6	Quality	(17), (19), 23, 64, 66	5
7	Competitiveness	31, 48, 49, 66	4
8	Reputation/branding	23, (46), 50	3
9	Product attractiveness	(17), 46	2
10	Quick to market	(17)	1
Total	-	-	**63**

Note: Numbers in brackets represent studies that exclusively used non-financial measures.

Other studies used competitiveness, branding, product attractiveness and quick to market as instruments to measure organisational performance. Studies that focused exclusively on non-financial aspects of organisational performance prefer to use the top three frequently used measures, namely customer satisfaction (Modi 2012; Oke *et al*. 2012; Walker, Damanpour & Devece 2011), market share (Adner & Kapoor 2010) and productivity (Ito & Lechevalier 2010).

Subjective versus objective

Only three studies (Articles 50, 53 and 54) used both objective and subjective measures. In two studies (Articles 50 and 53), the results of the study revealed mixed results and in one study (Article 54), the results showed that innovation leads to superior organisational performance. Despite the importance of using both objective and subjective measures, a considerable number of studies adopted either subjective or objective measures of organisational performance.

Subjective measures

Table 4 presents the article reference number of studies (see Table 1-A1) that used the subjective measures of organisational performance and the findings of the studies that investigated the relationship between innovation and organisational performance.

As stated in the literature, subjective measures are perceived organisational performance, where respondents are requested to assess their company's performance relative to that of their competitors. Of the 71 studies that investigated the relationship between innovation and organisational performance, 43 studies used the subjective measures of organisational performance. The findings provide overwhelming evidence (41 studies) indicating innovation is positively and significantly related to organisational performance. In contrast, two studies found mixed results.

Objective measures

Table 5 depicts authors and hypothesis results of studies that used objective measures of organisational performance on the relationship between innovation and organisational performance. Objective measures, the absolute values of a firm's actual performance, are generally sourced from an independent body such as a stock exchange.

Table 5 shows that when objective measures of organisational performance are used, the higher number of studies reveals mixed results. This suggests that the type of instrument used might also influence the results in studies that investigate the relationship between innovation and organisational performance. For example, the study conducted by Likar *et al*. (2014) showed innovation is significantly and positively related to performance when measured using ROE, whereas the same study revealed no relationship when ROS and ROA were used. Table 5 shows that, of the 25 studies that investigated the relationship between innovation and organisational performance, 13 found a positive relationship and 12 found mixed results.

TABLE 4: Subjective measures of organisational performance.

Article reference number	Findings	Number of articles
1, 2, 3, 4, 5, 8, 10, 12, 13, 14, 16, 18, 23, 24, 28, 29, 31, 33, 34, 35, 37, 38, 39, 40, 41, 42, 44, 46, 48, 49, 55, 56, 57, 58, 59, 62, 64, 66, 68, 70, 71	Innovation is significantly and positively related to organisational performance	41
17, 19	The results were mixed (positive, negative or no relationship)	2
Total	-	**43**

TABLE 5: Objective measures of organisational performance.

Article reference number	Findings	Number of articles
7, 9, 26, 27, 30, 36, 47, 52, 60, 61, 63, 65, 71	Innovation is significantly and positively related to organisational performance	13
6, 11, 15, 20, 21, 22, 25, 32, 43, 45, 51, 69	The results were mixed (positive, negative or no relationship)	12
Total	-	**25**

Managerial implication

The primary purpose of this study is to report on the instruments used to measure organisational performance and investigate whether the type of instrument used influences the results of those studies that investigated the relationship between innovation and organisational performance. Using the systematic review methodology, this study finds that combining both financial and non-financial measures is touted as the most effective measure of organisational performance. In total, 37 studies use both financial and non-financial measures, which constitute 50.7% of the overall sample of articles. However, a substantial number of authors still prefer to use financial measures as the sole measure of organisational performance, with 29 studies focusing exclusively on the financial measures, which constitute 40.8% of the overall sample. The sole use of financial indicators as a proxy for organisational performance may be informed by the popular notion that ultimately the goal of the organisation is to maximise profit in the short term and to maximise shareholder value in the long-term.

In addition, the study provides evidence that profitability, sales growth, ROA, ROS, ROI, ROE and turnover are the most preferred accounting measures for financial performance. Similarly, the study further reveals that Tobin's Q is the most favoured market-related measure used by innovation scholars to measure financial aspects of organisational performance.

On the contrary, market share, customer satisfaction and productivity measures are reported as the most preferred non-financial measures of organisational performance. This study provides clear evidence that the use of non-financial measures as a sole measure is not a common trend, with only 5 (7%) of 71 studies opting to exclusively use non-financial measures to measure organisational performance.

The use of any specific measure of organisational performance is not implicitly wrong, but Gentry and Shen (2010) urge that researchers should always be cautious in their approach and clearly define which aspects of organisational performance they intend to study, and then develop and test hypotheses around that defined area.

When findings were studied, this study showed that organisations that practise innovative behaviour generally exhibit superior organisational performance relative to organisations with less innovative behaviour. The study showed that 54 studies, which constitute 76% of the overall sample, supported the hypothesis that innovation leads to superior organisational performance. In addition, the findings also showed that 60.6% of the overall sample used the subjective measures of organisational performance, relative to only 35.2% which used objective measures of organisational performance. When objective measures were used, the findings reveal that a higher number of studies (48%) showed mixed results, no relationship or negative relationship, relative to 0.05% which showed mixed results, no relationship or negative relationship when subjective measures are used. This finding suggests that the selection of the instruments to measure organisational performance does influence the outcome of the results, as shown in studies that investigate the relationship between innovation and organisational performance.

Thus, the implications of the research for both researchers and practitioners can be divided into two main areas:

- Firstly, the study revealed the measurement instrument favoured by researchers. But of significance is that the reasons for selecting the instruments are generally based on the popularity of the instrument in this domain, and not necessarily based on the objective of the study. This observation suggests that researchers should be more cautious when selecting the instrument to measure organisational performance because the instrument has a direct impact on the outcome of the study.
- Secondly, the finding shows that the method in which the instruments is used can affect the outcome of the research. In other words, when subjective measures of organisational performance are used, the outcome of the results is easily predictable. In contrast, when objective measures are used, the extent of variability of the results increases. In other words, the outcome of the results is not easily predictable when objective measures are used. As such, researchers and practitioners should be more alert to the possible false inferences that may be the result of using a specific method to measure organisational performance, particularly the use of subjective measures.

Conclusion

In conclusion, this finding supports the argument put forward by Gentry and Shen (2010), which states that a thorough literature study should be central to decision-making when selecting measures of organisational performance, as the types of measures seemingly influence the outcome of the enquiry.

Recommendation for future research

This study should serve as stimulus for future studies to explore all the possible factors that influence findings related to the relationship between innovation and organisational performance. Future studies that investigate the relationship between innovation and organisational performance should try to isolate the role of innovation on organisations, and eliminate the cloud created by factors such as measurement tools, by selecting the instrument(s) based on the objective of the study.

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Competing interests

The authors declare that they have no financial or personal relationships which may have inappropriately influenced them in writing this article.

Authors' contributions

T.S. was responsible for all aspects of the research, including matters such as identifying the research problem, formulating the research objective, the research design, execution of the research and drafting the article. R.S. played a mentoring role and assisted with the critical comments and provided guidance in drafting the article.

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APPENDIX 1

BOX 1-A1: EBSCOhost databases.

- Abstracts in Social Gerontology;
- Academic Search Premier;
- Africa-Wide Information;
- AHFS Consumer Medication Information;
- America: History & Life;
- Art Source;
- ATLA Catholic Periodical and Literature Index;
- ATLA Religion Database with ATLASerials;
- Audiobook Collection (EBSCOhost);
- CAB Abstracts;
- Child Development & Adolescent Studies;
- CINAHL with Full Text;
- Communication & Mass Media Complete;
- Communication Abstracts;
- eBook Collection (EBSCOhost);
- EconLit with Full Text;
- Education Source;
- Environment Complete;
- ERIC;
- Family & Society Studies Worldwide;
- Garden;
- Landscape & Horticulture Index;
- Gender Studies Database;
- Global Health;
- GreenFILE;
- Health Source – Consumer Edition;
- Health Source: Nursing/Academic Edition;
- Historical Abstracts with Full Text;
- Hospitality & Tourism Complete;
- Humanities & Social Sciences Index Retrospective: 1907–1984 (H.W. Wilson);
- Humanities Source;
- Index to Legal Periodicals Retrospective: 1908–1981 (H.W. Wilson);
- Inspec;
- Inspec Archive – Science Abstracts 1898–1968;
- Legal Source;
- LGBT Life with Full Text;
- Library & Information Science Source;
- Library;
- Information Science & Technology Abstracts;
- MasterFILE Premier;
- MEDLINE;
- Mental Measurements Yearbook with Tests in Print;
- New Testament Abstracts;
- Newspaper Source;
- Old Testament Abstracts;
- Political Science Complete;
- PsycARTICLES;
- PsycBOOKS;
- PsycCRITIQUES;
- PsycEXTRA;
- PsycINFO;
- PsycTESTS;
- Race Relations Abstracts;
- Regional Business News;
- RILM Abstracts of Music Literature;
- Social Work Abstracts;
- SocINDEX with Full Text;
- Teacher Reference Center;
- Urban Studies Abstracts;
- Waters & Oceans Worldwide;
- Wildlife & Ecology Studies Worldwide.

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TABLE 1-A1: Chronological list of articles selected for the research.

Article reference number	Year	Author(s)	Title
1	2010	Adner & Kapoor	Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations
2	2010	Aspara, Hietanen & Tikkanen	Business model innovation versus replication: financial performance implications of strategic emphases
3	2010	Battor & Battor	The impact of customer relationship management capability on innovation and performance advantages: testing a mediated model
4	2010	Bodlaj	The impact of a responsive and proactive market orientation on innovation and business performance
5	2010	Clifton, Keast, Pickernell & Senior	Network structure, knowledge governance and firm performance: evidence from innovation networks and small and medium enterprises (smes) in the United Kingdom
6	2010	Cortez & Cudia	The impact of environmental innovations on financial performance: the case of Japanese automotive and electronics companies
7	2010	Faems, Visser, Andries & Looy	Technology alliance portfolios and financial performance: value-enhancing and cost-increasing effects of open innovation
8	2010	Gibb & Haar	Risk-taking, innovativeness and competitive rivalry: a three-way interaction towards firm performance
9	2010	Huffman & Skaggs	The effects of customer–firm interaction on innovation and performance in service firms
10	2010	Ito & Lechevalier	Why some firms persistently out-perform others: investigating the interactions between innovation and exporting strategies
11	2010	Artz, Norman, Hatfield & Cardinal	A longitudinal study of the impact of R & D, patents and product innovation on firm performance
12	2010	Kreiser & Davis	Entrepreneurial orientation and firm performance: the unique impact of innovativeness, proactiveness and risk-taking
13	2010	Lau, Tang & Yam	Effects of supplier and customer integration on product innovation and performance: empirical evidence in Hong Kong manufacturers
14	2010	McNally, Cavusgil & Calantone	Product innovativeness dimensions and their relationships with product advantage, product financial performance and project protocol
15	2010	Mat Rabi, Zulkafli &Che-Haat	Corporate governance, innovation investment and firm performance: evidence from Malaysian public-listed companies
16	2010	Stegerean & Gavrea	Innovation and development – criteria for organisational performance
17	2010	Terziovski	Innovation practice and its performance implications in smes in the manufacturing sector: a resource-based view
18	2010	Tsai & Tsai	Innovation capability and performance in Taiwanese science parks: exploring the moderating effects of industrial clusters fabric
19	2010	Walker, Damanpour & Devece	Management innovation and organisational performance: the mediating effect of performance management
20	2010	Wheatley & Doty	Executive compensation as a moderator of the innovation–performance relationship
21	2011	Aas & Pedersen	The impact of service innovation on firm-level financial performance
22	2011	Cainelli, Mazzanti & Zoboli	Environment-oriented innovative strategies and firm performance in services
23	2011	Camarero, Garrido & Vicente	How cultural organisations' size and funding influence innovation and performance: the case of museums
24	2011	Cambra-Fierro, Hart, Mur & Redondo	Looking for performance: how innovation and strategy may affect market orientation models
25	2011	Cortez & Cudia	The impact of environmental innovations on financial performance: the case of Japanese automotive and electronics companies
26	2011	Fang, Palmatier & Grewal	Effects of customer and innovation asset configuration strategies on firm performance
27	2011	Forsman & Temel	Innovation and business performance in small enterprises: an enterprise-level analysis
28	2011	Gökmen & Hamşioğlu	The effect of knowledge management, technological capability and innovation on the enterprise performance: a comprehensive empirical study of the Turkish textile sector
29	2011	Grawe, Daugherty & Roath	Knowledge synthesis and innovative logistics processes: enhancing operational flexibility and performance
30	2011	Huang, Chen & Han	The effect of business reorganisation and technical innovation on firm performance
31	2011	Liu & Wu	Technology embeddedness, innovation differentiation strategies and firm performance: evidence from Chinese manufacturing firms
32	2011	Sivakumar, Roy, Zhu & Hanvanich	Global innovation generation and financial performance in business-to-business relationships: the case of cross-border alliances in the pharmaceutical industry
33	2011	Song, Im, Van Der Bij & Song	Does strategic planning enhance or impede innovation and firm performance?
34	2011	Stock & Zacharias	Patterns and performance outcomes of innovation orientation
35	2011	Subrahmanya	Technological innovations and firm performance of manufacturing SMEs: determinants and outcomes
36	2011	Talke, Salomo & Kock	Top management team diversity and strategic innovation orientation: the relationship and consequences for innovativeness and performance
37	2011	Wu & Lin	The influence of innovation strategy and organisational innovation on innovation quality and performance
38	2012	Alpay, Bodur, Yilmaz & Büyükbalci	How does innovativeness yield superior firm performance? the role of marketing effectiveness
39	2012	Basterretxea & Mart´Inez	Impact of management and innovation capabilities on performance: are cooperatives different?
40	2012	Brockman, Jones & Becherer	Customer orientation and performance in small firms: examining the moderating influence of risk-taking, innovativeness and opportunity focus
41	2012	Eris & Ozmen	The effect of market orientation, learning orientation and innovativeness on firm performance: a research from Turkish logistics sector
42	2012	Gronum, Verreynne & Kastelle	The role of networks in small- and medium-sized enterprise innovation and firm performance
43	2012	Guiral	Corporate social performance, innovation intensity and financial performance: evidence from lending decisions
44	2012	Huang, Lai, Kao & Chen	Target costing, business model innovation and firm performance: an empirical analysis of Chinese firms
45	2012	Mazzola, Bruccoleri & Errone	The effect of inbound, outbound and coupled innovation on performance

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TABLE 1-A1 (Continues...): Chronological list of articles selected for the research.

Article reference number	Year	Author(s)	Title
46	2012	Modi	Market orientation in non-profit organisations: innovativeness, resource scarcity and performance
47	2012	Mollick	People and process, suits and innovators: the role of individuals in firm performance
48	2012	Nybakk	Learning orientation, innovativeness and financial performance in traditional manufacturing firms: a higher-order structural equation model
49	2012	Nybakk & Jenssen	Innovation strategy, working climate and financial performance in traditional manufacturing firms: an empirical analysis
50	2012	Oke, Walumbwa & Myers	Innovation strategy, human resource policy and firms' revenue growth: the roles of environmental uncertainty and innovation performance
51	2012	Padgett & Moura-Leite	Innovation with high social benefits and corporate financial performance
52	2012	Postružnik & Moretti	Innovation and communication as dimensions of the marketing culture: Their influence on financial performance in Slovenia's insurance and construction industries
53	2012	Ritala	Coopetition strategy – When is it successful? Empirical evidence on innovation and market performance
54	2012	Rubera & Kirca	Firm innovativeness and its performance outcomes: A meta-analytic review and theoretical integration
55	2012	Ruiz-Arroyo, Mar Fuentes-Fuentes, Bojica & Rodriguez-Ariza	Innovativeness and performance in women-owned small firms: The role of knowledge acquisition
56	2013	Stock, Six & Zacharias	Linking multiple layers of innovation-oriented corporate culture, product program innovativeness, and business performance: A contingency approach
57	2012	Ndregjoni & Elmazi	The effects of relationship between information technology and firm innovation on firm performance: The case of Albani
58	2013	Bigliardi	The effect of innovation on financial performance: A research study involving SMEs innovation
59	2013	García-Zamora, González-Benito & Muñoz-Gallego	Organisational and environmental factors as moderators of the relationship between multidimensional innovation and performance
60	2013	Hemert, Nijkamp & Masurel	From innovation to commercialisation through networks and agglomerations: Analysis of sources of innovation, innovation capabilities and performance of Dutch SMEs
61	2013	Iona, Leonida & Navarra	Business group affiliation, innovation, internationalisation and performance: A semi-parametric analysis
62	2013	Noruzy, Dalfard, Azhdari , Nazari-Shirkouhi & Rezazadeh	Relations between transformational leadership, organisational learning, knowledge management, organisational innovation and organisational performance: An empirical investigation of manufacturing firms
63	2013	Robeson & O'connor	Boards of directors, innovation and performance: An exploration at multiple levels
64	2013	Slavković & Babic	Global innovation generation and financial performance in business-to-business relationships: The case of cross-border alliances in the pharmaceutical industry
65	2013	Tsao & Lien	Family management and internationalisation: The impact on firm performance and innovation
66	2013	Ul Hassan, Shaukat, Nawaz & Naz	Effects of innovation types on firm performance: An empirical study on Pakistan's manufacturing sector
67	2013	Yen	The impact of bank's human capital on organisational performance: How innovation influences performance
68	2013	Zhou, Hong & Liu	Internal commitment or external collaboration? The impact of human resource management systems on firm innovation and performance
69	2014	Likar, Kopac & Fatur	Innovation investment and economic performance in transition economies: Evidence from Slovenia
70	2014	Nawaz, Hassan & Shaukat	Impact of knowledge management practices on firm performance: Testing the mediation role of innovation in the manufacturing sector of Pakistan
71	2014	Yang, Yang & Chen	Effects of service innovation on financial performance of small audit firms in Taiwan