



Knowledge-friendly organisational culture and performance: A meta-analysis

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ABSTRACT

Many studies have examined the relationship between knowledge-friendly organisational culture (KFOC) and organisational performance. However, the findings of these studies are varied and sometimes contradicting. To date, there has been no conclusive evidence regarding this relationship. Thus, this study investigates the relationship between KFOC and organisational performance by synthesising the findings of previous empirical studies and the impacts of certain contextual factors, such as national culture, economies, and industries, on this relationship. The KFOC is positively related to the overall performance—both financial and non-financial—of firms. The KFOC–overall organisational performance relationship is strengthened in restrained cultures, while the KFOC–financial performance relationship is strengthened in service industries. To the best knowledge of the authors, this is the first meta-analytic study concerning the relationships between KFOC and organisational performance that considers the impacts of the contextual factors of national culture, economy, and industry.

1. Introduction

Knowledge management (KM) has been popular in business research for more than 30 years, and it can be attributed to globalization, technological development, and the raise of knowledge-intensive economy (Handzic, 2017). Knowledge was considered to be one of the most critical resources for the development of competitive advantages of firms in the 1990s (Drucker, 1993; Grant, 1996), and effective KM can lead to the success of firms (Nonaka & Takeuchi, 1995). KM in the 1990s was mainly driven by managing explicit knowledge through information technologies (IT) (Snowden, 2002), but many of these IT-driven KM projects failed (Edwards, 2016). One of the reasons for their failure was the fact that firms lacked a knowledge-friendly organisational culture (KFOC). Some organisational cultures (i.e., a lack of trust and willingness to share knowledge, and difficulties creating a knowledge-sharing climate) are incompatible with KM, and these become barriers for KM implementation (Rivière & Calabrese, 2016). Therefore, after the 1990s, more attention has been paid to facilitating human-related factors (Handzic, 2017), such as KFOC, knowledge-based leadership, and knowledge-oriented human resource management, in managing knowledge to sustain a competitive advantage at firms.

KFOC is one of the critical enablers of the success of KM (Davenport,

De Long, & Beers, 1998; Rivière & Calabrese, 2016), and it is considered to be a set of shared values and beliefs in an organisation that promotes employees' passion for learning, openness to innovation, trust, collaboration, and willingness to share knowledge. KFOC enables organisational knowledge to be effectively created, acquired, shared, transferred, and applied (Colovic & Williams, 2020; Imran, Ilyas, Aslam, & Fatima, 2018) so that value can be successfully created for organisations (Kianto, Ritala, Vanhala, & Inkien, 2013). According to the knowledge-based view (Grant, 1996; Inkien, 2016; Shah & Kant, 2020), better organisational performance can be achieved when knowledge is efficiently integrated in an organisation (Grant, 1997) through a prevailing KFOC.

Previous review studies on organisational culture in the KM field have either only summarised earlier studies or proposed conceptual models. For instance, Tian, Deng, Zhang, and Salmador (2018) argued that the effects of organisational culture and national culture on innovation are complex and heterogeneous, suggesting that further quantitative approaches should be applied to investigate these relationships. Mueller (2012) identified the different perspectives of organisational culture in the KM literature. Jacks, Wallace, and Nemati (2014) and Al Saifi (2015) merely outlined a conceptual framework and argued that KFOC is related to its success without showing any empirical evidence for their research models. Intezari, Taskin, and Pauleen (2017)

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identified KM activities (e.g., knowledge sharing, creation, and implementation)¹ in the KFOC literature. In addition, earlier review studies either adopted a systemic review approach to evaluate the relationship between KM and organisational performance (Gupta & Chopra, 2018; Inkien, 2016) or focused on meta-analysing the relationship between strategic KM and firm performance (Liu, Tsui, & Kianto, 2020). However, to date, none of the review studies concerning organisational culture and KM have examined the impacts of KFOC on organisational performance through an integrative approach. Moreover, due to inconsistent empirical evidence, the impacts of KFOC on organisational performance are still inconclusive.

Despite the substantial amount of literature on the relationship between KFOC and organisational performance, current empirical studies reveal heterogeneous findings. For instance, Guimarães, Severo, Dorion, Coallier, and Olea (2016) found that the KFOC–organisational performance relationship was significant, whereas Song and Kolb (2013) reported this relationship as insignificant. Thus, based on these inconsistent empirical findings, the overall generalisability of the KFOC–organisational performance relationships is unconvincing. In addition, significant empirical findings from individual studies may not be generalisable to a broader range of economic and social contexts (Gupta & Chopra, 2018). Finally, managers from different national cultures are more likely to select different strategies to respond to the same managerial issues (Schneider & De Meyer, 1991), and firms may manage knowledge differently based on their different cultural backgrounds (Cegarra-Navarro & Sánchez-Polo, 2010; Cegarra-Navarro, Vidal, & Cegarra-Leiva, 2011). KM in organisations is socially embedded (Hussink, Kianto, Vanhala, & Ritala, 2017; Kim, 2020), but the effects of specific contextual factors, such as national culture, economy, and industry, on KM—which might then influence KM–organisational performance relationships—are still poorly understood. Therefore, this study aims to first synthesise the relationships between KFOC and organisational performance and then estimate the moderating effects of national culture, economy, and industry on the KFOC–organisational performance relationship by adopting a meta-analysis approach using a large number of studies in the KM literature.

The present study contributes to the extant KM literature in the following ways. First, it contributes to reducing the heterogeneity of the KFOC–organisational performance relationship prevalent in the KM literature by theoretically depicting and empirically identifying the overall directions and effect of the relations between KFOC and organisational performance. Second, it contributes to the KM literature via the theoretical establishment and empirical validation of the moderating effects of national cultures, economies, and industries on the KFOC–organisational performance relationship. Third, it offers a deeper understanding of the impacts of KFOC on organisational performance, as well as the role of contextual factors in this relationship, using a meta-analytical synthesis to expand on previous systematic review studies, such as Inkien (2016), Mueller (2012), and Gupta and Chopra (2018). To the best of the authors' knowledge, the present study, which adopts a meta-analysis approach to conduct the literature review, is the first to quantitatively synthesise the KFOC–organisational performance relationship in the KM literature.

2. Research model development

2.1. Main effects

In previous studies on the relationships between KFOC and organisational performance, organisational performance can be categorised into three types, namely, financial performance, non-financial performance, and overall organisational performance which includes both financial and non-financial performance indicators. Although many scholars have attempted to reveal these relationships using empirical evidence, findings are still inconclusive. For example, Chen, Liu, and Tsai (2008) found that the trust dimension of KFOC did not affect organisational performance directly, while Song and Kolb (2013) concluded that the learning culture of KFOC did not significantly impact overall performance of the firm. Payal, Ahmed, and Debnath (2016) also found that KFOC did not affect organisational performance. However, the majority of empirical studies reveal that KFOC significantly influences overall organisational performance (Baker & Sinkula, 1999; Boumarafi & Jabnoun, 2008; Chen et al., 2008; Chen, Elnaghi, & Hatzakis, 2011; Chuang, Liao, & Lin, 2013; Forte, Hoojaghan, & Pool, 2016; Guimarães et al., 2016; Kamath, Rodrigues, & Desai, 2016; Kamhawi, 2012; Khan, Ur Rahman, & Khan, 2015; Mageswari, Sivasubramanian, & Dath, 2017; Matin & Sabagh, 2015; Migdadi, 2009; Migdadi, Abu Zaid, Al-Hujran, & Aloudat, 2016; Mousavizadeh, Harden, Ryan, & Windsor, 2015; Palacios-Marqués, Ribeiro-Soriano, & Gil-Pechuán, 2011; Pham & Nguyen, 2017; Rezaei, Gholami, Shaharou, Saman, & Sadeghi, & Zakuan, 2017; Ruiz-Mercader, Meroño-Cerdan, & Sabater-Sánchez, 2006; Samson, Gloet, & Singh, 2017; Valdez-Juárez, De Lema, & Maldonado-Guzmán, 2016; Wei, 2010; Wong & Wong, 2011). Although inconsistent relationships exist, it still seems that, for the most part, the research evidence has indicated a positive relationship; therefore, it can be assumed that:

H1a: KFOC is positively related to overall organisational performance.

In addition, numerous studies have been conducted to examine the relationship between KFOC and the financial performance of firms, but the findings here are inconsistent as well. For example, Shih, Chuang, and Liao (2009) found that KFOC was not related to the financial performance of firms, while Kianto and Andreeva (2014) reported that KFOC significantly affected the financial performance of firms in service industries; however, this causal relationship was insignificant for firms in the manufacturing industry. On the other hand, the majority of scholarly works (Akgün, Ince, Imamoglu, Keskin, & Kocoglu, 2014; Chen et al., 2008; Chen & Liang, 2011; Collins & Smith, 2006; Feng, Zhao, & Su, 2014; Hsu & Sabherwal, 2012; Lee & Choi, 2010; Lin, McDonough Iii, Lin, & Lin, 2013; Marouf, 2016; Pett & Wolff, 2016; Rezaei et al., 2017; Santos-Vijande, González-Mieres, & López-Sánchez, 2013) have shown a positive relationship between KFOC and financial performance. Therefore, it can be assumed that:

H1b: KFOC is positively related to financial performance.

Finally, a wide range of research has focused on investigating the relationship between KFOC and the non-financial performance of firms. For example, Lee, Kim, and Kim (2012) and Noh, Kim, and Jang (2014) argue that the trust dimension of KFOC does not affect the non-financial performance of firms. In addition, Mills and Smith (2011) pointed out that the KFOC–non-financial performance relationship was insignificant. However, numerous studies have shown that KFOC has a positive impact on the non-financial performance of firms (Chong, Salleh, Ahmad, & Sharifuddin, 2011; Chuang et al., 2013; Cooper, Huscroft, Overstreet, & Hazen, 2016; Giampaoli & Ciambotti, 2016; Huang, Stewart, & Chen, 2010; Jiménez-Jiménez, Fernández-Gil, & Martínez-Costa, 2014; Kim & Hancer, 2010; Machuca & Costa, 2012; Mageswari et al., 2017; Migdadi et al., 2016; Moon & Lee, 2014; Mousavizadeh et al., 2015; Santos-Vijande et al., 2013; Shih et al., 2009; Sucahyo, Utari, Budi, Hidayanto, & Chahyati, 2016; Tan & Wong, 2015; Zhang, Sivaramkrishnan, Delbaere, & Bruning, 2007). Regardless of the small amount of insignificant evidence concerning the KFOC–non-financial

¹ KM activities refer to a set of knowledge processes (Beesley & Cooper, 2008), including knowledge application, identification, creation, acquisition, sharing, storage (Heisig, 2009), and so forth. KM practices refers to the conscious organisational and managerial practices intended to achieve organisational goals through efficient and effective management of the firm's knowledge resources (Inkien, 2016, p.232).

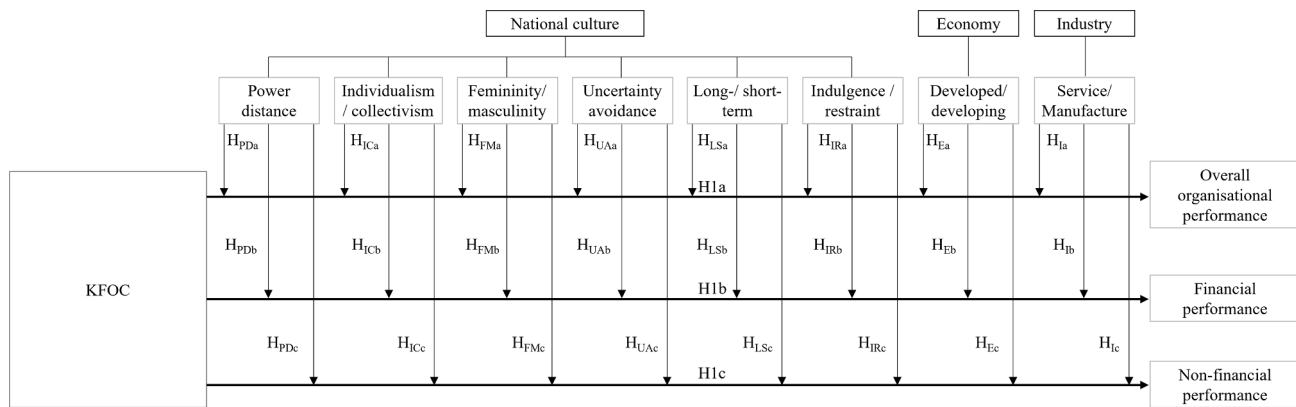


Fig. 1. Research model.

performance relationship, the majority of studies claim that KFOC is a positive predictor of the non-financial performance of organisations. Therefore, it can be assumed that:

H1c: KFOC is positively related to non-financial performance.

2.2. Moderating effects

Theoretically meaningful contextual explanations may explain the contrasting findings of previous studies on the KM–organisational performance relationships, since contexts are contingency factors influencing KM (Atakhan-Kenneweg, Oerlemans, & Raab, 2021; Hussinki et al., 2017; Liu, Chan, Zhao, & Liu, 2019) and may also moderate the relationships between KM and its outcomes. Here, we address three types of contextual issues as potential moderators: national culture, national economy, and firm industry. Associated hypotheses are delineated in the following paragraphs. Fig. 1 summarises our overall research model.

2.2.1. Moderating effects of national culture

National culture could be one of the most important contextual factors that affects people's KM activities as well as the relationships between KM and its outcomes. National culture refers to a collective programming of the mind of people in a nation that distinguishes people of different nationalities from each other (Hofstede, 1993; Hofstede, Hofstede, & Minkov, 2010), while organizational culture is the collective programming of the mind that distinguishes people of one organisation from those of another (Hofstede, 1994). An organisational culture is affected by national culture, as organisational members' values are affected by their national backgrounds. Both organisational culture and national culture can affect employees' KM activities in organisations (King, 2007), because culture provides a context for social interaction and determines the effectiveness of KM (De Long & Fahey, 2000).

The seminal cultural values framework by Hofstede and his colleagues (Hofstede, 2001; Hofstede et al., 2010) is believed by many to provide the best available framework for understanding differences between cross-cultural research on managerial and organisational issues (Kreacik & Marsh, 1986; Randall, 1993) and has hence guided research for several decades (Tsui, Nifadkar, & Amy Yi, 2016). Even though Hofstede's epistemology of national culture has been recently criticised for its theoretical, methodological underpinnings (McSweeney, 2002, 2020), and effectiveness (Bearden, Money, & Nevins, 2006; McSweeney, 2013; McSweeney, Brown, & Iliopoulou, 2016; Minkov, 2018), it is still a valid and useful model for understanding the major differences between national-level cultures, especially in quantitative research, where applied categories should be as generally applicable as possible (Beugelsdijk, Kostova, & Roth, 2017). For example, based on a review of 180 empirical papers published between 1980 and 2002 that applied the

national culture model, Kirkman, Lowe, and Gibson (2006) found that Hofstede's framework was successfully used among researchers to examine cultural differences and that most country differences predicted in the model were supported by these empirical works. Beugelsdijk, Maseland, and van Hooft (2015) examined how Hofstede's dimensions have developed over time by analysing data across two generational cohorts representing almost 100 countries and found that differences between countries still largely followed the original suggestions by Hofstede, meaning that the model could still be applied for inter-country comparisons. Indeed it has been lately applied for understanding, e.g., innovation performance (Tekic & Tekic, 2021), social responsibility performance (Liou, Lamb, & Lee, 2021), user-generated product information seeking (Leonhardt, Pezzuti, & Namkoong, 2020), and ownership control (Venkateswaran & George, 2020). As there is ample evidence demonstrating the reliability, validity and stability of Hofstede's model of national culture over time, the present study has adopted it.

According to this model, national culture can be categorised into six dimensions (Hofstede et al., 2010). The first, power distance, reflects the tolerance degree of people in terms of inequality (Hofstede, 2001). Managers, for example, are likely to hold onto their knowledge to sustain their power in large power distance societies. In addition, knowledge tends to be limited to managers in larger power distance societies and rarely reach bottom-line employees due to the rigid hierarchy in these societies. KFOC strongly affects employees' beliefs about knowledge-sharing, learning, and innovation, but the effects of KFOC on organisational performance are mitigated in large power distance societies, because knowledge flow might be restricted by the high hierarchies of organisations as well as by the knowledge-hiding behaviour of employees. Therefore, it can be assumed that:

H_{PDa-c}: The relationship between KFOC and organisational performance (a. overall, b. financial, c. non-financial) is stronger in small power distance regions than in large power distance regions.

The second, individualism and collectivism describe the relationship between the individual and the group in a specific society (Hofstede, 2001). KFOC emphasises an environment in which employees can trust and collaborate with each other through knowledge-sharing, which is more easily developed in collective societies, as employees are more naturally and socially integrated and thus more likely to work towards their mutual benefit when they recognise each other as members of the same group. On the other hand, individualistic employees are mainly focused on their own benefits and are less likely to share knowledge in a large group unless it directly benefits them. Therefore, it can be assumed that:

H_{ICa-c}: The relationship between KFOC and organisational performance (a. overall, b. financial, c. non-financial) is stronger in collective regions than in individualistic regions.

The third, femininity versus masculinity mirrors the differences in gender for a society (Hofstede, 2001). Employees in feminine-oriented societies tend to focus more on relationships and the work environment (Hofstede, 2001) and are thus more willing to enjoy a KFOC in which they trust and collaborate with each other. In contrast, employees in masculine-oriented societies are more centred around earnings and work outcomes (Hofstede, 2001) and thus more likely to hide knowledge as a way to protect their status. In addition, the learning environment is more equal for employees in feminine societies than in masculine societies. Therefore, it can be assumed:

H_{FMa-c} : The relationship between KFOC and organisational performance (a. overall, b. financial, c. non-financial) is stronger in feminine regions than in masculine regions.

The fourth, uncertainty avoidance reflects the degree of ambiguity tolerance in a society (Hofstede, 2001), and differences in the uncertainty tolerance of people highlight distinctive attitudes towards KM. It is more possible for KFOC to be inherently embedded in the organisations of weak uncertainty avoidance regions, because people are more likely to trust each other in these societies than in strong uncertainty avoidance societies (Hofstede, 2001). In addition, new ideas are more easily accepted in weak uncertainty avoidance regions (Hofstede, 2001) than in strong uncertainty avoidance regions. Therefore, it can be assumed that:

H_{UAa-c} : The relationship between KFOC and organisational performance (a. overall, b. financial, c. non-financial) is stronger in weak uncertainty avoidance regions than in strong uncertainty avoidance regions.

The fifth, long-term versus short-term orientation denotes people's values and beliefs about the past, present, and future in societies (Hofstede et al., 2010). For example, business values like learning, honesty, adaptiveness, accountability, and self-discipline are more attractive in long-term oriented societies, while business values like freedom, rights, achievement, and thinking for oneself are more popular in short-term oriented societies. Thus, it is obvious that KFOC is more likely to be nurtured in long-term oriented societies. On the other hand, it is difficult to obtain a return of investment in KM in a short amount of time, since it takes time for organisations and employees to embark on KM. For instance, one of the obvious obstacles in KM is a lack of KFOC, and it is impossible to cultivate KFOC overnight; considerable effort and time are required to change employees' attitudes and behaviour in order to get them to embrace KM. In addition, transforming an innovative idea into a product is always time-consuming. However, a short-term orientated society expects quick results, while the expectation of long-term (e.g., ten years) profits is quite the norm in long-term oriented societies. As such, KFOC, which emphasises continuous knowledge-sharing and innovation, contradicts the value of a short-term oriented society. Therefore, it can be assumed that:

H_{LSa-c} : The relationship between KFOC and organisational performance (a. overall, b. financial, c. non-financial) is stronger in long-term oriented regions than in short-term oriented regions.

The last, indulgence-oriented versus restraint-oriented culture describes people's perceptions of happiness and gratification in a nation (Hofstede et al., 2010). Studies on the happiness of knowledge-intensive workers have attracted much attention from scholars (Engelbrecht, 2007; Salas-Vallina, Alegre, & Fernández Guerrero, 2018). It has been argued that happiness strengthens the relationship between employees and their activities and outcomes, such as the knowledge-sharing–team proactivity relationship (Liu, Hsieh, Hsiao, Lin, & Yang, 2018) and the authentic leadership–creativity relationship (Semedo, Coelho, & Ribeiro, 2017). More people perceive themselves as happy in indulgence-oriented societies. In addition, people are more open to communicating with others in indulgence-oriented societies (Hofstede et al., 2010). It is thus reasonable to assume that KFOC is more easily fostered in indulgence societies. Therefore, it can be assumed that:

H_{IRa-c} : The relationship between KFOC and organisational performance (a. overall, b. financial, c. non-financial) is stronger in

indulgence-oriented regions than in restraint-oriented regions.

2.2.2. Moderating effects of national economy

Besides national culture, the national economy also affects the KM activities of organisations. For example, knowledge creation is more active in the developed countries of the world, in which more patents are granted. In addition, more advanced techniques and tools are invented in developed countries. Such innovation and invention cannot be achieved without a mature KFOC. Therefore, it can be assumed that:

H_{Ea-c} : The relationship between KFOC and organisational performance (a. overall, b. financial, c. non-financial) is stronger in developed economies than in developing economies.

2.2.3. Moderating effects of industries

Furthermore, the characteristics of KM vary across industries. It is believed that the service industries are more knowledge-intensive than the traditional manufacturing industries, because service products are intangibly produced through the knowledge interaction of the workers involved in KM activities (Kianto & Andreeva, 2014). In addition, employees' knowledge, experience, and skills are more important in service industries than in the manufacturing industry (Kianto, Hurmelinna-Laukkanen, & Ritala, 2010). It is therefore more necessary to especially pursue KM in service industries in order to foster a KFOC. Moreover, Chawla, Carrillo, and Joshi (2010) argued that KFOC is more mature in IT-related service firms than in manufacturing firms. Once a KFOC is well-formulated, firms in service industries can enjoy a competitive advantage by better managing their knowledge. Therefore, it can be assumed that:

H_{Ia-c} : The relationship between KFOC and organisational performance (a. overall, b. financial, c. non-financial) is stronger in service industries than in manufacturing industries.

3. Research methods

3.1. Meta-analysis

Meta-analysis is a type of statistical analysis of a large set of empirical results from individual studies used to synthesise the findings (Hartung, Knapp, & Sinha, 2008; Hempel, 2020) by correcting the errors and biases of quantitative scholarly works (Schmidt & Hunter, 2015). This technique is widely used in educational, social, medical sciences (Cheung, 2015) as well as business studies (Daryanto & Song, 2021; Nardi, Jardim, Ladeira, & Santini, 2020). This study aims to evaluate the relationship between KFOC and organisational performance across different empirical studies; therefore, a meta-analysis approach was adopted to integrate and correct the findings of these previous studies. Group analysis for categorical moderators (Noel & Todd, 2012) was also applied to examine whether the moderators were related to the effect sizes in our study. This study adopted the seven steps of Cooper (2017) to carry out this meta-analysis, as shown in Table 1.

Table 1
Procedures of meta-analysis.

SN	Steps in research synthesis	Corresponding section
1	Formulating the problem: Identify research variables and targeted relationships	Section 3.2
2	Searching the literature	Section 3.3
3	Gathering information from studies	Section 3.4
4	Evaluating the quality of the studies	Section 3.4
5	Analysing and integrating the findings of the studies	Section 4
6	Interpreting the results	Section 5
7	Presenting the results	The whole paper

3.2. Coding of variables

3.2.1. Primary study variables

Knowledge-Friendly Organisational Culture. Organisational culture influences organisations' views and practices about KM, and KFOC is embedded in organisations and facilitates their KM activities. Studies have regarded KFOC in a variety of ways; for instance, in a KFOC, employees are free to share their knowledge (Boumarafi & Jabnoun, 2008; Chen & Liang, 2011; Chuang et al., 2013; Mageswari et al., 2017; Mousavizadeh et al., 2015) and are open to expressing their ideas (Akgün et al., 2014; Feng et al., 2014; Rezaei et al., 2017). In addition, in a KFOC, a supportive learning environment (Khan et al., 2015; Lee et al., 2012; Moon & Lee, 2014; Mills & Smith, 2011) is created to improve the capabilities of employees. Employees trust (Chen et al., 2011; Giampaoli & Ciambotti, 2016; Kamhawi, 2012; Lee et al., 2012; Noh et al., 2014; Jain & Moreno, 2015) and smoothly collaborate with each other (Chen et al., 2011; Lee et al., 2012; Migdadi et al., 2016; Moon & Lee, 2014; Rezaei et al., 2017). Employees are also open-minded and encouraged to propose innovative proposals (Samson et al., 2017; Santos-Vijande et al., 2013). This study defines KFOC as a set of shared values and beliefs in an organisation that promotes employees' passion for learning, openness to innovation, trust, collaboration, and knowledge-sharing. Therefore, measurements of organisational culture (climate, environment, values, and beliefs) that reflect a knowledge-sharing, open, trusting, learning-oriented, innovative, and collaborative culture of KM were incorporated.

Organisational Performance. Organisational performance was mainly measured in terms of three aspects. The first category applies to financial indicators, such as return on investment, sales growth, profitability, return on equity, cash flow, and market share, used to measure financial performance of the firm. Financial performance was coded as 'F'. The second category emphasised non-financial measurements, such as cost reduction, stakeholders' satisfaction, time to market, organisational reputation, personnel development, and research and development, and it was coded as 'NF'. The last category combined both financial and non-financial indicators to measure the overall organisational performance and was coded as 'OP'.

3.2.2. Moderators

National Cultures. Six dimensions of Hofstede et al. (2010) national culture framework—power distance (PD), individualism vs. collectivism (IC), masculinity vs. femininity (MF), uncertainty avoidance (UA), long-term orientation vs. short-term orientation (LS), and indulgence vs. restrained (IR) culture—were coded based on the regions where the data of the selected studies were collected.

In this study, each dimension of national culture was classified into two groups to compare the impacts of this parameter on the relationship between KFOC and organisational performance. The values of each cultural dimension in 104 countries and regions (www.hofstede-insights.com/product/compare-countries/) were sequenced with increasing value. The mean value (Robie, Ryan, Schmieder, Parra, & Smith, 1998) of each culture dimension was calculated, and a threshold value, which is the closest to the mean value, was identified. Two groups were generated by comparing each nation's (or region's) value with the threshold value. Classification details are shown in Table 2.

Economies. Developing economies, economies in transition, and developed economies are the three broad categories used to demonstrate the economic status of countries and regions (UN, 2018). Economy was coded as 'developing vs. transition vs. developed' based on the geographic location of each conducted survey. The codification of economy in this study was done according to the *World Economic Situation and Prospects 2018*, published by the United Nations (2018).

Industry. This study identified three main types of industries the past studies sampled: manufacturing, service, and multiple industries. The manufacturing industry makes tangible products, while service industries are mainly comprised of financial services, consultancy services, IT services, and other services. The studies investigating research

Table 2

National culture classification.

Dimensions	Mean	Threshold	Rules	Code	Number of regions
Power distance	64.59	66	Larger than (included) 66	L	46
Individualism vs. collectivism	38.62	38	<66	S	58
			Less than (included) 38	C	64
Masculinity vs. femininity	47.58	47	Larger than 38	I	40
			Less than (included) 47	F	54
Uncertainty avoidance	64.11	65	Larger than 47	M	50
			Less than (included) 65	S	53
Long-term vs. short-term orientation	42.93	41	<65	W	51
			Larger than 41	L	41
Indulgence vs. restraint	47.99	48	Less than (included) 41	S	46
			Larger than (included) 48	I	41

models from the manufacturing industry were coded as 'Manufacturing', and the studies collecting data from the service industries were coded as 'Service'. The third group, which comprised surveys across dissimilar industries involving both service and manufacturing, was coded as 'Multiple'.

3.3. Search strategy and results

The search strategy was developed based on the view of Hempel (2020) and Cooper (2017), and it was derived from the research questions to locate as many relevant studies as possible. To accomplish this task, first, the Scopus database was used to locate research papers, since more KM journals are indexed in this database than in the Web of Science. Second, as 'KFOC' terms varied across the studies, the terms 'knowledge management' and 'performance' were used—based on their appearance in the title, abstract, or keywords of the target papers published from 1975 to 2018—to obtain as many papers as possible². In this way, 32,496 papers were found from the Scopus database, of which 31,526 were written in the English language. These were limited to the subjects of computer science; business management and accounting; engineering; social science; decision science; economics; econometrics and finance; psychology; arts and humanities; and multidisciplinary. Then, 24,663 remaining papers of the 31,526 papers were checked according to the contents of their abstracts and keywords. After excluding 23,189 papers that were not related to the present research, 136 papers that were unobtainable were also excluded, while six papers from references lists were included; thus, 1,344 papers were used for the next step of analysis, as shown in Table 3.

After excluding unexpected papers (366 irrelevant papers, 140 non-empirical papers, two non-English language papers, 164 papers without reporting correlation coefficients or other parameters that can be used to calculate correlation coefficients, 173 inappropriate papers on measurement, 43 papers measuring KM as one variable, eight sub-

² 'Knowledge management' and 'performance' were used to locate papers because (1) we aimed to collect as many papers in the KM field as possible; (2) KFOC terms varied from study to study; and (3) the adoption of 'culture' or 'organisational culture' as key search terms could produce too many irrelevant papers.

Table 3
Paper selection procedures.

SN	Selection procedures & criterion	No. of studies left
1	Searched 'knowledge management' and 'performance' as keywords in the Scopus database for works from 1975 to 2018	32,496
2	Excluded 970 papers not in English	31,526
3	Limited in subjects: computer science, engineering, business management and accounting, decision science, social science, economics, econometrics and finance, psychology, arts and humanities, and multidisciplinary	24,663
4	Excluded 23,189 papers not on topic after screening abstract and titles year-by-year	1,474
5	Excluded 136 unobtainable papers	1,338
6	Added six papers by snowballing from reference lists	1,344

Summary: The full content of 1344 papers was examined.

item correlation reporting papers, two incorrect correlations reporting papers, two duplicated papers, 34 unmatched methodical papers, two papers not showing measurements, 22 literature reviews, 79 papers on team performance, 47 papers on job performance, and 78 papers on innovation performance), 182 papers related to KM and organisational performance were selected for the primary data coding process, see Table 4.

The remaining 182 papers were classified in detail. Five papers lacked relevant information (e.g., variable measurement); so they were excluded. Ten papers were outside the scope of the desired measurement and were excluded as well. Fifty studies mainly focused on the relationships between KM activities and organisational performance. One paper was excluded due to its duplicate effect sizes. Finally, 116 papers concerning KM practices and organisational performance were coded in detail. Among these 116 papers³, 56 papers about KFOC and organisational performance were analysed in this study, as shown in Table 5.

Table 4
Paper selection procedures and exclusion criterion.

SN	Selection procedures & criterion	No. of studies left
1	Excluded 366 papers not on topic	978
2	Excluded 140 papers that are not empirical	838
3	Excluded 2 papers not in English	836
4	Excluded 164 papers not reporting correlation coefficients (or other statistics that can be used to calculate correlation coefficients)	672
5	Excluded 173 papers out of the scope of measurement	499
6	Excluded 43 papers that measured KM as a variable	456
7	Excluded 8 papers that reported sub-item correlations	448
8	Excluded 2 papers that reported incorrect correlations	446
9	Excluded 2 duplicate papers	444
10	Excluded 34 papers with unmatched methods	410
11	Excluded 2 papers not reporting measurements	408
12	Excluded 22 literature reviews	386
13	Excluded 79 papers on team performance	307
14	Excluded 47 papers on job performance	260
15	Excluded 78 papers on KM and innovation performance	182

Summary: 182 papers were left for primary data coding processes.

³ Among these 116 studies, 56 papers were related to KFOC and organizational performance. Twenty-two papers were related to knowledge-based leadership and organizational performance. Fourteen papers were about strategic KM and organizational performance. Fourteen papers were about knowledge codification strategy and organizational performance. Twelve papers were about knowledge personalization strategy and organizational performance. Forty papers were about KM-supportive IT and organizational performance, while forty-five papers were about organizational learning and organizational performance.

Table 5
Paper selection for final data coding.

SN	Exclusion criterion for final data coding	No. of studies left
1	Excluded 50 papers about KM process and organisational performance	132
2	Excluded five papers due to lack of information	127
3	Excluded 10 papers outside scope of measurement	117
4	Excluded one paper with a duplicated effect size	116

Summary: 116 papers remained for final data coding processes, and 56 papers about KFOC and organisational performance were analysed in this study.

3.4. Information collection and evaluation

The authors took part in discussion rounds regarding the data coding details and came to an agreement on a list of data items to code as well as the procedures for such. In this phase, KFOC and organisational performance were coded, which included the authors' names, correlation coefficients (other parameters were transformed into correlation coefficients if possible; Appendix B shows the calculation in detail), sample size, regions and industries of the data collected, and measurement of KFOC and organisational performance. During this procedure, the authors also assessed the quality of the studies to re-examine if those selected were appropriate to include in the final dataset. Details regarding the descriptive statistics of the studies are shown in Appendix A.

4. Results

4.1. Main effects analysis

A random-effects model was used to analyse the relationship between KFOC and organisational performance, because the effect sizes and sampling frameworks were varied (Borenstein, Hedges, Higgins, & Rothstein, 2010). In calculating with CMA 3.0, this study shows a positive comprehensive effect size between KFOC and overall organisational performance ($r = 0.438$, 95% confidence interval (CI): 0.362, 0.508, Z -value = 10.211, $p < 0.001$, number of studies: 30, total sample size: 9,515), which supports H1a. In addition, KFOC is positively related to financial performance and non-financial performance, therefore supporting H1b ($r = 0.375$, 95% CI: 0.190, 0.533, Z -value = 3.840, $p < 0.001$, number of studies: 14, total sample size: 2,851) and H1c ($r = 0.443$, 95% CI: 0.367, 0.513, Z -value = 10.275, $p < 0.001$, number of studies: 24, total sample size: 4,190). Empirical results are shown in Table 6.

Table 6
Main effect analysis.

Study	Sample size	Total subjects	Effect size	95% Confidence interval (CI)		Two-tailed test		Result
				Lower limited	Upper limited	Z-value	p-value	
KFOC–OOP	30	9,515	0.438	0.362	0.508	10.211	0.000	Supported H1a
KFOC–FP	14	2,851	0.375	0.190	0.533	3.840	0.000	Supported H1b
KFOC–NFP	24	4,190	0.443	0.367	0.513	10.275	0.000	Supported H1c

Table 7
Categorical moderator test of national culture (the KFOC–overall organisational performance relationship).

National culture dimension	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p-value	
Power distance (L)	14	0.428	0.283	0.554	5.400	0.000	Not supported $H_{PDa}^{[1]}$
Power distance (S)	15	0.451	0.361	0.532	8.818	0.000	
Total between	$Q_{\text{between}}: 0.077; df(Q):1; p\text{-value}: 0.781$						Not supported $H_{ICa}^{[1]}$
Collectivism (C)	16	0.404	0.285	0.510	6.235	0.000	
Individualism (I)	13	0.483	0.373	0.580	7.619	0.000	Not supported $H_{FMa}^{[1]}$
Total between	$Q_{\text{between}}: 1.025; df(Q):1; p\text{-value}: 0.311$						
Femininity (F)	11	0.376	0.279	0.466	7.090	0.000	Not supported $H_{FMa}^{[1]}$
Masculinity (M)	18	0.476	0.370	0.569	7.860	0.000	
Total between	$Q_{\text{between}}: 1.989; df(Q):1; p\text{-value}: 0.158$						Not supported $H_{LSa}^{[1]}$
Uncertainty avoidance (S)	13	0.392	0.258	0.510	5.431	0.000	
Uncertainty avoidance (W)	16	0.479	0.391	0.557	9.489	0.000	Not supported $H_{LSa}^{[1]}$
Total between	$Q_{\text{between}}: 1.310; df(Q):1; p\text{-value}: 0.252$						
Long-term orientation (L)	19	0.466	0.351	0.566	7.195	0.000	Not supported $H_{IRa}^{[1,2]}$
Short-term orientation (S)	9	0.397	0.305	0.482	7.839	0.000	
Total between	$Q_{\text{between}}: 0.914; df(Q):1; p\text{-value}: 0.339$						Not supported $H_{IRa}^{[1,2]}$
Indulgence (I)	10	0.330	0.223	0.429	5.772	0.000	
Restrainted (R)	18	0.504	0.399	0.596	8.246	0.000	Rejected $H_{IRa}^{[1,2]}$
Total between	$Q_{\text{between}}: 5.590; df(Q):1; p\text{-value}: 0.018^* < 0.1$						

Note: ^[1] The study of [Kamhawi \(2012\)](#) and ^[2] [Boumarafi and Jabnoun \(2008\)](#) were dropped.

4.2. Moderator analysis

National Cultures. Most of the national culture dimensions did not affect the KFOC–overall organisational performance relationship. As shown in [Table 7](#), H_{PDa} , H_{ICa} , H_{FMa} , H_{UAA} , and H_{LSa} were not supported, because none of the Q_{between} values of the groups of small and large power distance, collectivism and individualism, femininity and masculinity, weak and high uncertainty avoidance, and long-term and short-

term orientation were statistically significant. However, the restrained and indulgence-oriented culture differed regarding their impacts on the KFOC–overall organisational performance relationship due to the significant Q_{between} value ($Q_{\text{between}}: 5.590; df(Q):1; p\text{-value}: 0.018^* < 0.1$), but the overall effect size of the indulgence-oriented culture was smaller than that of the restrained culture ($r_{\text{indulgence}} = 0.330^{***} < r_{\text{restrained}} = 0.504^{***}$); thus, H_{IRa} could be rejected. In contrast, none of national culture dimensions had an impact on the KFOC–financial

Table 8
Categorical moderator test for industry (KFOC–financial performance relationship).

Industry type	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p-value	
Manufacturing	6	0.334	0.122	0.517	3.024	0.002	Supported $H_{Ib}^{[2]}$
Service	2	0.590	0.488	0.676	9.233	0.000	
Total between	$Q_{\text{between}}: 5.861; df(Q):1; p\text{-value}: 0.015^* < 0.05$						

Note: ^[2] The study of [Marouf \(2016\)](#) was excluded.

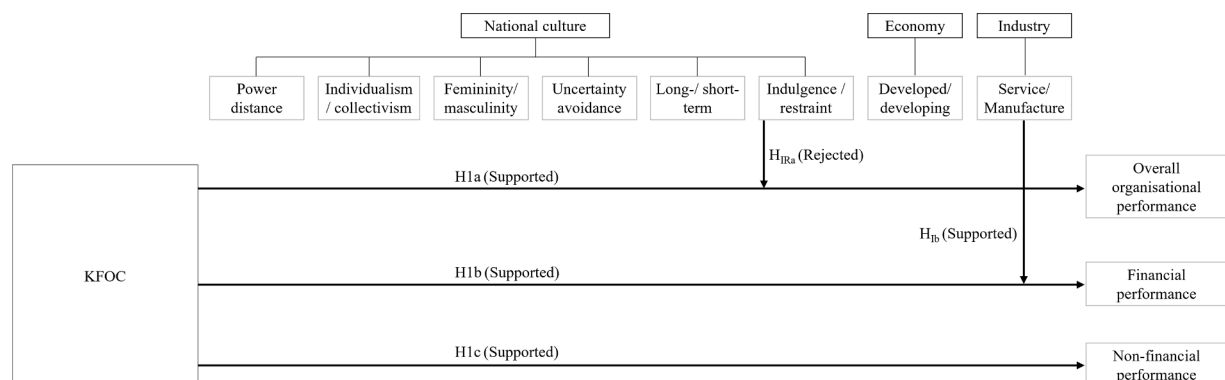


Fig. 2. Empirical results of KFOC–organisational performance relationships.

performance relationship or the KFOC–non-financial performance relationship. Detailed insignificant results can be found in Appendix E.

National Economy. The differences in economy did not affect the KFOC–organisational performance relationship in terms of the insignificant moderating tests, which did not support HE_a , HE_b , or HE_c . Detailed empirical results can be found in Appendix E.

Industry. Industry⁴ was a categorical moderator strengthening the KFOC–financial performance relationship in service industries ($r_{service} = 0.590^{***} > r_{manufacturing} = 0.334^{**}$), which supported H_{1b} (Table 8), whereas the moderating effects of industry on the KFOC–overall organisational performance relationship and the KFOC–non-financial performance relationship were insignificant, thus not supporting H_{1a} and H_{1c} . Details on the insignificant results can be found in Appendix E. The empirical results can be found in Fig. 2.

5. Discussion and implications

5.1. Key findings

A KFOC can help an organisation improve its performance by helping it create, acquire, and apply knowledge more effectively and efficiently. This study supported this argument by showing a significant accumulative effect size ($r_{KFOC-OOP} = 0.438$), confirming that KFOC was positively related to overall organisational performance. This finding is in line with a large number of previous studies, such as Wong and Wong (2011), Baker and Sinkula (1999), Kamhawi (2012), thus supporting H_{1a} . In addition, the finding is in agreement with earlier studies, such as Kianto et al. (2013), Collins and Smith (2006), and Hsu and Sabherwal (2012), which argued that KFOC is positively related to the financial performance of firms. Hypothesis H_{1b} was also supported through the demonstration of a significant overall effect size ($r_{KFOC-FP} = 0.375$). Finally, it is clear from this study that KFOC was positively associated with the non-financial performance of organisations ($r_{KFOC-NFP} = 0.443$), which corroborates the findings of prior research, such as Tan and Wong (2015), Suahyo et al. (2016), and Chuang et al. (2013), thus supporting hypothesis H_{1c} .

The above-mentioned positive findings on the relationships between KFOC and organisational performance can be explained by the fact that, if the organisational culture is more friendly towards knowledge, the organisation can manage their knowledge more successfully (Davenport et al., 1998; Mousavizade & Shakibazad, 2019). In a KFOC, employees understand that knowledge is important and believe that KM is beneficial in their jobs. Positive behaviour toward knowledge is common in organisations with KFOC; for instance, employees trust and share their knowledge to help each other, are open to experiment and create knowledge for innovation, smoothly collaborate to solve problems, and are willing to learn to improve their skills. In this way, employees can obtain the latest knowledge they need to improve their performance, and organisations can benefit from their employees' efforts in KM activities by increasing their competitive advantage over rivals.

The impacts of national culture on the KFOC–organisational performance relationship are complex, as not all comparisons of the different dimensions of national culture are significant, and some comparisons are inconsistencies. These inconsistencies might be explained by the fact that it is the organisational culture—rather than the national culture—that significantly affects organisational performance. KFOC is one of the internal causes behind the success of firms, whereas national culture is an external cause behind facilitated or hindered KFOC (Jacks et al., 2014)—performance relationships. On the other hand, different degrees of indulgence of regions were found to significantly impact the relationship between KFOC and overall organisational performance, thus rejecting H_{1Ra} , because the overall effect size in a restrained culture was found to be larger than in an indulgence-oriented culture

($r_{indulgence} = 0.330^{***} < r_{restrained} = 0.504^{***}$). This contradictory finding can be explained by the following factors. People in restrained cultures generally feel helpless in their lives (Hofstede et al., 2010), but the KFOC emphasis on building a trusting and collaborative culture conducive to knowledge-sharing mitigates this feeling of helplessness among the employees. This explains why the effect size in the restrained culture was stronger. In other words, KFOC is more effective in enhancing overall organisational performance once it is formulated in a restrained culture. This conclusion is also applicable for the relationship between KFOC and financial as well as non-financial performance. However, the distinctions were not statistically obvious when compared to indulgence-oriented and restrained cultures for these two types of organisational performance.

Comparisons between developed and developing economies in terms of KFOC–organisational performance relationships were not statistically significant, thus not supporting HE_a , HE_b , and HE_c . Despite the insignificant group comparisons, it was revealed that the effect sizes were larger in developing economies than in developed economies, which was contradictory to the hypotheses. This might be explained by the fact that, in general, KM in firms in developed economies is more mature than in firms in the developing economies. Such KM maturity was found to be homogeneous in developed economies, making it difficult to lead to competitive advantages. In contrast, the KM maturity level in developing economies was found to be heterogeneous, and a higher level of KM maturity was found to lead to the better performance of firms in these economies.

In line with Kianto and Andreeva (2014), this study found that the KFOC–financial performance relationship was strengthened in the service industries ($r_{manufacturing} = 0.334^{**} < r_{service} = 0.590^{***}$), which can be explained by the fact that service industries are more knowledge-intensive than the manufacturing industry (Kianto & Andreeva, 2014). With a mature KFOC, firms in service industries can achieve better financial performance than those in the manufacturing industry, because it is more important for service firms to have a culture in which employees can easily share, obtain, and apply knowledge. A similar conclusion was found for the KFOC–overall organisational performance relationship, although these comparisons were not significant. However, the comparison of these industries in terms of the relationship between KFOC and non-financial performance was insignificant, but the integrated effect size was larger in the manufacturing industry than in the service industries. This inconsistency may be due to the heterogeneity of the service industries, as some service industries are not more knowledge-intensive than the manufacturing industry (Kianto & Andreeva, 2014), and non-financial performance, such as product quality improvement, is more sensitive to KM in the manufacturing industry.

5.2. Theoretical implications

This study significantly contributes to knowledge-based theory and international business research from the following perspectives. First, to the best of the authors' knowledge, this study is the first to present evidence regarding the KFOC–organisational performance relationships using a meta-analysis technique. Moreover, this study deepens our understanding of knowledge-based theory by proving that a KFOC can help organisations realise a competitive advantage by fostering a widely accepted belief among employees that embracing positive knowledge-related behaviour can enhance the efficiency of knowledge flows in the organisation. With the meta-analysis approach, this study expands on the earlier review studies of Inkinen (2016) and Gupta and Chopra (2018) by offering a specific comprehensive magnitude between KFOC and overall organisational performance, KFOC and financial performance, and KFOC and non-financial performance. This study also remarkably improves the generalisability of the impacts of KFOC on organisational performance through clarifying the contradictory relationships between them by using a large number of research subjects across many different empirical studies (9,515 subjects from 30 studies for the KFOC–overall organisational performance relationship, 2,851

⁴ Studies not reporting on industry or those collecting data from multiple industries were excluded for the moderating test for industry type.

subjects from 14 studies for the KFOC–financial performance relationship, and 4,190 subjects from 24 studies for the KFOC–non-financial performance relationship).

Second, this study has enhanced our knowledge of the impact of national culture on the relationship between KFOC and organisational performance, thus extending knowledge-based theory by considering the impacts of cross-cultural factors and contributing to international business research. The present study also provides novel knowledge by showing that a restrained culture rather than an indulgence-oriented culture strengthens KFOC and its benefits, while the differences in other dimensions of national culture almost equally affected the KFOC–organisational performance relationship. Thus, this study contributes to international business research by generating new knowledge about the role of national culture and economy in KM. In addition, this is one of the few studies examining the impacts of industry on the relationships between KFOC and organisational performance. It enhances our understanding in this area by confirming that the KFOC–overall organisational performance relationship is stronger in service industries than in manufacturing industries.

5.3. Managerial implications

This study also has several useful practical applications, especially for organisations with cultures that are knowledge averse. First, it offers KM practitioners direct empirical evidence of the relationship between KFOC and its benefits, suggesting that knowledge managers should balance the cultural and technological aspects of KM. Therefore, KM leadership, which refers to the capability of leaders to influence others in terms of embracing KM, should be developed to foster KFOC, especially in firms against KM. Additionally, rapid technology development, such as Industry 4.0 and 5G, and fluctuating business environments, such as de-globalisation, re-shoring, and the COVID-19 pandemic, have changed the way of doing business for firms, thus requiring firms to embrace a KFOC to sustain a competitive advantage. In firms, certain practices should be adopted to create a set of shared values and beliefs encouraging employees to be passionate about learning, open to innovation, trusting, collaborative, and willing to share their knowledge with each other. These practices include, for instance, organising communities of practice, sharing knowledge during meetings, motivating learning and training through examinations, fostering trust through teamwork, and promoting a high tolerance for the unexpected results of innovative ideas.

This study also informs managers that not all dimensions of national culture impact KFOC–organisational performance relationships. This finding may help managers in multinational companies (MNCs) make better decisions when they invest in a new overseas market in the post-pandemic era. They should particularly pay attention to developing KFOC, since it may offset some negative impacts of national culture on KM. For instance, KFOC facilitates knowledge-sharing among employees, including managers and subordinates, thus reducing knowledge gaps within the tall managerial hierarchies in larger power distance regions. In addition, managers should be aware that organisational culture is generally easier to change than national culture. Therefore, they are encouraged to identify appropriate strategies to align KM needs by taking advantage of positive cultural backgrounds of a nation for KM and mitigate the negative impacts of national culture through KFOC. For instance, managers might encourage continuous learning without extra remuneration for employees in a restrained culture, as employees are more likely to learn by themselves, whereas employees in an indulgence-oriented culture are unlikely to learn by themselves without motivation, and managers might encourage them to learn by offering them bonus pay. Finally, this study recommends that knowledge managers, especially those in service industries, should be more dedicated to fostering a KFOC in their organisations, since knowledge is more critical for the success of service firms.

5.4. Limitations and future research

Despite the fact that this study provides significant theoretical contributions and valuable managerial implications, there are some specific limitations that could be addressed in the future. First, this study only included papers written in English from 1975 to 2018 from the Scopus database, and thus it might suffer from a language bias and a database bias, although such biases were considered minimal, according to past research (Livingston, Messura, Dellinger, Holder, & Hyde, 2008). Second, this study considered KFOC as an integrative variable, so that the relationships between the sub-dimensions of KFOC—such as knowledge-sharing, trusting, learning-focused, collaborative, and innovation-fostering cultures—and organisational performance remain unexplored. Future studies may examine these relationships in detail. Third, Hofstede's national culture dimensions have been criticised in the sense that their values do not represent the current situations of some nations, as Minkov (2018) argued. For instance, Confucian countries are becoming more individualism-oriented nowadays. Further studies might therefore adopt updated national culture values to replicate our model in exploring novel knowledge. For example, a newly developed national culture dimension—flexibility versus monumentalism (Minkov et al., 2018)—might be added to the research model. Fourth, the industries were only generally categorised into manufacturing, service, and multi-industries in this study; however, the effect sizes in specific industries, such as IT industries and finance industries, might be compared in the future. In addition, other moderators, such as national income level, educational development, total research and development investment, respondent characteristics, and year of data collection, might be applied in future studies to explain the variance across studies. Finally, meta-analysis studies can be conducted to investigate the relationships between other KM practices (i.e., KM leadership, KM strategies, KM-supportive IT, and organisational learning) or KM activities (i.e., knowledge creation, sharing, application, retention, etc.) and different types of performance, such as team or project performance, employee job performance, and innovation performance. Examinations of these relationships might be conducted through big data analytics and machine learning techniques as well.

6. Conclusions

The importance and novelty of this study is that it has clarified the complex relationship between KFOC and organisational performance using a meta-analysis technique. For the first time, this study has provided a specific answer to the essential questions: (1) what is the relationship between KFOC and organisational performance? and (2) do contextual factors (national culture, economy, and the type of industry) moderate the KFOC–organisational performance relationships? based on synthesising a large number of subjects from many studies. We confirmed that KFOC is positively related to organisational performance by correcting the mixed relationships in earlier studies. These findings support this study's contributions to the literature by providing specific strength of the relationship between KFOC and organisational performance and thereby enhancing the generalisability of the KFOC–organisational performance relationship. We also found that the restrained culture strengthens the KFOC–overall organisational performance relationship and that the KFOC–financial performance relationship is stronger in service industries, which contributes to KM theory by highlighting the impacts of contextual factors on this relationship. The study remarkably deepens our understanding of the role of contexts in affecting KM and its benefits. Finally, this study raises many questions that are worth investigating in the future, such as the relationships between other KM practices or KM activities and different types of performance, e.g., team performance, employee performance, and innovation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Descriptive statistics

As shown in Fig. A.1, studies concerning KFOC–organisational performance relations have become more popular after 2005, and a greater number of studies were published after 2010. Detailed descriptive statistics of these studies can be found in Table A1, Table A2, and Table A3.

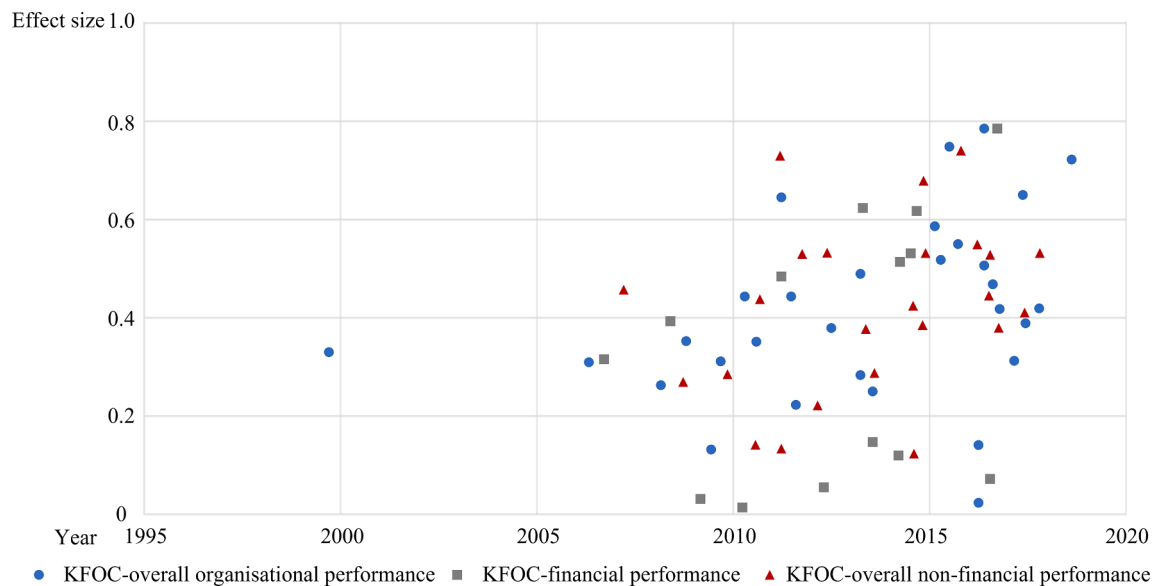


Fig. A1. Studies on KFOC–organisational performance relationships.

Table A1

Descriptive statistics of studies examining the KFOC–overall organisational performance relationship.

SN	Study name	Effect size	Sample size	Region	PD	IC	FM	UA	LS	IR	Economy	Industry
1	Baker & Sinkula, 1999-OP	0.325	411	US	S	I	M	W	S	I	Developed	Multiple
2	Boumarafi & Jabnoun, 2008-OP ^[2]	0.282	89	UAE	L	C	M	S	NA	NA	Developing	Multiple
3	Chen et al., 2011-OP	0.649	556	China	L	C	M	W	L	R	Developing	Service
4	Chen et al., 2009-OP ^[3]	0.314	325	China	L	C	M	W	L	R	Developing	Unclear
5	Cheng et al., 2008-OP	0.354	218	China	L	C	M	W	L	R	Developed	Multiple
6	Chuang et al., 2013-OP	0.274	119	Taiwan (China)	S	C	F	S	L	I	Developing	Manufacturing
7	Forte et al., 2016-OP ^[3]	0.500	101	Iran	S	I	F	W	S	R	Developing	Unclear
8	Guimarães et al., 2016-OP	0.080	618	Brazil	L	C	M	S	L	I	Developing	Manufacturing
9	Huang et al., 2010-OP	0.440	170	Taiwan (China)	S	C	F	S	L	I	Developing	Manufacturing
10	Imran et al., 2018-OP	0.710	197	Pakistan	S	C	M	S	L	R	Developing	Service
11	Jain & Moreno, 2015-OP	0.590	205	India	L	I	M	W	L	R	Developing	Manufacturing
12	Kamath et al., 2016-OP	0.790	249	India	L	I	M	W	L	R	Developing	Manufacturing
13	Kamhawi, 2012-OP ^[1]	0.370	167	Bahrain	NA	NA	NA	NA	NA	NA	Developing	Multiple
14	Khan et al., 2015-OP	0.737	214	Pakistan	S	C	M	S	L	R	Developing	Service
15	Lin et al., 2013-OP	0.290	214	Taiwan (China)	S	C	F	S	L	I	Developing	Multiple
16	Mageswari et al., 2017-OP	0.652	251	India	L	I	M	W	L	R	Developing	Manufacturing
17	Matin & Sabagh, 2015-OP ^[3]	0.530	148	Iran	S	I	F	W	S	R	Developing	Unclear
18	Migdadi et al., 2016-OP ^[3]	0.484	258	Saudi	L	C	M	S	S	I	Developing	Unclear
19	Migdadi, 2009-OP ^[3]	0.136	416	Saudi Arabia	L	C	M	S	S	I	Developing	Unclear
20	Mousavizadeh et al., 2015-OP	0.560	268	US	S	I	M	W	S	I	Developed	Multiple
21	Palacios-Marqués et al., 2011-OP	0.440	193	Spain	S	I	F	S	L	R	Developed	Service
22	Payal et al., 2016-OP	0.423	100	India	L	I	M	W	L	R	Developing	Service
23	Pham & Nguyen, 2017-OP ^[3]	0.316	103	Vietnam	L	C	F	W	L	R	Developing	Unclear
24	Rezaei et al., 2017-OP	0.371	222	Iran	S	I	F	W	S	R	Developing	Manufacturing
25	Ruiz-Mercader et al., 2006-OP	0.307	151	Spain	S	I	F	S	L	R	Developed	Service
26	Samson et al., 2017-OP	0.425	1579	Australia	S	I	M	W	S	I	Developed	Multiple
27	Song & Kolb, 2013-OP	0.492	633	Korea	S	C	F	S	L	R	Developing	Multiple
28	Valdez-Juárez et al., 2016-OP	0.144	903	Spain	S	I	F	S	L	R	Developed	Multiple
29	Wei, 2010-OP ^[3]	0.350	204	China	L	C	M	W	L	R	Developing	Unclear
30	Wong & Wong, 2011-OP	0.215	233	Malaysia	L	C	M	W	S	I	Developing	Manufacturing

Note: ^[1] National culture scores of Bahrain are unavailable, while the study of [Kamhawi \(2012\)](#) collected data in Bahrain, so it was excluded when moderating the effects of national culture. ^[2] [Boumarafi and Jabnoun \(2008\)](#) collected data in the UAE, but scores for long-term-oriented and indulgence-oriented of the UAE are not available. This study was also dropped when the moderating effects of long-term orientation and indulgence were analysed. ^[3] The studies of [Chen et al. \(2009\)](#), [Forte et al. \(2016\)](#), [Matin and Sabagh \(2015\)](#), [Migdadi et al. \(2016\)](#), [Migdadi \(2009\)](#), [Pham and Nguyen \(2017\)](#), and [Wei \(2010\)](#) did not report on industry in detail; therefore, these studies were excluded when the moderating effect of industries was tested.

Table A2

Descriptive statistics of studies examining the KFOC–financial performance relationship.

SN	Study name	Effect size	Sample size	Region	PD	IC	FM	UA	LS	IR	Economy	Industry
1	Akgün et al., 2014-F	0.110	193	Turkey	L	C	F	S	L	I	Developing	Manufacturing
2	Chen & Liang, 2011-F	0.490	97	Taiwan (China)	S	C	F	S	L	I	Developing	Multiple
3	Chen et al., 2008-F	0.390	150	Taiwan (China)	S	C	F	S	L	I	Developing	Manufacturing
4	Collins & Smith, 2006-F	0.313	136	US	S	I	M	W	S	I	Developed	Multiple
5	Feng et al., 2014-F	0.611	214	China	L	C	M	W	L	R	Developing	Manufacturing
6	Hsu & Sabherwal, 2012-F	0.050	510	Taiwan (China)	S	C	F	S	L	I	Developing	Multiple
7	Kianto & Andreeva, 2014-F-M ^[1]	0.535	86	NA	NA	NA	NA	NA	NA	NA	NA	Manufacturing
8	Kianto & Andreeva, 2014-F-S ^[1]	0.511	61	NA	NA	NA	NA	NA	NA	NA	NA	Service
9	Kianto et al., 2013-F	0.152	399	Finland	S	I	F	W	S	I	Developed	Multiple
10	Lee & Choi, 2010-F	0.016	187	Korea	S	C	F	S	L	R	Developing	Multiple
11	Marouf, 2016-F ^[2]	0.790	392	Kuwait	L	C	F	S	NA	NA	Developing	Unclear
12	Pett & Wolff, 2016-F	0.171	117	US	S	I	M	W	S	I	Developed	Manufacturing
13	Santos-Vijande et al., 2013-F	0.620	154	Spain	S	I	F	S	L	R	Developed	Service
14	Shih et al., 2009-F	0.089	155	Taiwan (China)	S	C	F	S	L	I	Developing	Manufacturing

Note: ^[1] [Kianto and Andreeva \(2014\)](#) collected their research data from Finland, China, and Russia, but these three countries are not consistent in any dimension in terms of national culture and economic status. Therefore, it was deleted with the analysis of the moderating effects of national culture and economy. ^[2] [Marouf \(2016\)](#) study was carried out in Kuwait, where scores regarding long-term orientation and indulgence oriented are not available. Then, it was abandoned, when we analysed the moderating effects of long-term orientation and indulgence. In addition, [Marouf \(2016\)](#) did not clearly report the industry categories from which the data was collected; thus, it was dropped when the moderating effect of industry were analysed.

Table A3

Descriptive statistics of studies examining the KFOC–non–financial performance relationship.

SN	Study name	Effect size	Sample size	Region	PD	IC	FM	UA	LS	IR	Economy	Industry
1	Boumarafi & Jabnoun, 2008-NF ^[2]	0.289	89	UAE	L	C	M	S	NA	NA	Developing	Multiple
2	Chen & Liang, 2011-NF	0.532	97	Taiwan (China)	S	C	F	S	L	I	Developing	Multiple
3	Chong et al., 2011-NF ^[3]	0.128	203	Malaysia	L	C	M	W	S	I	Developing	Government
4	Chuang et al., 2013-NF	0.293	119	Taiwan (China)	S	C	F	S	L	I	Developing	Manufacturing
5	Cooper et al., 2016-NF	0.551	448	US	S	I	M	W	S	I	Developed	Service
6	Giampaoli & Ciambotti, 2016-NF	0.529	85	Italy	S	I	M	S	L	R	Developed	Multiple
7	Huang et al., 2010-NF	0.436	170	Taiwan (China)	S	C	F	S	L	I	Developing	Manufacturing
8	Jiménez-Jiménez et al., 2014-NF	0.104	81	Spain	S	I	F	S	L	R	Developed	Service
9	Kianto & Andreeva, 2014-NF-M ^[1]	0.435	175	NA	NA	NA	NA	NA	NA	NA	NA	Manufacturing
10	Kianto & Andreeva, 2014-NF-S ^[1]	0.391	120	NA	NA	NA	NA	NA	NA	NA	NA	Service
11	Kim & Hancer, 2010-NF	0.149	179	US	S	I	M	W	S	I	Developed	Service
12	Lee, Kim, & Kim, 2012-NF	0.536	105	Korea	S	C	F	S	L	R	Developing	Multiple
13	Machuca & Costa, 2012-NF	0.208	100	Spain	S	I	F	S	L	R	Developed	Service
14	Mageswari et al., 2017-NF	0.543	251	India	L	I	M	W	L	R	Developing	Manufacturing
15	Migdadi et al., 2016-NF ^[3]	0.430	258	Saudi	L	C	M	S	S	I	Developing	Unclear
16	Mills & Smith, 2011-NF ^[2]	0.723	189	Jamaica	S	I	M	W	NA	NA	Developing	Multiple
17	Moon & Lee, 2014-NF	0.690	230	Korea	S	C	F	S	L	R	Developing	Multiple
18	Noh et al., 2014-NF	0.536	108	Korea	S	C	F	S	L	R	Developing	Multiple
19	Rezaei et al., 2017-NF	0.414	222	Iran	S	I	F	W	S	R	Developing	Manufacturing
20	Santos-Vijande et al., 2013-NF	0.370	154	Spain	S	I	F	S	L	R	Developed	Service
21	Shih et al., 2009-NF	0.298	155	Taiwan (China)	S	C	F	S	L	I	Developing	Manufacturing
22	Sucahyo et al., 2016-NF	0.387	139	Indonesia	L	C	F	W	L	R	Developing	Multiple
23	Tan & Wong, 2015-NF	0.728	206	Malaysia	L	C	M	W	S	I	Developing	Manufacturing
24	Zhang et al., 2007-NF	0.457	307	Canada	S	I	M	W	S	I	Developed	Multiple

Note: ^[1] [Kianto and Andreeva \(2014\)](#) collected their research data from Finland, China, and Russia, but these three countries are not consistent in any dimension in terms of national culture and economic status. Therefore, this study was not included when the moderating effects of national culture and economy were examined. ^[2] The study of [Boumarafi and Jabnoun \(2008\)](#) as well as [Mills and Smith \(2011\)](#) were conducted with the data from the UAE and Jamaica. Scores for long-term and indulgence orientation are not available in these countries. Thus, these two studies were removed when the moderating effects of long-term orientation and indulgence were analysed. ^[3] The subjects of [Chong et al. \(2011\)](#)'s study were from the government; while [Migdadi et al. \(2016\)](#) did not clearly specify from which industry they collated their data; thus, these studies were omitted when the moderating effect of industry were analysed.

Appendix B. Effect size transformation

Appendix B1. Converting t-value to effect sizes

Several test statistics, such as t-statistics, Chi-square, F-test score, p-values, and Z-statistics, can be converted into *r* correlations. In this research, nine studies reported t-statistics, while other statistics were not found. Then, formulas from previous studies ([Rosenthal, 1991](#)) was adopted to transform the t-statistics into correlation coefficients.

$$ESr = \frac{t}{\sqrt{t^2 + df}}$$

Appendix B2. Combining effect sizes across studies

Many studies reported more than one correlation coefficient for multiple measures. For instance, Lee et al. (2012) adopted trust, collaboration, and learning to measure KFOC and reported three correlation coefficients. In such cases, the mean effect sizes of the three correlation coefficients were combined by the methods proposed by Noel and Todd (2012), Rosenthal (1991), and Shadish and Haddock (1994).

First, the Z-values (ESZ_r) of each correlation coefficient (r) were standardized by:

$$ESZ_r = 0.5 \log_e \left[\frac{1+r}{1-r} \right] \text{ (Lim, Dehning, Richardson, & Smith, 2011);}$$

Then, the mean Z_r effect size was calculated by the following equation:

$$\overline{ESZ_r} = \frac{\sum (WZ_r \cdot ESZ_r)}{WZ_r}, \text{ } WZ_r = n - 3,$$

where n is the sample size for each study (Lim et al., 2011);

Finally, the standardized correlation was converted back from the mean Z_r as follows:

$$\overline{ESr} = \frac{e^{2\overline{ESZ_r}} - 1}{e^{2\overline{ESZ_r}} + 1} \text{ (Lim et al., 2011).}$$

Appendix C. Publication bias test

The fail-safe N test is commonly used to detect ‘file-drawer’ problems. In the seminal paper of Rosenthal (1979), the author proposed an indicator called the ‘failsafe N’ to indicate the number of excluded studies with a zero effect size that can converse present conclusion of a meta-analysis. Rosenthal also suggested a general rule for detecting publication bias with the failsafe N parameter. The ‘file-drawer’ problem does not exist if the failsafe N is larger than (or equal = to) $5k + 10$ (k is the number of studies in a meta-analysis), because it is unlikely to have many unpublished studies in file drawers (Rosenthal, 1979). The test results showed there was no publication bias in these studies, as shown in Table C1.

Table C1

Publication bias analysis.

Studies	Failsafe N	k	N/5k + 10	Result
KFOC–overall organisational performance (OOP)	3,318	30	20.738	No publication bias
KFOC–financial performance (FP)	1,369	14	17.113	No publication bias
KFOC–non-financial performance (NFP)	5,799	24	44.608	No publication bias

Appendix D. Homogeneity test

The Q-statistic and I^2 (Huedo-Medina et al., 2006; Noel & Todd, 2012) can be used to assess the heterogeneity of a meta-analysis, while the Q-statistic only shows whether the meta-analysis study is heterogeneous or not; however, I^2 can quantify the extent of the heterogeneity (Noel & Todd, 2012). I^2 explains the ratio of between-study variance to total variance (Higgins & Thompson, 2002), while the total variance is comprised of between- and within-study variance (Noel & Todd, 2012). In general, $I^2 \approx 25$, $I^2 \approx 50$, and $I^2 \approx 75$ denotes low, medium, and high heterogeneity, respectively ($I^2 = 0$ denotes word homogeneity) (Huedo-Medina et al., 2006; Noel & Todd, 2012). Therefore, this study applied I^2 to evaluate the heterogeneity of the meta-analysis. As shown in Table D1, the variation in effect sizes cannot be explained by the sampling error only, which is necessary to examine the effects of moderators and the roots of the heterogeneity.

Table D1

Homogeneity test.

Studies	Sample size	Heterogeneity				Tau-square				Result
		Q	df(Q)	p	I^2	τ^2	SE	δ^2	τ	
KFOC–OOP	30	546.419	29	0.000	94.693	0.059	0.021	0.000	0.242	Heterogenous
KFOC–FP	14	367.186	13	0.000	96.460	0.066	0.058	0.004	0.375	Heterogenous
KFOC–NFP	24	197.260	23	0.000	88.340	0.045	0.016	0.000	0.211	Heterogenous

Appendix E. Moderating effects of contextual factors

Insignificant moderating effects of contextual factors are shown in Table E1, Table E2, Table E3, Table E4, Table E5, Table E6, and Table E7.

Table E1

Categorical moderator test for national culture (KFOC–financial performance relationship).

National culture dimension	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p value	
Power distance (L)	3	0.560	0.080	0.829	2.244	0.025	Not supported $H_{PDB}^{[1]}$
Power distance (S)	9	0.263	0.119	0.396	3.528	0.000	

(continued on next page)

Table E1 (continued)

National culture dimension	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p value	
Total between Collectivism (C)	Q _{between} : 1.547; df(Q):1; p-value: 0.214						0.358
0.062	0.596	2.350	0.019	Not supported		8	
Individualism (I)	4	0.329	0.079	H _{ICb} ^[1]	0.540	2.553	0.011
Total between Femininity (F)	Q _{between} : 0.025; df(Q):1; p-value: 0.876						Not supported H _{FMb} ^[1]
9		0.337	0.077	0.555	2.510	0.012	
Masculinity (M)	3	0.386	0.076	0.628	2.408	0.016	
Total between Uncertainty avoidance (S)	Q _{between} : 0.065; df(Q):1; p-value: 0.799						Not supported H _{UAb} ^[1]
8		0.359	0.060	0.600	2.331	0.020	
Uncertainty avoidance (W)	4	0.328	0.065	0.549	2.424	0.015	
Total between Long-term orientation (L)	Q _{between} : 0.027; df(Q):1; p-value: 0.869						Not supported H _{LSb} ^[1, 2]
8		0.317	0.115	0.494	3.017	0.003	
Short-term orientation (S)	3	0.199	0.101	0.294	3.919	0.000	
Total between Indulgence (I)	Q _{between} : 1.099; df(Q):1; p-value: 0.295						Not supported H _{IRb} ^[1,2]
8		0.215	0.109	0.315	3.943	0.000	
Restrained (R)	3	0.449	0.022	0.737	2.055	0.040	
Total between	Q _{between} : 1.206; df(Q):1; p-value: 0.272						

Note: ^[1] The study of [Kianto and Andreeva \(2014\)](#) was excluded. ^[2] The study of [Marouf, 2016](#) was excluded.

Table E2

Categorical moderator test for national culture (KFOC–non-financial performance relationship).

National culture dimension	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p value	
Power distance (L)	6	0.442	0.244	0.604	4.133	0.000	Not supported H _{PDC} ^[1]
Power distance (S)	16	0.447	0.354	0.531	8.514	0.000	
Total between	Q _{between} : 0.003; df(Q):1; p-value: 0.959						
Collectivism (C)	12	0.459	0.337	0.566	6.671	0.000	Not supported H _{ICc} ^[1]
Individualism (I)	10	0.429	0.309	0.537	6.418	0.000	
Total between	Q _{between} : 0.128; df(Q):1; p-value: 0.721						
Femininity (F)	12	0.417	0.315	0.509	7.416	0.000	Not supported H _{FMc} ^[1]
Masculinity (M)	10	0.478	0.344	0.593	6.324	0.000	
Total between	Q _{between} : 0.568; df(Q):1; p-value: 0.451						
Uncertainty avoidance (S)	13	0.420	0.323	0.509	7.762	0.000	Not supported H _{UAc} ^[1]
Uncertainty avoidance (W)	9	0.479	0.337	0.600	5.989	0.000	
Total between	Q _{between} : 0.500; df(Q):1; p-value: 0.480						
Long-term orientation (L)	13	0.437	0.341	0.523	8.150	0.000	Not supported H _{LSc} ^[1, 2]
Short-term orientation (S)	7	0.431	0.270	0.568	4.916	0.000	
Total between	Q _{between} : 0.004; df(Q):1; p-value: 0.949						
Indulgence (I)	10	0.419	0.291	0.532	5.972	0.000	Not supported H _{IRc} ^[1,2]
Restrained (R)	10	0.451	0.340	0.550	7.236	0.000	
Total between	Q _{between} : 0.161; df(Q):1; p-value: 0.688						

Note: ^[1] The study of [Kianto and Andreeva \(2014\)](#), ^[2] [Boumarafi and Jabnoun \(2008\)](#), and [Mills and Smith \(2011\)](#) were excluded.

Table E3

Categorical moderator test for economy (KFOC–overall organisational performance relationship).

Economies	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p value	
Developed economies	7	0.369	0.254	0.474	5.944	0.000	Not supported H _{Ea1}
Developing economies	23	0.458	0.360	0.546	8.238	0.000	
Total between	Q _{between} : 1.466; df(Q):1; p-value: 0.226						

Table E4

Categorical moderator test for economy (KFOC–financial performance relationship).

Economies	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p value	
Developed economies	4	0.329	0.079	0.540	2.553	0.011	Not supported H _{Ea2} ^[1]
Developing economies	8	0.358	0.062	0.596	2.350	0.019	
Total between	Q _{between} : 0.025; df(Q):1; p-value: 0.876						

Note: ^[1] The study of [Kianto and Andreeva \(2014\)](#) was excluded.

Table E5
Categorical moderator test for economy (KFOC–non-financial performance relationship).

Economies	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p value	
Developed economies	7	0.356	0.212	0.486	4.639	0.000	Not supported $H_{Ea3}^{[1]}$
Developing economies	15	0.484	0.383	0.574	8.261	0.000	
Total between	$Q_{between}: 2.302; df(Q):1; p\text{-value}: 0.129$						

Note: ^[1] The study of Kianto and Andreeva (2014) was excluded.

Table E6
Categorical moderator test for industry (KFOC–overall organisational performance relationship).

Industry type	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p value	
Manufacturing	8	0.459	0.235	0.637	3.795	0.000	Not supported $H_{Ia1}^{[3]}$
Service	6	0.570	0.427	0.685	6.636	0.000	
Total between	$Q_{between}: 0.855; df(Q):1; p\text{-value}: 0.355$						

Note: ^[3] Studies not reporting on industry and those that collected data from multiple industries were excluded.

Table E7
Categorical moderator test for industry (KFOC–non-financial performance relationship).

Industry type	Sample size	Effect size	95% CI		Two-tailed test		Result
			Lower limited	Upper limited	Z-value	p value	
Manufacturing	7	0.467	0.334	0.582	6.232	0.000	Not supported H_{Ia3}
Service	6	0.312	0.135	0.470	3.384	0.001	
Total between	$Q_{between}: 2.316; df(Q):1; p\text{-value}: 0.144$						

Note: ^[3] The study of Chong et al. (2011) and Migdadi et al. (2016) were excluded.

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