South African Journal of Information Management
ISSN: (Online) 1560-683X, (Print) 2078-1865

Effects of knowledge management on firm competitiveness: The mediation of operational efficiency

Authors:
Mokgadi P. Mantje[1]
Patient Rambe[1]
Takawira M. Ndofirepi[1]

Affiliations:
[1]Department of Business Support Studies, Faculty of Management Sciences, Central University of Technology, Bloemfontein, South Africa

Corresponding author:
Mokgadi Mantje,
mokgadimantje@gmail.com

Dates:
Received: 06 Apr. 2022
Accepted: 22 June 2022
Published: 08 Feb. 2023

How to cite this article:
Mantje, M.P., Rambe, P. & Ndofirepi, T.M., 2023, 'Effects of knowledge management on firm competitiveness: The mediation of operational efficiency', *South African Journal of Information Management* 25(1), 1549. https://doi.org/10.4102/sajim.v25i1.1549

Background: Although knowledge management (KM) directly impacts firm competitiveness, in efficiency-driven economies such as South Africa, the contribution of operational efficiency to this relationship has been underexplored in KM literature.

Objectives: This study examined how operational efficiency interacts with KM to influence firm competitiveness. The study employs the South African context to enrich knowledge on the effects of KM on firm competitiveness and the extent to which operational efficiency mediates the process.

Method: Using a quantitative approach with a survey design, 300 structured questionnaires were distributed to 300 small, medium and micro enterprise (SMME) owners and managers in the Free State province to establish the interaction of KM, operational efficacy and competitiveness.

Results: The results of path coefficients revealed KM's positive and significant effect on firm competitiveness. Moreover, operational efficiency partially mediated KM (recognition) (B = 0.1545, p = 0.019) and KM (implementation)'s (B = 0.0697, p = 0.050) effects on firm competitiveness.

Conclusion: The prevalence of highest qualification among SMME owners/managers demonstrates that human capital development, especially business management training during business start-ups, may contribute to increased firm competitiveness. Moreover, the lack of resources in managing knowledge for implementing daily routines and increasing sales demonstrates that improved resource mobilisation by SMMEs might improve their competitiveness.

Contribution: The study provides strategic interventions for improving SMME competitiveness through better management of their knowledge practices and operational efficiency.

Keywords: knowledge management; operational efficiency; firm competitiveness; SMMEs; mediation.

Introduction

Small, medium and micro enterprises (SMMEs) are key drivers of job creation and poverty alleviation in developing economies (SEDA 2016). As such, their increased competitiveness could be a main game-changer in an information-intensive global economy. Firm competitiveness denotes the business's ability to deploy its resource combinations to have an edge over its competitors (Ramorena 2016). Literature suggests that firm competitiveness is central to the long-term financial sustenance (Kiptalam, Komene & Buigut 2016; Akben-Selcuk 2015), innovative capacity (Ramorena 2016) and operational performance of firms (Rao & Soumya 2015).

Recent studies recognise knowledge as a strategic resource (Ha & Lo 2018; Nenungwi & Garaba 2022; Samir 2020) and foreground effective knowledge management (KM) as critical to organisational success (Centobelli, Cerchione & Esposito 2019). Knowledge comprises human capital resources such as ability, ideas, expertise and know-how. Knowledge management pertains to 'an integrated process that provides organisations with the capability to acquire, convert, apply and protect knowledge for the fulfilment of organisational objectives' (Ha & Lo 2018:24).

Effective implementation of KM tools and practices contributes to enhanced operational efficiency, improved innovation orientation, improved service delivery and improved prediction

of new developments in markets (De Souza & Awazu 2006). Implementation is the process that turns strategies and plans into actions to accomplish strategic objectives and goals (Olsen 2015). Effectiveness is about delivery of high-quality products and services through reasonable exploitation of resources therefore, effective implementation denotes the process through which organisations translate strategies, plans, programmes and projects into actionable activities through appropriate deployment of resources. The capacity of the firm to acquire, manipulate and apply knowledge enables the efficient operations of human and capital resources (Omotayo 2015) by eliminating resource wastage and directs critical resources to areas where they are most needed. This assertion identifies with Abusweilem and Abualoush's (2019) view on the positive and significant role of KM in the operational performance of firms, which contributes to their increased productivity (Attar, Kang & Sohaib 2019).

Although some previous studies (Nowacki & Bachnik 2016; O'Connor & Kelly 2017) associate KM with business competitiveness in a way it brings innovation to organisational context, this is based predominantly on data relating to large firms and not SMMEs (Edvardsson & Durst 2013). Furthermore, studies by Zieba, Bolisani and Scarso (2016) suggest that the practice and execution of KM is not similar in small and large corporations. Therefore, size, resource endowments and capabilities differences mean that the results on KM-competitiveness relationships for large firms cannot be transferred simplistically to small firms.

Literature suggests a positive relationship between operational efficiency and firm competitiveness, because operational efficiency is associated with healthy and sustainable financial performance (Kholopane 2016; Ndolo 2015). Kholopane (2016) posited that operational efficiency impacts firm competitiveness through offering superior services, quality products and service delivery and serving foreign markets. Moreover, Zanotti, Reyes and Fernandez (2018) affirmed that through streamlined financial and operational performance, firms can improve their liquidity and competitive positioning. Similarly, Ndolo (2015) contended that an operational strategy enables firms to utilise their resources better to improve their competitiveness.

While there is sufficient literature on the effects of KM on firm competitiveness, Akben-Selcuk (2015) and Kiptalam et al. (2016) posited that KM influences financial performance and the effects of KM on operational efficiency (Abusweilem & Abualoush 2019; Omotayo 2015) because KM streamlines internal operations. There is lack of knowledge on the mechanisms through which operational efficiency affects the interactions between KM and competitiveness of firms. As KM directly affects firm competitiveness (Jyoti, Rani & Kotwal 2013; Kiptalam et al. 2016) and operational efficiency (Abusweilem & Abualoush 2019), the same way operational efficiency has an influence on company's bottom line (Sharma, Vashisth & Sharma 2014), it can be inferred that operational efficiency facilitates the relationship between KM and firm competitiveness. However, what remains unclear is the extent to which operational efficiency mediates the KM and firm competitiveness relationship mediates the KM-firm competitiveness relationship; hence, this study explores this gap.

Literature review and hypothesis

Theoretical overview

The dynamic capabilities framework provides a useful strategic management framework for understanding how firms harness their internal and external capabilities to enhance their performance and long-term competitiveness. Capabilities denote the ability to adapt, reconfigure and integrate skills, resources and functional competences (Mohamud & Sarpong 2016; Teece & Pisano 1994) in ways that increase the economic value of firms. The dynamic capabilities framework postulates that firms which emphasise repetitive processes and harness their internal and external competences to address the changing environment have more potential to attain competitive advantage than those that do not (Mohamud & Sarpong 2016). Inan and Bititci (2015) posited that dynamic capabilities allow firms to extend or modify their existing resources, alter their operational capabilities so that they can adapt. The present study argues that dynamic capabilities manifest in the capacity of small firms to harness their knowledge resources and their operational efficiencies prudently and competently in ways that reduce the cost of production, augment their sales and exert dominance in markets, thereby increasing their competitive advantage.

The dynamic capabilities framework provides a useful theoretical lens for grasping the effects of KM on firm competitiveness, as it lays a foundation for comprehending how strategic resources at the disposal of the firm (e.g. capacity to manage knowledge and operational efficiency) can be harnessed as useful vehicles for unleashing the competitive edge of firms. Nielsen (2006:60) presented dynamic capabilities as 'integrated sets of KM activities that changes, renews and exploits the knowledge-based resources of the firm'. Effective KM (acquisition, conversion, application and protection), a key dynamic capability in organisations directly impacts strategic organisational performance, which in turn influences financial outcomes (Zack, Mckeen & Singh 2009). Effective KM, for example, creates a competitive advantage (Sook-Ling, Choo-Kim & Razak 2013), enables effective service delivery (Nenungwi & Garaba 2022) and adds value to client engagement, according to empirical studies based on economic entities from various economic sectors (Govender, Mearns & Du Plessis 2022). Given the agility and versatility of small firms in terms of resources appropriation and exploitation (e.g. bootstrapping, collapsing of managerial and ownership functions as cost-recovery strategies), one would expect such capabilities to be advanced to the benefit of the firm in terms of competing with rival firms.

Concept of firm competitiveness

Although there is no generally accepted definition of term 'competitiveness', Ocloo et al. (2014) perceived

competitiveness as the extent to which a firm's products and services exhibit an edge over its competitors for continued survival and competition for markets, resources and revenues. Firm competitiveness is therefore usually measured by a firm's performance against other firms and depends on its ability to manage knowledge and cultivate operational efficiency (Kiptalam et al. 2016). Institutionalised competitive intelligence is critical to achieving strategic business objectives such as firm competitiveness in the information and knowledge economy age (Maritz & Du Toit 2018). An effective competitive intelligence system converts information about the business environment into new business knowledge that business leaders can use to make decisions that will improve their enterprises' competitiveness (Chevallier et al. 2016). Ghannay and Zeineb (2012) argued that the combination and alignment of competitive intelligence and KM policies and systems allows businesses to gain a long-term competitive advantage.

Conceptualisation of knowledge management

Knowledge management is an emerging set of organisational design and operational principles, processes, organisational structures, applications and technologies that help knowledge workers to dramatically leverage their creativity and ability to deliver business value to customers and assist organisations to acquire improved business competitiveness and improved operations (Jantarajaturapath, Imsuwan & Wongsim 2016). Because organisations in the global economy no longer rely on just tangible assets and production factors to remain competitive (Omotayo 2015), KM has evolved as the main source of competitive advantage. Hence, SMMEs need this strategic shift to KM to capitalise on the innovation and competence prospects associated with it (Dube & Ngulube 2012; Krajnovic, Covo & Jasic 2012).

Knowledge management can be broadly categorised into two dimensions, namely knowledge recognition and knowledge implementation (Mokoena 2019; Ndolo 2015). These dimensions are relevant because they are concerned with the identification of knowledge gaps and the constitution of KM practices (Robertson 2016; Zieba et al. 2016). The fundamental importance of the dimensions under study is underpinned by their recursive processes that permit SMMEs to compete globally.

Knowledge management recognition and firm competitiveness

Knowledge management recognition deals with the awareness of having knowledge or perceptive knowledge of a situation or fact (Wiboho 2014). Small, medium and micro enterprises' knowledge recognition implies that SMMEs are acutely aware of the innovative potential of knowledge they search for and identify as most germane for the firm, are conscious of immediate customer trends and can establish the firm's customers and client relations beyond immediate borders (Lofgren 2014). This confirms Baporikar's (2014) assertion that knowledge recognition revolves around locating knowledge that increases a firm's productive capacity, the awareness of and ability to take advantage of business opportunities, thereby strengthening the firm's competitiveness.

Knowledge recognition deals with the awareness and realisation of the importance of well-managed knowledge and how it fits into the firm's workflow (Wiboho 2014). The fact that knowledge recognition is a critical tool in organisational operations is suggestive of its potential contribution to increasing firm competitiveness. Hence, Kuppusamy and Ramanigopal (2017) posited that the provision of awareness sessions to employees regarding the importance of knowledge recognition needs further improvement and focus, especially among small firms, because of their dependence on knowledge resources. Masic et al. (2017) asserted that in organisations, knowledge recognition could improve the decision-making process, reduce operational costs and time, improve efficiency and enhance competitiveness of firms. This study therefore posits that:

> **Hypothesis 1:** Knowledge management (recognition) directly influences firm competitiveness.

Knowledge management (implementation) and firm competitiveness

Naicker et al. (2017) asserted that the implementation of KM deals with the structured coordination of a firm's people and culture, processes and technology. Hamad et al. (2018) posited that KM implementation involves the effective utilisation, sharing and transferring of knowledge once it is created with colleagues, teammates and coworkers to improve organisational effectiveness. Effectiveness involves selecting the best action among a range of alternatives or the identification of appropriate strategic goals, that is, 'doing the right thing' (Lee & Johnson 2012). Therefore, KM implementation can be regarded as a practice of leveraging knowledge and thus adding value to organisation advantage (Bennet, Bennet & Avedisian 2015).

Literature on KM implementation highlights that in the new knowledge-based economy, the achievement of competitive advantage depends on the firm's capacity to develop and implement its knowledge-based resources. This assertion leads to the postulation that KM implementation is positively associated with the company's competitiveness (Andreeva & Kianto 2012). Knowledge management implementation is a critical ingredient for organisations seeking to ensure sustainable strategic competitive advantage (Omotayo 2015). As such, it is therefore cogent to hypothesise that KM implementation is an organisation's strategic process, which is directed at developing strategic capabilities, enabling firms to deal with turbulence in the business environment, which ultimately improves the competitive advantage of firms. It can be postulated that:

> **Hypothesis 2:** Knowledge management (implementation) directly influences firm competitiveness.

Operational efficiency

There is a clear lack of consensus on the definition of operational efficiency. On the one hand, operational efficiency

is expressed as an operational excellence management system (OEMS) consisting of a set of rules that will guide a company in its operations to achieve operational competence (Al-Qubaisi & Ajmal 2018). On the other hand, the concept is conceived as a ratio of actual input measured against maximum output and behaves like financial leverage (Sharma et al. 2014). The authors contend that operational efficiency identifies and eliminates wasteful processes and resources that threaten organisational profits and facilitates remedial design of new work processes that improve the quality and productivity of the firm. In Njoroge's (2012) view, a firm is operating efficiently when it is generating sales revenue and minimising costs, as evidenced by increasing its sales volumes at minimal cost.

Operational efficiency is extensively linked with firm competitiveness. Kiptalam et al. (2016) validated this observation by contending that operational efficiency and capabilities available to the firm determine whether the firm will be competitive over its rivals or not. Thus, Okwang'a, Mungania and Karanja (2015) maintained that operating efficiently ensures that firms produce at lower costs, increase customer satisfaction and stay ahead of the competition in the market.

Operational efficiency mediates the relationship between knowledge management (recognition) and firm competitiveness

To attain better competitive advantage, it is imperative that firms recognise their KM strengths and shortfalls. The general view is that KM (recognition), which is the firm's ability to locate and recognise knowledge that increase the productive capacity (Baporikar 2014), has the potential to affect operational efficiency. For instance, Al-Qubaisi and Ajmal (2018) underscore that KM recognition can be implemented to maximise the organisations' efficiency, which according to Kiptalam et al. (2016) is higher productivity against lower inputs. This corroborates Hegazy and Ghorab's (2015) assertion that KM recognition enables an organisation to achieve its goals of improving effectiveness and efficiency – in other words, operational efficiency. Omotayo (2015) affirmed that KM recognition increases the capacity of firms to effectively utilise their resources in ways that assert their dominance in the market in relation to their competitors. Moreover, Omotayo (2015) emphasised that KM (recognition) is a key driver of organisational performance, as it is a vital tool for organisational survival, competitiveness and profitability.

Although the impact of operational efficiency on firm competitiveness has been equivocal, operational efficiency and KM recognition have also shown complementary or substitutive effect on firm competitiveness. for instance, KM (recognition) directly impacts firm competitiveness (Abusweilem & Abualoush 2019; Obeidat et al. 2016) and operational efficiency (Madonsela, Sobiyi & Twala 2017), then operational efficiency also directly impacts firm competitiveness (Ponelis 2011). It is plausible that KM (recognition) interacts with firm competitiveness via operational efficiency. Put differently, operational efficiency mediates the relationship between KM and firm competitiveness. One needs to test this postulation empirically to establish the extent of this mediation. It is against this background that this study hypothesises that:

> **Hypothesis 3:** Operational efficiency mediates the influence of knowledge management (recognition) on firm competitiveness.

Operational efficiency mediates the relationship between knowledge management (implementation) and firm competitiveness

Even though studies (Ho, Hsieh & Hung 2014; Lyu, Zhou & Zhang 2016) report the lack of empirical evidence validating the relationship between KM practices (implementation) and operational efficiency, Al-Qubaisi and Ajmal (2018) argued that there is credible evidence within KM literature suggesting strong links between KM implementation and operational efficiency. Moreover, Omotayo (2015) proclaimed that for any organisation, the goal of managing knowledge is to increase profit by improving the efficiency of operations, thus enhancing competitiveness or competitiveness differentiation. Therefore, it can be inferred that the superior profits and improved efficiency are positive benefits accruing to operational efficiency, a view that supports operational efficiency's mediation of KM implementation–firm competitiveness relationship. This inference corroborates Okwang'a et al.'s (2015) study that suggested a positive relationship between KM implementation and operational efficiency and Kuppusamy and Ramanigopal's (2017) claim that KM implementation is a critical and vital organisational resource that aids efficiency and effectiveness, which invariably affect the competitive advantage of firms in the global business environment.

The current study identifies with Simaškienė and Stancikienė's (2014) argument that the implementation of KM helps the company to create, collect, organise, share, analyse, update and use knowledge as a rationally managed resource (Simaškienė & Stancikienė 2014), which helps the company to appropriately to adapt to the changes and compete successfully in the market. As such, it is plausible to have an indirect relationship between KM implementation and firm competitiveness, when KM interacts with competitiveness via operational efficiency, which is an intermediary between these two variables. This study, therefore postulates that if knowledge management (implementation) directly impacts firm performance firm performance (Jyoti et al. 2013; Kiptalam et al. 2016) and operational efficiency (Meihami & Meihami 2013), then operational efficiency directly impacts firm competitiveness (Simaškienė & Stancikienė 2014). Furthermore, it is plausible that KM (implementation) interacts with firm competitiveness via operational efficiency. Therefore, operational efficiency mediates the relationship between KM and firm competitiveness. Cognisant of the preceding discussion, this study hypothesises that:

> **Hypothesis 4:** Operational efficiency mediates the influence of knowledge management (implementation) on firm competitiveness.

The conceptual model depicted in Figure 1 demonstrates a direct relationship between KM and firm competitiveness,

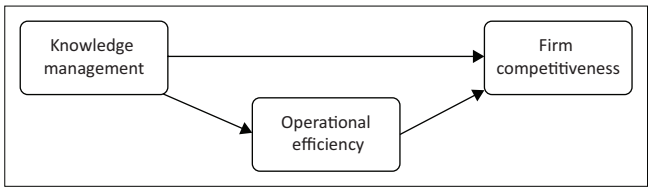


FIGURE 1: Conceptual model.

KM can also interact with firm competitiveness through operational efficiency (mediation effect).

Methodology

Research design and target population

This study employed an explorative, cross-sectional design to explore the influence of KM and firm competitiveness, with operational efficiency as an intermediary. A positivistic and quantitative approach was adopted to test the associative relationships between variables under study. A survey instrument was developed based on extensive literature covering KM, operational efficiency and competitiveness. A cross-section survey was administered on retail SMMEs in Mangaung Metropolitan Area (MMA), Free State province, a large administrative area with a fairly large concentration of small business in the central region of South Africa. As one of the traditional methods of research, a survey instrument was considered most appropriate appropriate for the study because of its ease of use and ability to yield large amounts of analysable data (Young 2016) in a short time.

The target population for this study was retail SMMEs, business entities that have a strong presence in the central region of South Africa (SEDA 2016). Moreover, the choice of SMMEs was driven by their overall strategic importance in boosting the country's economy through employment creation and poverty alleviation (Mbuyisa 2017), despite their apparent weak competitiveness (Rambe & Khaola 2020), a concern which necessitates due attention. The Wholesale and Retail Sector Training Authority (W&RSTA) of South Africa estimated that there are approximately 3165 registered SMMEs in the Free State province. The W&RSTA was deemed the most credible source because it is made up of predominantly SMMEs, which account for approximately 90% of the retail sector.

Sampling and data collection

Drawing on the identified population, the researchers extracted a sample comprising a manageable number of SMMEs. Using an online sample size calculator[1] set at 95% confidence level and a margin of error of 5%, a population of 3165 SMMEs will generate a sample of 343 SMMEs. Even though the sample was drawn from SMMEs, the authors drew their information from SMME owners and managers because of their close proximity to the relevant variables under study and their knowledge of routine business operations. A structured questionnaire comprising closed-ended, five-point Likert scale questions was developed to establish the extent of respondents' agreement with the provided statements (Maree & Pietersen 2016). The questionnaire was deemed most appropriate as it provided convenience of completion in view of the SMME owners and managers' competing roles and responsibilities. The instrument covered demographic data and business profiles, SMME's KM dimensions, operational efficiency and competitiveness.

1.See https://www.surveysystem.com/sscalc.htm.

A total of 343 survey questionnaires were distributed by hand by the main author and two research assistants to SMME owners and managers in the MMA. Some SMME owners and managers completed and handed over their copies instantly to the researchers, while others asked them to collect it later. Over a period of 2 months, 300 out of the 343 questionnaires (representing acceptable 87.5% response rate) were correctly completed and collected from SMME owner and managers. Small, medium and micro enterprise owners and managers were accessible directly from their respective workplaces, while those who were not physically available were reached through their e-mails. Those who completed the form electronically submitted it via e-mail to the researcher or research assistants.

Demographics and business profile of respondents

The results indicate male dominance (60%) in SMME ownership, while the female counterparts accounted for 40%. This finding corroborates Bhorat et al.'s (2018) assertion that men typically own the majority of SMMEs. About 46.7% of the respondents were between the ages of 36 and 55 years, 42.3% were between 18 and 35 years, while only 11.0% were individuals over 56 years. This demonstrates the presence of mature adult population as either owners or managers of SMMEs. Black people were the most represented (49%) racial group, followed by mixed race people, who comprised 27.7% of the sample. A significant percentage (35.3%) of owners and managers possessed the highest qualification of matric or lower high school grade and 27.7% professed to having tertiary qualification, while 30% were postgraduates. The important statistics to note are that almost half the number of respondents (47.3%) were owners and managers of the business and 42% of businesses were in existence for 6–10 years.

Measures

The scales used to measure the variables were adapted from the existing literature.

Knowledge management: Two dimensions (recognition and implementation) were used to assess SMME KM (Cardoni et al. 2020). On a five-point Likert scale, respondents were asked to indicate their extent or agreement with an available set of statements. Items included in the measurement scale were knowledge resources available in operations and sales, training and personnel, including knowledge sharing and transfer (Baporikar 2014; Robertson 2016). Sample questions around KM recognition (items) were how critical the recognition of KM was in business operations and sales and

whether the business supported employees with training and role specification. Sample question items on KM implementation were the extent to which the business deployed other resources and personnel to support the implementation of KM and how the business encouraged knowledge sharing and transfer. Overall, KM was measured by 11 items covering two dimensions.

Operational efficiency: The construct was subdivided into two dimensions: proactiveness and intelligence generation (Bindl & Parker 2010; Ndolo 2015). On a five-point Likert scale, respondents were asked to indicate their extent or agreement with a provided set of statements. Sample items used to measure proactiveness covered the firm's ability to leverage technology, enhance employee skills and promote efficient delivery of goods and services to customers (Kalluru & Bhat 2009). Intelligence generation was measured using sample questions (items) such as the gathering and assessing of competitor information, gathering of customer information, business discussions with suppliers and maintaining corporate relations with other firms. Overall, operational efficiency was measured by 11 items covering two dimensions.

Firm competitiveness: On a five-point Likert scale, respondents were asked to indicate their extent or agreement with a provided set of statements. Sample items used to measure firm competitiveness were whether the firm forecasted better return on investment (Arslan & Tathdil 2012; Ricardo 2015), the company enjoyed better market share, the firm had increased gross sales (SME Competitiveness Outlook 2015). Measuring SME competitiveness the firm had retained existing customers and attracted new customers and the business could attract talented employees.

Ethical considerations

Ethical clearance to conduct this study was obtained from the Faculty of Management Sciences Research and Innovation Committee of the Central University of Technology (ref. no. FMSEC05/18).

Results

The researchers used partial least squares structural equation modelling (PLS-SEM) to test whether the collected data adequately described the proposed model. ADANCO 7 computer software was used to conduct the tests. The PLS-SEM is a nonparametric structural equation model estimator which, unlike covariance-based SEM, does not require specific thresholds concerning data distribution and sample size to be satisfied. The PLS-SEM is conducted at two levels, that is, (1) assessment of the measurement (outer) and (2) assessment of the structural (inner) model assessment.

Measurement (outer) model assessment

Asssessment of the measurement model involves ascertaining whether proposed indicator variables adequately represent the latent constructs, which they are purpoted to measure. In this regard, the following issues are tested: internal consistency (reliability), convergent and discriminant validity. Firstly, the researchers used the Cronbach's alpha (α) coefficient to access reliability. A Cronbach's alpha coefficient of at least 0.7 confirms acceptable internal consistency of measuring items. Secondly, average variance extracted (AVE) was used to measure convergent validity. Convergent validity of a latent construct is confirmed when its indicator values demonstrate high levels of positive correlation – AVE greater than 0.5. The results of the two tests are presented in Based on the data presented in the table, all the constructs in the proposed conceptual model satisfied the minimum conditions of reliability and convergent validity.

While testing the suitability of the measurement model, the extent to which the constructs in the model differed from each other was also evaluated. This is known as discriminant validity. Discriminant validity exists when indicators exhibit high factor loadings on the specific constructs, which they represent and there are no cross-loading of items across constructs. Table 2 shows no evidence of cross-loadings, and this confirms discriminant validity.

Structural (inner) model assessment

The structural model was assessed using the following indicators: (1) the coefficient of determination (*R*-squared), a measure of predictive power, and (2) path coefficients, measures of strength of relationships between variables. *R*-squared measures the variance of an endogenous variable explained by a set of predictor variables. Its value ranges from 0 to 1. As presented in Figure 2 and Table 3, KM (recognition) and KM (implementation) accounted for 75.4% of the variance in operational efficiency (proactiveness) and 53.1% of the variance in operational efficiency (intelligence gathering). Moreover, KM (recognition), KM (implementation), operational efficiency (proactiveness) and operational efficiency (intelligence gathering) collectively explained 64.6% of the variance in firm competitiveness. Hair et al. (2014) suggested that R^2 values ranging from 0.5 to 0.75 represent moderate predictive power of a proposed model. Therefore, the model that was proposed in this study has moderate predictive power.

Path coefficients were used to test the strength of the direct and indirect relationships between the independent and dependent variables. The statistics in Table 4 shows that data supported the following hypothesised direct relationships: H1: KM

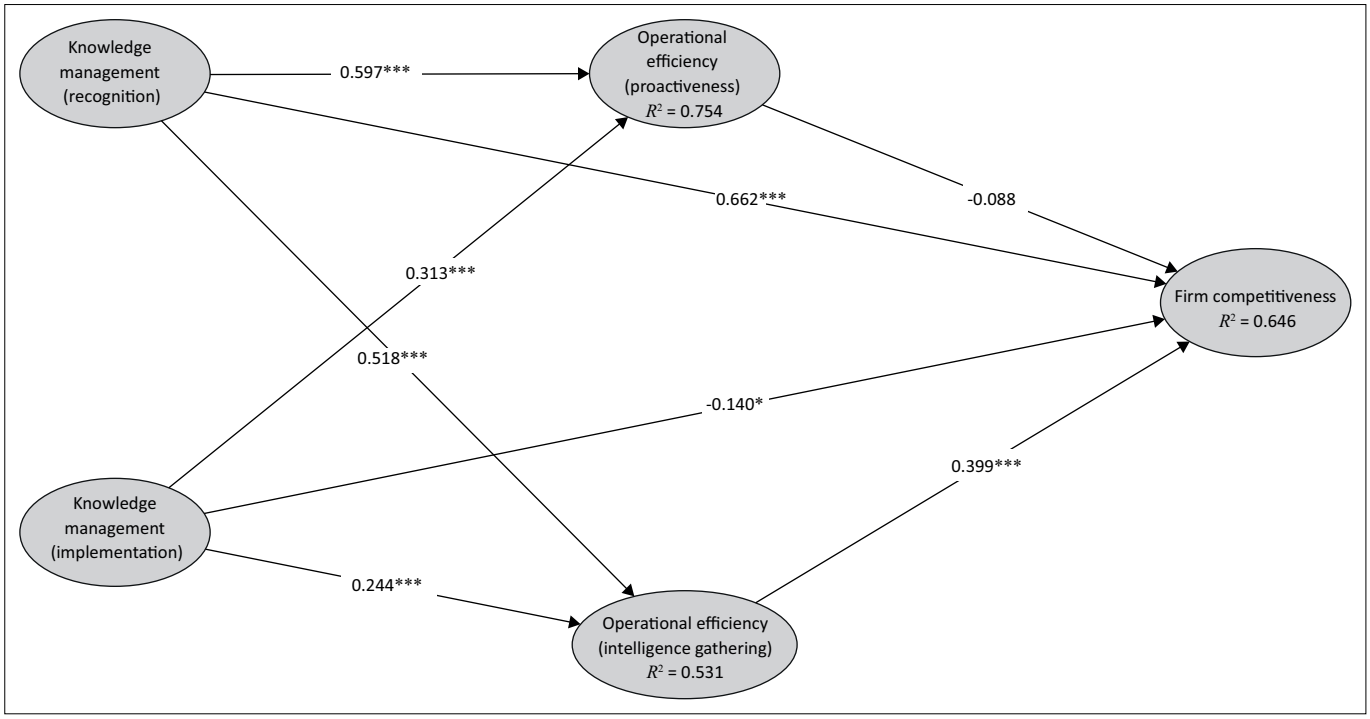
TABLE 1: Reliability and convergent validity.

Construct	Number of items	Cronbach's alpha (α)	Average variance extracted (AVE)
Operational efficiency (intelligence gathering)	5	0.8514	0.6279
Knowledge management (recognition)	5	0.7540	0.5110
Operational efficiency (proactiveness)	6	0.8356	0.5532
Firm competitiveness	6	0.8744	0.6148
Knowledge management (implementation)	6	0.8490	0.5942

(recognition) -> firm competitiveness ($B = 0.662$, $p = 0.000$) and H2: KM (implementation) -> firm peformance ($B = -0.1402$, $p = 0.0335$). This means KM (recognition) had a strong, positive and significant explanatory influence on firm competitiveness, while KM (implementation) had a weak but negative, significant explanatory effect on the same outcome variable.

TABLE 2: Indicator factor-loadings

Indicator	Operational efficiency (intelligence gathering)	Knowledge management (recognition)	Operational efficiency (proactiveness)	Firm competitiveness	Knowledge management (implementation)
C23	-	0.5234	-	-	-
C24	-	0.6526	-	-	-
C25	-	0.7876	-	-	-
C26	-	0.8477	-	-	-
C27	-	0.7184	-	-	-
C28	-	-	-	-	0.8647
C29	-	-	-	-	0.8428
C30	-	-	-	-	0.9197
C31	-	-	-	-	0.8208
C32	-	-	-	-	0.4747
C33	-	-	-	-	0.6021
D34	-	-	0.7717	-	-
D35	-	-	0.8456	-	-
D36	-	-	0.6604	-	-
D37	-	-	0.6275	-	-
D38	-	-	0.7060	-	-
D39	-	-	0.8249	-	-
D40	0.7936	-	-	-	-
D41	0.8850	-	-	-	-
D42	0.7824	-	-	-	-
D43	0.7249	-	-	-	-
D44	0.7675	-	-	-	-
F50	-	-	-	0.8011	-
F51	-	-	-	0.8182	-
F52	-	-	-	0.8338	-
F53	-	-	-	0.8129	-
F54	-	-	-	0.7323	-
F55	-	-	-	0.6967	-



*, means relationship is statistically significant at the 0.05 level.

***, means relationship is statistically significant at the 0.01 level.

FIGURE 2: Path relationships and coefficients.

TABLE 3: Coefficient of determination.

Construct	Coefficient of determination (R^2)	Adjusted R^2
Operational efficiency (intelligence gathering)	0.5311	0.5280
Operational efficiency (proactiveness)	0.7544	0.7527
Firm competitiveness	0.6459	0.6411

Source: Adapted from MacKinnon D.P., Fairchild A.J. & Fritz M.S., 2007, 'Mediation analysis', *Annu Rev Psychol* 58, 593–614. https://doi.org/10.1146/annurev.psych.58.110405.085542

TABLE 4: Variable effect overview.

Effect	Direct effects	*p*	Indirect effects	*p*	Total effect	*p*	Cohen's f^2
Knowledge management (recognition) -> firm competitiveness	0.6620	0.0000	0.1545	0.0019	0.8164	0.0000	0.2836 – medium effect size
Knowledge management (implementation) -> firm competitiveness	−0.1402	0.0335	0.0697	0.050	−0.0705	0.2533	0.0171 – small effect size

Source: Adapted from MacKinnon D.P., Fairchild A.J. & Fritz M.S., 2007, 'Mediation analysis', *Annu Rev Psychol* 58, 593–614. https://doi.org/10.1146/annurev.psych.58.110405.085542

A bootstrapping procedure based on 500 samples was carried out to ascertain the mediation effects of operational efficiency on the influence of KM (recognition) and KM (implementation) on firm competitiveness. The mediation effects describe a situation where a third variable is added and intervenes in the relationship between two variables (MacKinnon, Fairchild & Fritz 2007). The result of the tests are presented in Table 4. The indirect relationship proposed in H3: KM (recognition) -> operational efficiency -> firm peformance (B = 0.1545, p = 0.019) was significant. This proves complementary partial mediation because both the direct and indirect relationships between KM (recognition) and firm competitiveness were statistically significant. The indirect relationship in H4: KM (implementation -> operational efficiency -> firm peformance was also supported (B = 0.0697, p = 0.050), confirming mediation. As the direct and total effects and/or relationships were negative while the indirect effect and/or relationship was positive, the nature of the mediation relationship was partial and positive.

Discussion

This study sought to investigate the mechanisms through which operational efficiency interacts with KM to influence firm competitiveness in selected SMMEs in South Africa. This topic is under-researched in emerging economies, especially in the small business context.

Consistent with previous research emphasising the contribution of effective and efficient KM to organisational performance (Donate et al. 2017; Naicker et al. 2017), the findings of this study demonstrate that KM (recognition) and KM (implementation) were directly and positively linked to firm competitiveness. This outcome is not surprising, given the claim that KM is regarded as a critical dynamic resource for attaining competitive advantage (Jyoti et al. 2013; Kiptalam et al. 2016).

This study's results also indicate that the effect of both subtypes of KM on firm competitiveness was partially mediated by the operational efficiency variable. The result thus resonates with the claim that effective KM is integral to organisational efficiency, which in turn is a precursor to firm competitiveness (Meihami & Meihami 2013). A plausible explanation could be that good management and internal communication of intelligence about the business environment enhances the integration of organisational processes, which ultimately leads to operational improvement. This in turn positions the firm to perform better against competitors.

Limitations, implications and recommendations

While the study provides insightful knowledge on the intersection of KM, operational efficiency and firm competitiveness, there were some limitations. Firstly, the study used a cross-sectional design to address the hypotheses. While Wang and Cheng (2020) conceded that a cross-sectional study is relatively inexpensive and easy to conduct, its major weaknesses are that it does not follow-up with the individual (respondent) over time and it is difficult to make causal inferences based on its data. That said, the authors accept that the rigour applied in the data analysis coupled with the use of mainstream literature in the development of the scales was useful in the generation of credible results. Secondly, while the sample may have been adequate to test the hypotheses, it may not be enough to make inferences across the whole of the Free State province. Hence, future studies could examine the research variables on a larger research setting. Thirdly, even though the use of mixed method research approach in conducting interviews in parallel with administering questionnaires could have provided some more comprehensive insights on relationships between variables (Rambe & Khaola 2020), the limitation of resources (finances, time and effort) could not permit the researchers to do so. Lastly, the choice of parameters of competitiveness adopted in this study was constant, whereas in reality, they may be different for individual firms (Cetindamar & Kilitcioglu 2013). As such, the results need to be considered in their context. While this could threaten the transferability of results, it is noted that despite any measure's comprehensiveness, no measure can be exhaustive and be a one-size-fits-all.

Despite the limitations, there are useful owner and managerial implications revealed by the study. The results confirm that firm competitiveness is directly and positively influenced by KM recognition and implementation. As such, SMME owners and managers must identify knowledge gaps, provide personnel training, draft and follow KM implementation processes and policies that are germane to the growth and competitiveness of the business. Although the study results confirmed partially mediated relationships, the effect sizes were substantial, pointing to the significance of SMMEs' streamlining their daily operations through better communication with customers and suppliers, improved delivery of goods and services and maintaining good corporate relations with other firms, to ensure that competitiveness is not negatively impacted.

Conclusion

This study has hypothesised and demonstrated a statistically strong influence of KM dimensions (recognition and implementation) and operational efficiency on the competitiveness of SMMEs. While the literature shows that KM and operational efficiency in small firms are widely researched, research on operational efficiency as an intermediary between KM (recognition and implementation) and firm competitiveness still requires more focus. The authors have provided evidence on the direct interaction between KM and firm competitiveness and on the mediating effects of operational efficiency in this interaction. Based on the foregoing discussion, it is logical to argue that while KM (recognition and implementation) has a direct influence on firm competitiveness, it also influences it indirectly via operational efficiency.

Acknowledgements

The authors are grateful to the Central University of Technology for funding the studies of the first author, which inspired the writing of the current article.

Competing interests

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

Authors' contributions

M.P.M. did the data collection and wrote the literature sections of this paper. P.R. wrote the theory sections and the discussion and substantially reworked the different versions of the draft. He also supervised the Master's study on which this study was based. T.M.N. did the methodology section and also analysed the data for the article.

Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Data availability

The SPSS data on which this article was based is available from the first author upon request. However, this data remains the intellectual property of the Central University of Technology.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

References

Abusweilem, A.A. & Abualoush, S., 2019, 'The impact of knowledge management process and business intelligence on organisational performance', *Management Science Letters* 9, 2143–2156. https://doi.org/10.5267/j.msl.2019.6.020

Akben-Selcuk, E., 2015, '"Factors influencing college students" financial behaviors in Turkey: Evidence from a national survey', *International Journal of Economics and Finance* 7(6), 87–94. https://doi.org/10.5539/ijef.v7n6p87

Al-Qubaisi, S.S. & Ajmal, M.M., 2018, 'Determinants of operational efficiency in the oil and gas sector: A balanced scorecard perspective', *Benchmarking an International Journal* 25(9), 3357–3385. https://doi.org/10.1108/BIJ-04-2017-0079

Andreeva, T. & Kianto, A., 2012, 'Does knowledge management really matter? Linking knowledge management practices, competitiveness and economic performance', *Journal of Knowledge Management* 16(4), 617–636. https://doi.org/10.1108/13673271211246185

Arslan, N. & Tathdil, H., 2012, 'Defining and measuring competitiveness: A comparative analysis of Turkey with 11 potential rivals', *International Journal of Basic & Applied Sciences* 12(2), 31–43.

Attar, M., Kang, K. & Sohaib, O., 2019, 'Knowledge sharing practices, intellectual capital and organisational performance', in *Proceedings of the 52nd Hawaii international conference on system sciences*, Grand Wailea, HI, January 2019, pp. 5578–5587.

Baporikar, N., 2015, 'Knowledge management in Small and Medium Enterprises', in J. Zhao, P. Ordóñez de Pablos & R. Tennyson (eds.), *Organizational Innovation and IT Governance in Emerging Economies*, pp. 1–20, Business Science Reference, University of Minnesota, USA.

Bennet, D., Bennet, D. & Avedisian, D., 2015, *The course of knowledge: A 21st century theory, the knowledge series*, Mountain Quest Institute, Frost, WV.

Bhorat, H., Asmal, Z., Lilenstein, K. & Van Der Zee, K., 2018, *SMMES in South Africa: Understanding the constraints on growth and performance*, Development policy research unit working paper no. 201802, DPRU, University of Cape Town.

Bindl, U. & Parker, S.K., 2010, *Proactive work behavior: Forward thinking and change-oriented action in organisations*, Institute of Work Psychology, Washington DC.

Cardoni, A., Zanin, F., Corazza, G. & Paradisi, A., 2020, 'Knowledge management and performance measurement systems for SME's economic sustainability', *Sustainability* 12(7), 1–27. https://doi.org/10.3390/su12072594

Centobelli, P., Cerchione, R. & Esposito, E., 2019, 'Efficiency and effectiveness of knowledge management systems in SMEs', *Production Planning & Control* 30(9), 779–791. https://doi.org/10.1080/09537287.2019.1582818

Cetindamar, D. & Kilitcioglu, H., 2013, 'Measuring the competitiveness of a firm for an award system', *Competitiveness Review* 23(1), 7–22. https://doi.org/10.1108/10595421311296597

Chevallier, C., Laarraf, Z., Lacam, J.S., Miloudi, A. & Salvetat, D., 2016, 'Competitive intelligence, knowledge management and coopetition: The case of European high-technology firms', *Business Process Management Journal* 22(6), 1192–1211. https://doi.org/10.1108/BPMJ-11-2015-0161

Desouza, K.C. & Awazu, Y., 2006, 'Knowledge management at SMEs: Five peculiarities', *Journal of Knowledge Management* 10(1), 32–43. https://doi.org/10.1108/13673270610650085

Donate, M.J., De Pablo, J.D.S., Guadamillas, F. & González-Ramos, M.I., 2017, *The role of knowledge management strategies in cooperation agreements, in strategic information systems and technology in modern organisations*, pp. 128–150, IGI Global, Hershey, PA.

Dube, L. & Ngulube, P., 2012, 'Knowledge sharing in a multicultural environment: Challenges and opportunities', *South African Journal of Libraries and Information Science* 78(1), 68–77. https://doi.org/10.7553/78-1-48

Edvardsson, I.R. & Durst, S., 2013, 'The benefit of knowledge management in small and medium-sized enterprises', *Procedia – Social and Behavioral Sciences* 81, 351–354. https://doi.org/10.1016/j.sbspro.2013.06.441

Govender, L., Mearns, M. & Du Plessis, T., 2022, 'Knowledge management toolkit enhancement for a professional services firm', *South African Journal of Information Management* 24(1), a1447. https://doi.org/10.4102/sajim.v24i1.1447

Ghannay, C.G. & Zeineb, B.A.M., 2012, 'Synergy between competitive intelligence and knowledge management: A key for competitive advantage', *Journal of Intelligence Studies in Business* 1(2), 198–207. https://doi.org/10.37380/jisib.v2i2.38

Ha, S.T. & Lo, M.C., 2018, 'An empirical examination of knowledge management and organisational performance among Malaysian manufacturing SMEs', *International Journal of Business Innovation and Research* 17(1), 23–37. https://doi.org/10.1504/IJBIR.2018.094196

Hair, J.F., Hult, G.T.M., Ringle, C.M. & Sarstedt, M., 2014, 'Partial least squares structural equation modelling, rigorous applications, better results and higher acceptance', *Long Range Planning* 46(1–2), 1–12. https://doi.org/10.1016/j.lrp.2013.01.001

Hamad, H., Elbeltagi, I. & El-Gohary, H., 2018, 'An empirical investigation of business-to-business e-commerce adoption and its impact on SMEs competitive advantage: The case of Egyptian manufacturing SMEs', *Strategic Change* 27(3), 209–229. https://doi.org/10.1002/jsc.2196

Hegazy, F.M. & Ghorab, K.E., 2015, 'The effect of knowledge management processes on organisational business processes and employees' benefits in an academic institution's portal environment', *Communications of IBIMA* 2015, 928262. https://doi.org/10.5171/2015.928262

Ho, C., Hsieh, P. & Hung, W., 2014, 'Enablers and processes for effective knowledge management', *Industrial Management & Data Systems* 114(5), 734–754. https://doi.org/10.1108/IMDS-08-2013-0343

Inan, G.G. & Bititci, U.S., 2015, 'Understanding organisational capabilities and dynamic capabilities in the context of micro enterprises: A research agenda', *Procedia – Social and Behavioral Sciences* 210, 310–319. https://doi.org/10.1016/j.sbspro.2015.11.371

Jantarajaturapath, P., Imsuwan, T. & Wongsim, M., 2016, 'Knowledge management, organisational innovativeness, business competitiveness and potential operations of electrics and electronics businesses in Thailand', *Journal of Business and Retail Management Research* 11(1), 42–53.

Jyoti, J., Rani, R. & Kotwal, S., 2013, 'Knowledge management and competitive advantage: Mediating role of innovation capacity', in *Conference: Rethinking management theory & practice in the present Indian Economic Context*, University of Jammu, IIM Ahmedabad, December 2013, pp. 1–54.

Kalluru, S. & Bhat, K., 2009, 'Determinants of cost efficiency of commercial banks in India', *ICFAI Journal of Bank Management* 8(2), 32–50.

Kholopane, P., 2016, 'Boosting competitive advantages of small and medium manufactures in South Africa by applying continuous improvement and operational strategies', in *Proceedings of PICMET 2016: Technology management for social innovation*, IEEE, Portland, September 2016, pp. 1442–1447.

Kiptalam, A., Komene, J.J. & Buigut, K., 2016, 'Effect of knowledge management on firm competitiveness: Testing the mediating role of innovation in the small and medium enterprises in Kenya', *International Journal of Small Business and Entrepreneurship Research* 4(5), 1–14.

Krajnovic, A., Covo, P. & Jasic, D., 2012, 'Knowledge management for small and medium sized enterprises – Whose concern is it?', in *International Conference on Technology and Business Management*, University of Zadar, Croatia, January 2012, pp. 726–733.

Kuppusamy, D. & Ramanigopal, C.S., 2017, 'A study on status of employee awareness on knowledge management in micro, small and medium enterprises (MSME's) in Tamilnadu', *International Research Journal of Engineering and Technology* 4(4), 3196–3199.

Lee, C.Y. & Johnson, A.L., 2012, 'Operational efficiency', in A.B. Badiru (ed.), *The handbook of industrial and systems engineering*, pp. 1–1271, Rouledge, Beavercreek, OH.

Lofgren, A., 2014, 'International network management for the purpose of market expansion: The mediating effect of co-innovation in the network of SMEs', *Journal of International Enterpreneurship* 12, 162–182. https://doi.org/10.1007/s10843-014-0129-1

Lyu, H., Zhou, Z. & Zhang, Z., 2016, 'Measuring knowledge management performance in organisations: An integrative framework of balanced scorecard and fuzzy evaluation', *Journal of MDPI AG (Information)* 7(2), 29. https://doi.org/10.3390/info7020029

MacKinnon, D.P., Fairchild, A.J. & Fritz, M.S., 2007, 'Mediation analysis', *Annu Rev Psychol* 58, 593–614. https://doi.org/10.1146/annurev.psych.58.110405.085542

Madonsela, N.S., Sobiyi, K. & Twala, B., 2017, 'Competitive business intelligence and analytics systems: A strategy for SMME organisations', in *Global business and technology association nineteenth annual international conference*, July 2017, pp. 395–402.

Maree, K. & Pietersen, J., 2016, *First steps in research*, 2nd edn., Van Schaik, Pretoria.

Maritz, R. & Du Toit, A., 2018, 'The practice turn within strategy: Competitive intelligence as integrating practice', *South African Journal of Economic and Management Sciences* 21(1), a2059. https://doi.org/10.4102/sajems.v21i1.2059

Masic, B., Nesic, S., Nikolic, D. & Dzeletovic, M., 2017, 'Evolution of knowledge management', *Industrija* 45(2), 129–147. https://doi.org/10.5937/industrija45-13201

Mbuyisa, B.B., 2017, 'ICT usage in small, medium and micro enterprises: A South African perspective of its role and impact on poverty reduction', Doctoral dissertation, University of Pretoria.

Meihami, B. & Meihami, H., 2013, 'Knowledge management: A way to gain a competitive advantage in firms (evidence of manufacturing companies)', *International Letter of Social and Humanistic Sciences* 14, 80–91. https://doi.org/10.18052/www.scipress.com/ILSHS.14.80

Mohamud, M. & Sarpong, D., 2016, 'Dynamic capabilities: Towards an organizing framework', *Journal of Strategy and Management* 9(4), 511–526.https://doi.org/10.1108/JSMA-11-2015-0088

Mokoena, B.A., 2019, 'The relationship between selected market orientation dimensions and organisational performance within universities in South Africa', *Studia Universitis Babes Bolyai – Oeconomica* 64(3), 54–68. https://doi.org/10.2478/subboec-2019-0015

Naicker, V., Le Roux, S., Bruwer, J. & Bruwer, J.P., 2017, 'Knowledge sharing as a value-adding initiative for South African SMME sustainability: A literature review', *Expert Journal of Business and Management* 5(2), 51–60.

Ndolo, P.S., 2015, 'The relationship between operational efficiency and financial performance of firms listed at the Nairobi securities exchange', Master's thesis, University of Nairobi.

Nenungwi, F. & Garaba, F., 2022, 'Knowledge management awareness in South African provincial government departments: The case of KwaZulu-Natal department of public works, Pietermaritzburg', *South African Journal of Information Management* 24(1), 1–10. https://doi.org/10.4102/sajim.v24i1.1456

Nielsen, A.P., 2006, 'Understanding dynamic capabilities through knowledge management', *Journal of Knowledge Management* 10(4), 59–71. https://doi.org/10.1108/13673270610679363

Njoroge, P.T., 2012, 'A survey of factors affecting operation efficiency of small entrepreneurs: The case of M-PESA outlets in Nairobi, Kenya', Master's thesis, University of Nairobi.

Nowacki, R. & Bachnik, K., 2016, 'Innovations within knowledge management', *Journal of Business Research* 69(5), 1577–1581. https://doi.org/10.1016/j.jbusres.2015.10.020

Obeidat, B.Y., Al-Suradi, M.M., Masa'Deh, R.E. & Tarhini, A., 2016, 'The impact of knowledge management on innovation: An empirical study on Jordanian consultancy firms', *Management Research Review* 39(10), 1214–1238. https://doi.org/10.1108/MRR-09-2015-0214

Ocloo, C.E., Akaba, S. & Worwui-Brown, D.K., 2014, 'Globalization and competitiveness: Challenges of Small and Medium Enterprises (SMEs) in Accra, Ghana', *International Journal of Business and Social Science* 5(4), 1–10.

O'Connor, C. & Kelly, S., 2017, 'Facilitating knowledge management through filtered big data: SME competitiveness in an agri-food sector', *Journal of Knowledge Management* 21(1), 156–179. https://doi.org/10.1108/JKM-08-2016-0357

Okwang'a, B.C., Mungania, A.K. & Karanja, J.G., 2015, 'Analysis of factors affecting the operational efficiency of Jua Kali Sector: A case of apparel industry in Nairobi, Kenya', *European Journal of Business and Management* 7(30), 119–129.

Olsen, E., 2015, *Strategic implementation*, viewed 12 June 2022, from https://onstrategyhq.com/resources/strategic-implementation/.

Omotayo, F.O., 2015, 'Knowledge management as an important tool in organisational management: A review of literature', *Library Philosophy and Practice - Electronic Journal* 4(10), 1–23.

Ponelis, S., 2011, 'An exploratory study of business intelligence in knowledge-based growth small, medium and micro enterprises in South Africa', PhD (IT) thesis, University of Pretoria.

Rambe, P. & Khaola, P., 2020, 'The impact of innovation on agribusiness competitiveness: The mediating role of technology transfer and productivity', *European Journal of Innovation Management* 25(3), 1–33. https://doi.org/10.1108/EJIM-05-2020-0180

Ramorena, M., 2016, 'The impact of social networks on innovation, competitiveness and firm performance in the South African context: A case study of emerging construction firms in the Free State', thesis submitted to the school of Business Support Studies, Central University of Technology, Free State.

Ricardo, D., 2015, 'David Ricardo's theory of comparative advantage and its implications for development in Sub-Saharan Africa: A decolonial view', *African Journal of Public Affairs* 8(5), 17–33.

Robertson, S., 2016, 'An application of knowledge management and human capital valuation: The case of credit unions', in M. Russ (ed.), *Quantitative multidisciplinary approaches in human capital and asset management*, Hershey, PA, pp. 201–233, University of Wisconsin-Green Bay, USA.

Samir, M., 2020, 'The impact of knowledge management on SMEs performance in Egypt', *Library Journal* 7, e6445. https://doi.org/10.4236/oalib.1106445

Sharma, T., Vashisth, K. & Sharma, S., 2014, 'Management of operational efficiency: Can Indian SMEs afford overseeing IT', *Industrial Engineering Letters* 4(8), 49–55. https://doi.org/10.9790/487X-1682100105

Simaškienė, T. & Stancikienė, A.D., 2014, 'Influence of knowledge management to the competitiveness of enterprises', *Societal Studies* 6(3), 557–578. https://doi.org/10.13165/SMS-14-6-3-07

Small Enterprise Development Agency (SEDA), 2016, *The small, medium and micro enterprise sector of South Africa*, Commissioned by the small enterprise development agency, viewed 14 November 2021, from http://www.seda.org.za/Publications/Publications/The%20Small,%20Medium%20and%20Micro%20Enterprise%20Sector%20of%20South%20Africa%20Commissioned%20by%20Seda.pdf.

SME Competitiveness Outlook, 2015, *Connect, Compete and Change for Inclusive Growth*, International Trade Centre, Geneva.

Sook-Ling, L., Choo-Kim, T. & Razak, A., 2013, 'The knowledge management activities in achieving competitive advantage: A conceptual framework', *International Journal of Business and Management* 8(23), 1–12. https://doi.org/10.5539/ijbm.v8n23p1

Teece, D.J. & Pisano, G.P., 1994, 'The dynamic capabilities of firms: An introduction', *Industrial and Corporate Change* 3(3), 537–556. https://doi.org/10.1093/icc/3.3.537-a

Wang, X. & Cheng, Z., 2020, 'Cross-sectional studies: Strengths, weaknesses, and recommendations', *Chest Journal* 158(1), 65–71. https://doi.org/10.1016/j.chest.2020.03.012

Wiboho, M.P., 2014, 'Knowledge management awareness and maturity levels of small and medium enterprises in Technoparks of Turkey', Master's thesis, Middle East Technical University.

Young, T.J., 2016, 'Questionnaires and surveys', in Z. Hua (ed.), *Research methods in intercultural communication: A practical guide*, pp. 165–180, Wiley, Oxford.

Zack, M., McKeen, J. & Singh, S., 2009, 'Knowledge management and organizational performance: An exploratory analysis', *Journal of Knowledge Management* 13(6), 392–409. https://doi.org/10.1108/13673270910997088

Zanotti, C., Reyes, F. & Fernandez, B., 2018, 'Relationship between competitiveness and operational and financial performance of firms: An exploratory study on the European brewing industry', *Intangible Capital* 14(1), 99–115. https://doi.org/10.3926/ic.1104

Zieba, M., Bolisani, E. & Scarso, E., 2016, 'Emergent approach to knowledge management by small companies: Multiple case-study research', *Journal of Knowledge Management* 20(2), 292–307. https://doi.org/10.1108/JKM-07-2015-0271