ASIAN ACADEMY OF MANAGEMENT JOURNAL

EARLY VIEW

Manuscript title: The mediating effect of innovation on the relationship between corporate governance and firm performance: Evidence from developed and developing countries

Authors: Ploypailin Kijkasiwat, Anwar Hussain, Uzma Nisar, and Liew Chee Yoong

Accepted date: 19 December 2022

To cite this article: Kijkasiwat, P., Hussain, A., Nisar, U., & Yoong, L. C. (2023). The mediating effect of innovation on the relationship between corporate governance and firm performance: Evidence from developed and developing countries. *Asian Academy of Management Journal* (early view).

THE MEDIATING EFFECT OF INNOVATION ON THE RELATIONSHIP BETWEEN CORPORATE GOVERNANCE AND FIRM PERFORMANCE: EVIDENCE FROM DEVELOPED AND DEVELOPING COUNTRIES

Ploypailin Kijkasiwat[1*], Anwar Hussain[2], Uzma Nisar[3], and Liew Chee Yoong[4]

[1]Faculty of Business Administration and Accountancy, Khon Kaen University, Thailand
[2]Ghazi University, Department of Business Administration, Dera Ghazi Khan, Pakistan
[3]The University of Lahore, Pakistan
[4]Department of Accounting & Finance, Faculty of Business Management, UCSI University, Kuala Lumpur, Malaysia

[*]Corresponding author: ploypailin@kku.ac.th

ABSTRACT

Prior studies have shown that innovation has a mediating effect on the relationship between corporate governance and firm performance. This study compares this mediating effect in developed and developing countries using agency theory and signaling theory. A panel sample of 2688 firms in developing and developed countries is analysed for the period 2002 to 2017. The empirical findings demonstrate that corporate innovation fully mediate the relationship between corporate governance and firm performance in developed countries. However, innovation partially mediates the relationship between corporate governance and firm performance in developing countries. This could be because of different socioeconomic factors and capabilities of innovators involved in corporate governance structure. The study has both theoretical and policy implications and provides insights for policy makers for identifying the influence of innovation on firm value and evaluating the importance of corporate governance.

Keywords: corporate governance, innovation, firm performance, mediating effect, developed and developing countries

INTRODUCTION

Every organization in the service and manufacturing sectors or any other grouping wants to ascertain how they can achieve enhanced profits and ensure sustainability. This goal becomes even more imperative in the current highly competitive market. One potential strategy to improve profitability is through effective corporate governance (Jamil, Ghazali, M., and Nelson, 2020; Adedeji, San Ong, Uzir and Hamid, 2020). Prior studies mention that corporate governance (CG) can improve firm performance (FP) (Bhatt and Bhatt, 2017; Pillai and Al-Malkawi, 2018). Companies with good governance can ensure investors' safety, protecting them from corporate scandals (Bhatt and Bhatt, 2017). Firms that follow corporate governance codes tend to reduce agency conflict and information asymmetry between agents and principals, and can then reduce agency costs (Huu Nguyen, Thuy Doan and Ha Nguyen, 2020). Corporate governance is a tool to boost investors' confidence and the financial health of firms (Mishra and Mohanty, 2014). From investors' perspective, firms with good corporate governance are

attractive and have higher market capitalization which positively impacts firm performance (Widiatmoko, Indarti and Pamungkas, 2020). Conversely, it has been shown in the literature that without a strong governance system, many problems occur and that a weak governance system is the main reason for the failure of firms or financial crises (Udin, Khan, and Javid, 2017; Yang, Jiao, and Buckland, 2017). The literature demonstrates that there is a direct correlation between CG and FP (Ciftci, Tatoglu, Wood, Demirbag, and Zaim, 2019). Corporate governance is the internal driver that can enhance the performance of firms. There are also external drivers that can potentially enhance firm performance. In the contemporary environment, a potentially significant external driver is adopting innovation and technology to reduce risks, increase returns, and enhance overall performance (Lee, Lee, and Garrett, 2019). Many scholars suggest that innovative activities could help firms and organizations to improve their work and achieve their objectives in a shorter period (Gunday, Ulusoy, Kilic, and Alpkan, 2011; Teece, 2010)

Corporate governance structure and its implications for firm performance varies considerably between developed and developing countries. Board size is one area which illustrates this difference. According to Rashid (2008), in developing countries, a larger board improves outcomes for shareholders, while the converse is true for developed financial markets. Another significant point of difference is ownership structure. The literature suggests. that in developing countries, corporate governance is limited and creates difficulties. Families tend to exert considerable control over businesses, shareholders are often not engaged, there may be insufficient legislative control, and expertise may be lacking. (Mahmood, Kouser, Ali, Ahmad and Salman, 2018; Khan, Muttakin, Siddiqui, 2013; Ullah and Rahman, 2015). This pattern of family control and flimsy corporate governance can be seen in developing countries such as those in South Asia. The dominance of family ownership may result in a carelessness about shareholder benefits. (Khan, Muttakin, Siddiqui, 2013; Muttakin, Mihret, Khan, 2018; Bae, Masud, Kaium and Kim, 2018).

In addition, the literature also notes differences between corporates in developed and developing countries in relation to disclosure. In developed countries, disclosure of information especially in relation to Corporate Social Responsibility (CSR), is used to enhance corporate status and public esteem (Momin and Parker, 2013.) Disclosure of CSR information is also important to satisfy the requirements of different stakeholders such as regulators, creditors, investors, and environmentalists. However, in developing countries the influences on corporate disclosure are different. (Alnabsha, Abdou, Ntim and Elamer, 2018). In developing countries, influential external interests determine CSR disclosure such as international buyers, foreign investors, or the views of the international media (Ali, Frynas and Mahmood, 2017).

Furthermore, the literature has also established that both good governance and innovation promote improved performance in many firms. Firms make more investments on innovative activities during the initial stage rather than during the mature stage (Shahzad, Ahmad, Fareed and Wang, 2022). Mature firms prefer to maintain assets for enlargement compared to their counterparts, so they prefer to invest in growth-oriented innovation projects (Richardson, 2006). However, McGahan and Silverman (2001) argued that innovation investments were more substantial in mature firms than emerging firms. Although these arguments are found in the studies investigating at which stage a firm adopts more innovative technology, the results are various among developed and developing countries (Audretsch, Sanders and Zhang, 2021; Tariq,

Badir, Safdar, Tariq and Badar, 2019). This is particularly the case, when corporate governance is involved in strategic plans (Bianchini, Krafft, Quatraro and Ravix, 2018; Jia, Huang and Man Zhang, 2019; Iyengar and Sundararajan, 2020). Less attention has been paid to how corporate governance affects the impact of innovative factors on firm performance (Gooderham, Minbaeva, and Pedersen, 2011), particularly to the relationship between corporate governance and innovation of firms in developed and developing countries. It has been shown that companies in developed countries who incorporate environmentally responsible practices into their primary business plans are more likely to obtain financial resources from green financial markets than those in developing countries (Manrique and Martí-Ballester, 2017). Accessing these financial benefits, in turn, enables firms to initiate innovations to improve firm performance. Furthermore, better quality public governance improves the capacity of corporate governance to reduce risks associated with innovation. (Jia, Huang and Man Zhang, 2019). By contrast, in developing countries, while globalisation has influenced corporate governance standards, these standards have not been applied to innovative practices (Khanna, Kogan and Palepu, 2006).

There is extant research that considers corporate governance in different countries (Bae, Masud, Kaium and Kim, 2018; Iqbal, Nawaz and Ehsan, 2019; Pillai, and Al-Malkawi, 2018), but there is still a need for a more comprehensive investigation of the difference between developed and developing markets (Panda and Leepsa, 2017). Likewise, a few studies argue that innovation has a mediating role in the relationship between corporate governance and organizational performance. In these cases, individual countries were examined, as in the work of Khan, Hussain, Maqbool, Ali and Numan (2019) and Umrani, Johl, and Ibrahim (2017). However, there is still a gap in terms of looking at the differences between developed and developing countries, to ascertain how corporate innovation influences the relationship between corporate governance and organisational performance.

To address these identified gaps, this paper examines the mediating role of innovation on CG and FP across developed and developing countries**.** The hypothesis of the mediating role of innovation is based on two theories, agency theory and signaling theory. While the relationship between CG and FP is investigated based on agency theory, the relationship between CG and innovation is examined with reference to signaling theory (Xia, Gao, Wei and Ding, 2022). It has been shown in the research that corporate governance structures relay different messages about innovation to the market and various stakeholders (Bae, Masud, Kaium and Kim, 2018). If board members support innovation, they can demonstrate the potential importance of this in more detail. For example, a corporate innovation plan can be demonstrated through research and development (RandD) which is scaled according to expenses (Fernández-Sastre and Montalvo-Quizhpi, 2019). When collecting data from Compustat, this study double checks on how the measured innovation, namely the RandD expenses, is evaluated. From the database, there are no IFRS adoption differences across the 17 countries' data, so the measurement used in this study is consistent for all the countries in the sample. Furthermore, according to Shah, Liang and Akbar (2013), there are no differences in the value relevance of R&D expenses in the pre- and post-IFRS periods. All these prove that the measurement of R&D expenses as a proxy for corporate innovation in the research sample is consistent over time.

The current study aims to contribute to the research literature in several ways. Firstly, the study can assist decision makers, analysts, policy makers, practitioners, and shareholders in both developed and developing countries to understand the different impacts of CG and FP through consideration of the role of corporate innovation. Secondly, this study offers an academic contribution by demonstrating how differences in corporate governance structures impact on the influence of innovation on a firm's value.

The following section presents the theoretical framework and hypothesis development. Section three defines the research methodology. Section four provides empirical findings and discussion. The last section summarizes the study's conclusion and offers recommendations for further studies.

THEORETICAL BACKGROUND AND HYPOTHESIS FORMULATION

Agency Theory

Agency theory depends on the agency relationship between shareholders and the management of companies. Shareholders are the owners of the company; they elect directors to act on behalf of the shareholders. The director's aim is to represent the owners and work on their behalf. On occasions, directors may, knowingly or unknowingly, make decisions which are not beneficial to the interests of the shareholders. When the owners and managers do not work effectively together, conflict may arise, and firm performance may vary based on their choices. Conflicts that arise can affect firm performance adversely. Agency theory is based on the relationship between an agent and the principal shareholders. The agent works on behalf of the principal shareholders. Problems arise when the interests of the two parties diverge, and the agent does not act for the principal shareholders' benefit. These conflicts arise due to miscommunication or other factors that lead to financial losses (Liew, Alfan and Susela, 2015, 2017, 2020). Corporate governance changes the rules of agency theory to introduce motivation strategies that motivate the agent to work for the best interest of shareholders and resolve conflicts.

Regarding agency conflict in firms listed in developed and developing countries, it has been shown that remuneration packages and board independence are not effective tools for governing owner managers in some developing countries (Yusuf, Yousaf and Saeed, 2018). Compared with developed countries, firms listed in emerging markets face some problems relating to information asymmetry which can lead to stock volatility (Kumar and Tsetsekos, 1999; Pillai and Al-Malkawi, 2018). It has been suggested by some authors that there are relevant authorities who try to minimize problems such as monopolies, inadequate managerial market regulations, and imbalances affecting minority shareholders (Pillai and Al-Malkawi, 2018). Nevertheless, as different national cultural factors affect corporate governance practices (Humphries and Whelan, 2017), firms in developed countries do tend to have contract enforcement measures, dispersed and separate ownership, as well as better regulations and protection of minority shareholders' rights (Awasthi, 2017). Consequently, agency conflicts between stakeholders are minimized.

Signaling Theory

This theory relates to the response of the stock market to information (Connelly, Certo, Ireland and Reutzel, 2011). This response includes the presentation of the intellectual capital and innovation in an annual report in firms for signaling external investors about intangible assets and development (Woudstra, Berghout, Tan, van Eekeren and Dedene, 2017). Innovation disclosure can also inform external stakeholders about the company's competitive position (Widiatmoko, Indarti and Pamungkas, 2020) which could enhance firm performance (Chege, Wang and Suntu, 2020). Additionally, board independence, board size and women directors can enhance 'environment' 'social' and 'governance' (ESG) voluntary disclosure (Lagasio and Cucari, 2019). Higher ESG scores can communicate the positive indicators to investors of the competitive advantage of enhancing corporate sustainability performance (Alsayegh, Abdul Rahman and Homayoun, 2020).

While firms in developed and developing countries adopt innovation in different ways, the signals to investors can assume different forms. Supporting factors generating innovative activities are dependent on policies of capital markets, regulation as well as financial support to promote and value the innovative firms (Zhang, Zhang and Cheng, 2021). When there is a higher level of institutional ownership, firms tend to adopt innovative technology and green innovation to enhance firm performance in the long term (Shu, Zhao, Liu and Lindsay, 2020). This depends on regulations and the nature of the region or country and how this affects innovative activities, which, in turn, influences firm performance (Burrus, Graham and Jones, 2018). For example, state ownership in the Chinese market plays an important role in RandD intensity in innovation (Yi, Hong, Chung Hsu and Wang, 2017). Moreover, the inefficiency of state ownership in transforming RandD input into innovation output decreases when industrial competition is high (Zhou, Gao and Zhao, 2017).

Corporate Governance and Firm Performance

Corporate governance (CG) involves a set of relationships between a company's management, its board, its shareholders, and other stakeholders. CG also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined (Yasser, Entebang, and Mansor, 2011). All countries have their own official procedures according to their customs, political environment, religious beliefs, and social and economic backgrounds. Countries have their own set of CG codes that protect the rights of stakeholders. CG is one way to deal with agency problems when conflict arises between owners and agents, resulting in variations in firm performance. CG changes the rules or introduces motivation strategies that motivate the agent to protect the interests of shareholders and resolve conflicts. Corporate performance is related to the number of agents on the board, board independence, the extent of gender diversity, and CEO duality (Bhagat and Bolton, 2008).

Board Size and Firm Performance

The ideal board size depends on the size of the organization and its diversification. The Board of Directors (BOD) manages the work of organizations, and all work is done under the supervision or guidance of the BOD. They resolve issues related to any transactions and any conflict that

arises between parties. Under the supervision of an efficient BOD, a firm's performance can be enhanced. Some aspects of the relationship between a BOD and a firm's performance have been explored in the literature. Riaz, Khan, and Shaheen (2017) report that there is a significant relationship between board size and firm performance based on their study of 168 listed companies of the Lahore Stock Exchange (LSE). Yasser et al. (2011) explore the significant relationship between board size and firm performance through return on equity (ROE), and return on assets (ROA) in the 30 Pakistan listed firms used in the study. Nicholson and Kiel (2007) report that the board of directors are the main resources of the organizations that are linked with the external environment or provide unique resources to the organizations. Prior studies indicate that there is an insignificant relationship between board size and firm performance for small sized firms (Chbib and Page, 2020). One plausible explanation is that with a large board more problems arise due to communication gaps, coordination issues and differences in interests. If these issues that are associated with a large board are resolved, then firm performance should improve.

Board Independence and Firm Performance

The board of a firm consists of both executive and non-executive directors. The role of independent directors is to represent shareholders and resolve agency problems. Researchers report mixed results regarding the relationship between board independence and firm performance. It is not necessarily the presence of many independent directors that will enhance a firm's value, although this might bring about positive changes in a firm's performance. The positive impact of non-executive directors will vary according to contextual factors and different countries. Kakabadse, Yang, and Sanders (2010) argue that in China, the system of non-executive directors is weak due to the greater involvement of dominating shareholders. Mohammad, Wasiuzzaman, and Salleh (2016) indicated that in Malaysian companies, 33% of non-executive directors on the board is not enough for effective monitoring. McCabe and Nowak (2008) interviewed 30 directors of Australian listed companies and based on their findings, reported that the inclusion of more non-executive directors has a positive effect on a firm. More non-executive directors are a safeguard against management issues. A negative association between non-executive directors and a firm's performance could occur because of inefficient monitoring and the dominating role of managers (Haniffa, Rahman, and Ali, 2006).

Female Directorship and Firm Performance

Another area of debate in the research literature is the topic of women's representation in business and the role of females on a board. More typically, board members are male. Bernile, Bhagwat, and Yonker (2018) and Yasser, Al Mamun, and Suriya (2015) contend that if there is diversity on the board, this brings in different ways of thinking and perspectives and correspondingly leads to greater creativity and more innovative ideas in the organization. Yasser et al. (2015) also suggest that women may be better at understanding the market situation and make sounder decisions as compared to men. The image of a firm is also improved when there is greater diversity among board members and can positively affect a firm's performance. In recent years, empirical studies on the effect of female directors strongly indicate that having more female directors may enhance the performance of the firm (Green and Homroy, 2018). The gender diversity literature points out some factors that positively associate with firm performance

(Terjesen, Couto, and Francisco, 2016). A diverse board offers greater expertise in decision-making and more knowledge and information sharing, that positively affects firm performance. Additionally, women are seen to be very realistic and keen observers of the market (Eagly, 2007; Gudjonsson, Kristinsson, Gylfason, and Minelgaite, 2020).

CEO Duality and Firm Performance

CEO duality occurs when a single person performs both the role of CEO and chairman of the BOD (Krause, Semadeni, and Cannella Jr, 2014). The role of the CEO is to operate a firm in an efficient way. A CEO needs to make an efficient plan and implement it to achieve the objectives of the firm. Yasser et al. (2015) conducted a study to examine the relationship between the CEO and firm performance of Pakistani listed companies, using data from 2007 to 2011 as a sample; for this purpose, the data were collected from Karachi Stock Exchange (KSE). The two theories that underpinned this study were agency theory and stewardship theory; the findings did not indicate a significant association between CEO duality and firm performance. Firms with CEO duality are unable to enhance performance as compared with firms without CEO duality. With CEO duality, decisions take time, particularly when monitoring activities need to be approved by the highest authority from both the management and governance team (Tuliao and Chen, 2017). Prior literature also explores how CEO duality can lead to firm failure. If the CEO and the chairman are separated, the chances of bankruptcy are fewer, a firm can raise capital, and shareholders show more confidence in the firm (Ehikioya, 2009; Fosberg, 2004; Yermack, 1996).

US firms prefer the duality of CEO and chairman, and regulators and investors prefer a duality structure. Many firms separate the duality role of CEO and chairman and they do so because of the requirement of the environment. Overall, there are different arguments related to CEO duality, some in favor of and some against CEO duality. Stewardship theory argues in favor of CEO duality while agency theory argues against CEO duality.

Corporate Governance and Innovation

The literature examines the effect of corporate governance on innovation (Lu and Wang, 2018; Rejeb, Berraies, and Talbi, 2019). The discussion in the literature concerns the relationship between managerial compensation, directors, ownership structure and innovation (Chen and Jermias, 2014). The stance taken by scholars in this regard depends on their theoretical perspective. In the perspective underpinned by Resource Dependence Theory, the board of directors not only provides resources to the organization, but also performs monitoring functions (Haynes and Hillman, 2010). Independent boards focus on various areas of technology to improve innovation performance alongside existing strategies, without hindering the opportunity for breakthrough. (Balsmeier, Fleming, and Manso, 2017). In contrast, the followers of agency theory illustrate that when a manager's interest and an owner's interest are not aligned, a manager's shortsighted approach to long-term investments can have a negative effect on innovation or firm value (Chen and Jermias, 2014). Likewise, if directors or managers do not have long-term shares or rewards in a firm, they tend to focus on the short-term performance-oriented goals and ignore innovations which are beneficial for the long-term value creation of a firm. Owing to a longer time horizon and uncertainty about results, the executive may feel

hesitation while putting resources into strategically oriented innovative projects. Based on prior studies, the first hypothesis is developed:

H1*:* Corporate governance is significantly associated with corporate innovation.

Innovation and Firm Performance

In evaluating the success of innovation, researchers employ different methods. One measure of the success of innovation is firm performance (Reijonen and Komppula, 2007). This indicates that innovation has a direct effect on the outputs of innovation and the firm performance. Similarly, it is argued that firms developing innovative strategies attain greater opportunities for growth and success in businesses as compared to those businesses who do not develop these kinds of strategies (Baldwin and Gellatly, 2003). Because of innovative strategies, productivity can be increased in a firm and a firm can also attain competitive advantages (Anning-Dorson, 2018). Firms that engage in innovative activities tend to be highly profitable or demonstrate greater growth**.** Within the limitations of firm size, small young firms which are regularly involved in innovative activities can compete in the market or enjoy high profits (McKelvie, Brattström, and Wennberg, 2017). In addition, Liao et al. (2021) found that the effect of corporate innovation on firm performance is stronger in developing countries compared to developed economies. Furthermore, Manogna and Aswini Kumar (2021) argued that the relationship between corporate innovation and firm performance depends upon country specific factors such as economic conditions and the structure of the economy, innovation policies, industrial policies, RandD subsidies, intellectual property laws and demand conditions. They further argued that all or some of these factors differ between developed and developing countries which implies that the relationship between corporate innovation and firm performance may differ between developed and developing countries. Pekovic et al. (2015) further found that the determinants of innovation performance differs between developed and developing countries and since innovation influences firm performance, so their findings also imply that the influence of corporate innovation on firm performance differs between developed and developing economies. Gomez-Bolanos et al. (2022) further discovered that multinational enterprises (MNEs) from developed countries with stronger institutional quality are better able to absorb globally acquired knowledge and improve their innovation performance compared to MNEs from developing countries with weaker institutional quality. Since innovation influences firm performance, it is arguable that their findings also imply that the influence of firm innovation on firm performance in the context of MNEs differs between developed and developing economies.

Furthermore, Zhang and Ma (2021) found that corporate innovation mediates the relationship between corporate governance i.e. environmental management and firm economic performance. In addition, Van Hiel et al. (2018) found that education widens the gap of the level of innovation between developed and developing economies which implies that firm performance differs as well between these two types of countries as a result of differences in the level of innovation. This may suggest that corporate governance which can be a result of the education of the corporate board can influence the level of innovation of the firm which in turn influences firm performance and this differs between developed and developing economies. Hence, the mediating effect of innovation on the relationship between corporate governance and firm

performance may differ between developed and developing economies. In addition, prior studies also indicate that corporate governance has a significant relationship with corporate innovation. Firms can improve their value by adopting essential innovation**s**. This can be achieved through the support of the corporate board who recognize the alignment between their management purposes and the value added to principal shareholders. Based upon all the arguments, the following hypotheses are generated:

H2*:* Innovation is significantly associated with firm performance.
H3: Corporate innovation mediates the relationship between corporate governance and firm performance.

EMPIRICAL STUDY

Data Collection, Population and Sampling

The nature of the data is panel data; panel data is a combination of time and cross data. The data was collected from the Compustat database over the period from 2002 to 2017. The population of the present study consists of developed regions (Austria, Belgium, China, Denmark, Finland, France, Germany, Great Britain, Hong Kong, Japan, Korea, Switzerland, and United States), and developing economies (Pakistan, India, Taiwan, and Turkey). This categorisation is based upon the classification developed by Nielsen (2011). Samples are selected based on the availability and completeness of research and development data. The present study used data from 17 countries: Austria, Belgium, China, Denmark, Finland, France, Germany, Great Britain, Hong Kong, Japan, Korea, Switzerland, United States are part of the developed regions and Pakistan, India, Taiwan, Turkey is included in the developing economies. The total sample size of the study is 2688 firms. The percentages of population and sample size for the countries involved are indicated in Table 1.

Table 1
Population and sample size of the study

Country	Population	Samples	Percent
Austria	143	11	0.4
Belgium	156	12	0.44
China	1,290	97	3.61
Denmark	267	20	0.75
Finland	363	27	1.02
France	866	65	2.42
Germany	1,080	81	3.02
Great Britain	1,874	141	5.25
Hong Kong	145	11	0.41
India	717	54	2.01
Japan	4,860	366	13.61
Korea	1,249	94	3.5
Pakistan	1,695	128	4.75

Switzerland	624	47	1.75
Taiwan	1,542	116	4.32
Turkey	213	16	0.6
United States	18,633	1402	52.17
Total	35,717	2,688	100

Variables

The dependent variable in this study is the firm performance measured by return on assets (ROA) presenting the ratio of earnings to total assets before interest and taxes. Prior studies used the same indicator to examine the association between corporate governance and firm performance as per Wu, Ting, Lin and Chang (2020); Danoshana and Ravivathani, T. (2019); Maseda, Iturralde and Arosa (2015). ROA is one of the financial performance dimensions used in corporate governance studies (Azila-Gbettor, Honyenuga, Berent-Braun and Kil, 2018). ROA shows the effects on performance of the board decisions on investments (Buallay, Hamdan and Zureigat, 2017). ROA reflects the efficiency of the firm in using its innovative resources to generate profits (Isidro and Sobral, 2015). Regarding the independent variables, four measures are used for measuring the effect of CG. Board size (BS) is measured through the number of total members on the board. Board independence (BI) is the ratio of the number of independent directors to the number of all directors. CEO duality (CEOD) is measured as a dummy variable, zero value if CEO and chairman are the same and one if the CEO and chairman are separate. Female directorship (FD) is measured with a dummy variable, one if there are female directors on the board and zero otherwise.

In keeping with the work of Kao, Hodgkinson and Jaafar (2019), the current study uses firm size (FS), financial leverage (LEV) and sales growth (SG) as control variables. Different characteristics of firms in developed and developing markets affect corporate government structure differently. Larger companies are likely to be more diversified, and thus might be subjected to higher agency and bureaucratic costs (Choi, Park and Yoo, 2007). Small firms may also have trouble in minimizing agency problems (Lopez-Gracia and Mestre-Barberá, 2015). However, some studies state that small companies are frequently managed and owned by only one person and thus do not face this issue (Lopez-Gracia and Mestre-Barberá, 2015). For this study, firm size is measured by the natural logarithm of total assets. In terms of LEV, agency conflicts become more serious when a company is in financial difficulty (Lopez-Gracia and Mestre-Barberá, 2015). A firm with a high LEV ratio is more vulnerable to business shocks, since it has less ability to repay debt (Kao, Hodgkinson and Jaafar, 2019). As LEV is individual firm leverage, external control and capital structure needs to be monitored by creditors to protect interests. This study measures financial leverage by using total debt to total equity. Regarding firm growth, Clarkson, Li, Richardson and Vasvari (2008) argue that profitable firms reveal their organizational legitimacy by complying with environmental regulations because they are better positioned to adopt them, while poorly performing firms may choose to limit disclosure or remain silent on the matter. Sales growth is measured by the ratio of current year sales minus previous year sales divided by previous year sales.

From an investor perspective, innovation as a firm's long-term RandD investments could be a risk if it relates to long-term uncertain outcomes. This could generate high agency costs.

Appropriate corporate governance mechanisms can affect the decision-making of managers and corporate RandD efforts. In addition, RandD efficiency is positively associated with ROA (Wu, Ting, Lin and Chang, 2020). In this study innovation is used as a mediator. Corporate innovation is measured through the ratio of research and development expenses to sales. Table 2 presents the variables used in this study.

Table 2
Variables, measures, and abbreviations

Abbreviation	Variables	Measures
L1	Lag 1	Lagged level 1 of the ROA
L2	Lag 2	Lagged level 2 of the ROA
RD	Research and Development	Research and development expenses to sales
CEOD	CEO Duality	CEO duality is a dummy variable which take a value of zero if the CEO is also chairperson of the BOD and one otherwise.
BI	Board Independence	Ratio of the number of independent directors to the number of all directors.
BS	Board size	Number of board directors include chairperson and independent directors.
FD	Female Directorship	Dummy variable one if there are female directors on the board and zero otherwise.
FS	Firm Size	Natural logarithm of total assets.
LEV	Leverage	Total debt to total asset.
SG	Sales Growth	Ratio of current year sales minus previous year sales divided by previous year sales.
ROA	Return on Assets	Ratio of earnings before interest and taxes to total assets.
INNO	Corporate Innovation	Ratio of RD expense to sales.

Data Analysis

Data analysis is a transforming process for obtaining useful information. Heteroskedasticity is checked by Breusch Pagan LM test, autocorrelation is checked with Durbin Watson H test, and multicollinearity is checked by a correlation matrix. Variance inflation factor (VIF) is the test of multicollinearity. We checked VIF values; Table 5 shows all values are less than 5. This means there is no multicollinearity issue in the variables. Heteroskedasticity results are significant which means that heteroskedasticity issues exist. (Gujarati and Sangeetha, 2007).

Table 5
Variance inflation factor

Variable	VIF	1/VIF
RD	1.03	0.970480
CEOD	1.01	0.987435
BI	1.01	0.985358
BS	1.00	0.996754
FD	1.00	0.999823
FS	1.05	0.949297
LEV	1.02	0.977023
SG	1.00	0.999867

The endogeneity issue is also checked for in this study. This study employs the technique of a two-step dynamic panel system estimation for analysis. To evaluate the mediation, a generalized method of moment (GMM) system estimation is used. The current study applies a two-step dynamic GMM estimation for the following reasons. Firstly, the present study uses dependent variables which are likely to be measured as annual data, and it seems desirable to use a dynamic panel estimation to allow for this. Secondly, there is a possibility of unobserved heterogeneity with regressors, and GMM estimation is used to control such effects. The lagged dependent variable in the two step dynamic panel data system estimation controls some of the effect of omitted variables varying over time.

A generalized method of moments (GMM) produces consistent parameters (Arellano and Bond, 1991; Blundell and Bond, 1998). Roodman (2009) mentions that Arellano-Bond estimators use a one and two step estimation. He notes that the two-step dynamic panel estimation of the Generalized Method of Moment System estimation of the standard error tends to be severely downward biased, therefore, the present study applied the two step GMM estimator to evaluate mediation across developed and developing countries over the period of 2002-2017.

Tests were employed to ascertain whether innovation mediates the relationship between corporate governance and firm performance. Empirically, the test is done by applying the two-step dynamic estimation model. Lagged values of dependent variables could control endogeneity issues. Regarding the mediation check, this study follows the work of Baron and Kenny (1986). For testing the mediating model of innovation between CG and FP the following conditions must be fulfilled. The first condition is that the independent variable (CG variables) must affect the mediator (innovation). The second condition is that the independent variable (CG variables) must affect the dependent variable (ROA). The third condition is that the mediator (innovation) must affect the dependent variable (ROA). If these conditions are fulfilled, then the fourth condition can be considered. For the fourth model, if the independent variable (CG variable) is significant in the presence of mediator (innovation), there is partial mediation. If the independent variable is insignificant in the presence of the mediator, there is full mediation.

$$INNO_{i,t} = \alpha + \beta CG_{i,t1} + \gamma Z_{i,t1} + \varepsilon_{i,}t \qquad (i)$$

To test the model i, INNO is corporate innovation, CG is the vector of the corporate governance variable (board size, board independence, CEO duality and female directorship) the dummy variables. Z is the vector of the control variables (leverage, firm size, and sales growth).

$$ROA_{i,t} = \alpha + \beta CG_{i,t1} + \gamma Z_{i,t1} + \varepsilon_{i,t} \qquad (ii)$$

To test model ii, ROA is a dependent variable measured as ratio of earnings to total assets before interest and taxes. CG is the vector of the corporate governance variable (board size, board independence, CEO duality and female directorship), CEO duality and female directorship are the dummy variables. Z is the vector of the control variables (leverage, firm size, and sales growth).

$$ROA_{i,t} = \alpha + \beta INNO_{i,t1} + \gamma Z_{i,t1} + \varepsilon_{i,t} \qquad (iii)$$

In model iii, to check the effect of corporate innovation on ROA, INNO is the research and development, measured as ratio of R and D expense to sales. Z is the vector of control variables (leverage, firm size, and sales growth).

$$ROA_{i,t} = \alpha + \beta CG_{i,t1} + \delta INNO_{i,t1} + \gamma Z_{i,t1} + \varepsilon_{i,t} \qquad \text{(iv)}$$

To test model (iv), where the dependent variable is ROA, other variables are defined as before.

Descriptive Statistics

Table 3 reports the descriptive statistics. In this regard, the mean value of ROA is 4.339. The mean value of leverage is 0.307 which means 30% of firms' finance is through leverage. From the samples, most firms are large-sized firms. Where the mean value of CEO duality is 0.607, the CEO and chairperson are the same persons in the firms. The data shows 43% of the directors in the board are independent. Regarding board size, the average board number is nine while the mean value of female directors is 0.644. The data demonstrates that only 4.5% is spent on corporate innovation.

Table 3
Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	2,688	4.339	18.066	–386.21	794.396
RD	2,688	0.045	0.122	–0.007	10.751
CEOD	2,688	0.607	0.488	0	1
BI	2,688	43.539	31.996	0	95.03
BS	2,688	9.912	2.84	3	27
FD	2,688	0.644	0.479	0	1
FS	2,688	16.561	5.663	0.01	100.91
LEV	2,688	0.307	0.314	0	13.379
SG	2,688	1.017	118.388	–1	21993.2

Table 4 reports on the correlation tests**.** RandD is positively correlated with corporate governance, which shows that with proper management and provision of resources to the organization, firm performance would improve**.** This finding aligns with the study of Chen and Jermias (2014**).** Leverage is negatively correlated with ROA which means that when organizations used more financial leverage this affects the firm value negatively**.** This outcome corresponds with that reported by Bhagat and Black (2002**).** Size is positively correlated with ROA which shows that if firm size increases, then firm performance also improves**.** Board independence, women directors and board size are positively correlated with ROA, which shows that a more independent board enhances firm performance, the presence of females on the board increases a firm**'**s value and a large board size also increases a firm**'**s value**.** This result is consistent with the findings of Zahra **(**1996**).** CEO duality is negatively correlated with ROA, which shows that if the CEO and chairperson are the same person this would negatively affect the firm performance. This occurs when CEOs possess additional informal power (Wijethilake and Ekanayake, 2019).

Table 4
Correlation matrix

	ROA	LEV	FS	RD	CEOD	BI	BS	FD
ROA	1							
LEV	–0.0674	1						
FS	0.0509	0.1139	1					
RD	–0.3562	0.034	–0.1612	1				
CEOD	–0.0087	–0.0314	–0.0936	0.0117	1			
BI	0.0131	–0.0835	–0.0666	0.0337	0.0616	1		
BS	0.0018	–0.0367	–0.0311	0.0046	0.0243	0.0316	1	
FD	0.0056	–0.0019	–0.008	0.0011	–0.005	–0.0035	0.0048	1
SG	–0.0018	–0.0041	0.0002	0.0007	–0.0056	–0.0028	–0.0058	–0.0063

EMPIRICAL FINDINGS AND DISCUSSION

Impacts of Corporate Governance and Innovation on Firm Performance

Table 6 shows the GMM results for the different GMM models used in this research. For developing countries, regarding model (i): the relation between corporate innovation and corporate governance, corporate governance has a significant relationship with corporate innovation in developing countries. These results are aligned with previous studies. Firms with good corporate governance are more likely to have better innovative performance. Diverse board size and firms with CEO duality tend to invest in research and development.

For developing countries, regarding model (ii): the relation between firm performance and corporate governance, results show that CEO duality has a negative, yet significant association with firm performance (β = –1.29, p. 0.01). This finding is not aligned with the study of Wijethilake and Ekanayake (2019) which reports that CEO duality improves firm performance when board involvements are high. This could be because CEO duality exerts a negative effect on firm performance, particularly when the CEO is equipped with additional informal power. The higher the number of roles held by directors, the lower the firm performance (Merendino and Melville, 2019). Board independence has a significant and positive association with firm performance, and the results are aligned with the study of Uribe-Bohorquez, Martínez-Ferrero, and García-Sánchez (2018) who state that the greater the independence of the board is, the better the firm performance. The positive impact of independent directors on efficiency is greater when firms operate in countries with a greater extent of law and enforcement (Uribe-Bohorquez et al., 2018). However, increased board independence could weaken the CEO's power over the board and restrain corporate risk-taking resulting in less variability of firm performance (Bird, Huang, and Lu, 2018).

The current study found that board size has a significant and positive association with firm performance. Large board size brings various ideas from different parties which can improve firm performance (Tulung and Ramdani, 2018). In contrast, lower levels of board size could lower the likelihood of a firm having external commitments in other companies, which can lead to positive results for firm performance (Bird et al., 2018). This finding highlight that the board

of directors should be of an adequate size, but not too large, considering that a larger boardroom does not necessarily result in positive performance (Merendino and Melville, 2019).

Female directorship has a significant, yet negative association with firm performance which could imply that more females in a board result in a decrease in firm performance (Green and Homroy, 2018). According to Bennouri, Chtioui, Nagati, and Nekhili (2018), female directorship variable captures certain behavioral attributes which they may bring to the board, then impacting firm performances. It is found that female directors who are foreigners, have business training, and with longer tenure significantly negatively correlate with all performance measures. Additionally, the education level of female directors and their chairperson position are negatively correlated with Tobin's Q. This is found particularly in the countries having issue about gender inequality (Low, Roberts and Whiting, 2015).

The result of model (iii): the relation between corporate innovation and firm performance shows corporate innovation negatively significantly associate with firm performance. This is not supported by Huang and Hou (2019) who report that increasing the level of research and development expense in a company can increase firm performance. Previous studies state that the production of fundamental research and applied research lead to better performance and enhance their competitiveness in the future (Tung and Binh, 2021).

For developing countries, for model (iv): the relation between corporate governance, corporate innovation and firm performance, the findings demonstrate that corporate governance and corporate innovation have a significant, yet negative relationship with firm performance. In the above models, the result of model i, ii, iii is significant, the result of model iv is also significant which means that there is partial mediation (Leung and Sharma, 2021), so it is argued that corporate innovation is a mediator between corporate governance and firm performance. Table 6 presents all the results for developing countries.

According to Table 6, corporate performance factors including CEO duality, board independence and female directorship are negatively associated with firm performance through investing on innovation (Mubeen, Han, Abbas & Hussain, 2020; Agarwal, Campbell, Franco & Ganco, 2016). This negative association could generate from the corporate governance structure associating with investment in research and development. According to Model iv, although these corporate governance factors negatively associate with firm performance though negative corporate innovation, board size positively relates to corporate performance via negative corporate innovation. In developing countries, independence and large-sized could create an increase in ROA if the board has low investment on R&D. When the CEO and chairman is the same person or when the director of firm is female, the performance of firm is decreased, particularly when the board invests in high innovation (high R&D expenses).

Table 6
Two-step system dynamic panel estimation of developing countries

Variable	Model i	Model ii	Model iii	Model iv
	0.423***	0.627***	0.631***	0.625***
L1	(0.00)	(0.00)	(0.00)	(8874.6)
	0.111***	–0.01***	–0.00***	–0.01***
L2	(0.00)	(–297.60)	(–890.73)	(–285.93)
			–7.85***	-7.48***
RD			(–884.45)	(–158.90)
	0.000***	–1.29***		–1.28***
CEOD	(552.60)	(–994.3)		(–972.44)
	0.000***	0.018***		0.01***
BI	(2625.20)	(976.15)		(939.18)
	0.001***	0.082***		0.08***
BS	(2080.52)	(260.75)		(293.67)
	0.000***	–1.01***		–1.02***
FD	(390.52)	(–638.6)		(–573.70)
	0.000***	–0.16***	–0.17***	–0.16***
FS	(1579.35)	(–2369.0)	(–9560.9)	(–2304.6)
	0.000***	–0.45***	–0.40***	–0.45***
LEV	(152.46)	(–259.68)	(–819.81)	(–7.21)
	–0.00***	0.085***	0.072***	0.082***
SG	(–331.69)	(434.26)	(1152.9)	(0.01)

Note: The asterisks *, ** and *** denote significance at 10%, 5% and 1% levels, respectively

For developed countries, regarding model i: the relation between corporate innovation and corporate governance, CEO duality has an insignificant association with corporate innovation. This indicates that CEO duality decreases the role of corporate innovation. We found board independence has an insignificant association implying the more independent the board is, the lower the level of corporate innovation. Board size and the number of female directors has an insignificant association with corporate innovation. We can conclude that overall, there is no significant relationship between corporate governance and corporate innovation.

For developed countries, regarding model ii: the relationship between firm performance and corporate governance, CEO duality has an insignificant association with firm performance. The findings show board independence, board size and the number of female directors insignificantly associate with firm performance. Corporate governance of firms can be different depending on institutions, legal environment, and culture (Filatotchev, Poulsen, and Bell, 2019). Innovative culture can impact innovation and corporate governance of firms across different countries (Farah, Elias, Aguilera, and Abi Saad, 2021; Khan, Hussain, Maqbool, Ali, and Numan, 2019).

For developed countries, for model iii with respect to the relationship between corporate innovation and firm performance, corporate innovation has a significant, yet negative association with firm performance. The research results imply that increasing R and D expenses reduces firm performance. For model iv: the relationship between corporate governance, corporate innovation and firm performance, corporate governance variables have an insignificant relationship with firm performance. Corporate innovation has a significant, yet negative association with firm performance. Table 7 demonstrate these findings.

Table 7
Two-step system dynamic panel estimation of developed countries

Variable	Model i	Model ii	Model iii	Model iv
L1	2*** (24.43)	0.221*** (19.28)	0.205*** (19.29)	0.205*** (19.23)
L2	–0.037*** (–25.37)	0.047*** (8.61)	0.04*** (7.55)	0.04*** (7.59)
RD			–30.096*** (–11.21)	–29.919*** (–11.12)
CEOD	0 (0.12)	–0.017 (–0.1)		–0.015 (–0.09)
BI	0 (1.56)	0.001 (0.87)		0.001 (0.82)
BS	0 (0.55)	–0.017 (–0.56)		–0.028 (–0.92)
FD	0.001 (1.92)	–0.038 (–0.22)		–0.044 (–0.26)
FS	–0.04*** (–32.45)	–0.152 (–0.59)	–0.906*** (–3.61)	–0.911*** (–3.62)
LEV	0.044*** (5.97)	–7.239*** (–7.25)	–6.888*** (–7.18)	–6.928*** (–7.21)
SG	0 (0.010)	0 (0.07)	0 (0.02)	0 (0.01)

Note: The asterisks *, ** and *** denote significance at 10%, 5% and 1% levels, respectively

For the overall sample, combining firms in developing and developed countries, Table 8 sets out the results. Regarding model i: the relationship between corporate innovation and corporate governance, CEO duality, board independence and board size are insignificantly associated with corporate innovation. The two-step system dynamic panel estimation shows the result of model ii that CEO duality, the independence of the board, board size and the number of female directors has an insignificant association with firm performance. Therefore, there is no significant relationship between corporate governance and firm performance.

Regarding model iii and iv of the whole sample, the corporate governance variables have an insignificant relation with firm performance. Corporate innovation has a significant, yet negative association with firm performance. The study concludes that corporate innovation is a mediator between corporate governance and firm performance, however the impacts are different between developing and developed countries. Table 8 demonstrates these findings.

Table 8
Two-step system dynamic panel estimation of overall sample

Variable	Model i	Model ii	Model iii	Model iv
L1	0.111*** (38.77)	0.23*** (20.320)	0.217*** (20.64)	0.216*** (20.57)
L2	0.017*** (14.04)	0.04*** (7.31)	0.038*** (7.27)	0.038*** (7.3)
RD			–29.9*** (–11.31)	–29.7*** (–11.19)
CEOD	0 (0.43)	–0.096 (–0.59)		–0.089 (–0.55)
BI	0	0.001		0.001

	(1.38)	(0.62)		(0.56)
BS	0	–0.021		–0.028
	(0.39)	(–0.68)		(–0.94)
FD	0.001	–0.013		0.006
	(1.78)	(–0.08)		(0.04)
FS	–0.00***	–0.23***	–0.28***	–0.28***
	(–7.07)	(–4.62)	(–5.25)	(–5.26)
LEV	0.006	–3.80***	–3.38***	–3.39***
	(1.48)	(–4.66)	(–4.57)	(–4.58)
SG	0	0	0	0
	(0.11)	(0.03)	(0.03)	(0.04)

Note: The asterisks *, ** and *** denote significance at 10%, 5% and 1% levels, respectively

Robustness Checks

In the 17 countries analyzed, firms that had minimal information were also left out of the analysis. This is the reason the number of companies per country differs during the period which is analysed (see Table 1). It is important to point out that the selected companies are the most representative ones of the corresponding Stock Exchange by market capitalization.

This study ran GMM robustness tests for samples, excluding the USA and Japan, since both these countries comprise a substantial percentage of the sample data. Most of the sample data are from the USA. After reestimation of the robustness test, results are consistent with prior results.

Table 9
Robustness test by USA in two-step system dynamic panel estimation of developed countries

Variable	Model i	Model ii	Model iii	Model iv
	0.02***	0.03***	0.352***	0.28***
L1	(42.01)	(20.21)	(25.69)	(23.02)
	–0.052***	0.052***	0.08***	0.48***
L2	(–26.52)	(11.25)	(9.12)	(9.85)
			–47.52***	–0.46***
RD			(–25.02)	(–259.68)
	0.74	–0.27		–0.27
CEOD	(0.13)	(–1027.77)		(–0.49)
	0.00	0.02		0.02
BI	(0.68)	(0.11)		(0.97)
	0.01	0.09		0.08
BS	(0.68)	(0.30)		(0.64)
	0.00	–0.01		–0.85
FD	(0.07)	(–0.23)		(–0.65)
	–0.02***	–0.16***	–0.17***	–0.17***
FS	(–79.94)	(–2829.14)	(–7861.61)	(2369.08)
	–0.02***	0.09***	0.07***	0.09***
LEV	(–7.78)	(532.48)	(1185.01)	(434.26)
	0.59***	5.42***	5.90***	5.81***
SG	(40.02)	(1125.32)	(4240.97)	(1169.80)

Note: The asterisks *, ** and *** denote significance at 10%, 5% and 1% levels, respectively

According to Table 9, regarding model i: the relationship between corporate innovation and corporate governance, CEO duality, board independence and board size are insignificantly associated with corporate innovation. Model ii shows that CEO duality, the independence of the

board, board size and the number of female directors has an insignificant association with firm performance. Therefore, there is no significant relationship between corporate governance and firm performance. Regarding model iii and iv of the whole sample, the corporate governance variables have an insignificant relation with firm performance. Corporate innovation has a significant, yet negative association with firm performance. Eventually, on the basis of above discussion, researchers found that results are consistent with those stated earlier.

Samples are discussed in Table 10 interpretation and the major contributions of Japan is evident in the sample. Therefore it was necessary to check the robustness result for Japan. Accordingly this research applied the robustness test to Japan and accordingly, the reestimation of robustness test results was shown to be consistent with prior results. Regarding model i: model ii: model iii: and model iv: all results are aligned with the mainstream result.

Table 10
Robustness test by Japan in two-step system dynamic panel estimation of developed countries

Variable	Model i	Model ii	Model iii	Model iv
	0.08***	0.08***	0.259***	0.69***
L1	(25.02)	(12.59)	(19.69)	(31.08)
	–0.069***	0.06***	0.07***	0.96***
L2	(–15.21)	(15.21)	(8.25)	(69.58)
			–17.52***	–0.89***
RD			(-39.12)	(0.652.52)
	0.29	–0.25		–0.78
CEOD	(0.231)	(0.85)		(0.22)
	0.00	0.08		0.08
BI	(0.49)	(0.58)		(0.45)
	0.02	0.07		0.06
BS	(0.87)	(0.28)		(0.45)
	0.07	–0.01		–0.96
FD	(0.14)	(–0.08)		(–0.27)
	–0.25***	–0.14***	–0.52***	–0.15***
FS	(–25.84)	(–1852.01)	(–1452.04)	(–962.05)
	–0.08***	0.03***	0.58***	0.02***
LEV	(–8.23)	(425.02)	(1590.42)	(225.30)
	0.41**	6.52***	7.98***	7.15***
SG	(20.56)	(459.85)	(2581.85)	(965.2)

Note: The asterisks *, ** and *** denote significance at 10%, 5% and 1% levels, respectively

Samples are discussed in Table 11 and interpretation and major contributions of Japan and United States of America are indicated in the sample. Therefore it was necessary to check the robustness result for USA and Japan. Accordingly,this research applied the robustness test for Japan and the USA. Accordingly, the reestimation of the robustness test, results were shown to be consistent with prior results. Regarding model i: model ii: model iii: and model iv: all results are aligned with prior results. Regarding model i: the relationship between corporate innovation and corporate governance, CEO duality, board independence is insignificantly associated with corporate innovation. Model ii that CEO duality, the independence of the board, and the number of female directors has an insignificant association with firm performance. Therefore, there is no significant relationship between corporate governance and firm performance. Regarding model iii and iv of the whole sample, the corporate governance variables have an insignificant relation with firm performance. Corporate innovation has a significant and negative association with firm

performance. Overall as evidenced in the discussion above, researchers found that results are consistent before and after robustness checks.

Table 11
Robustness test by USA and Japan in Two-step system dynamic panel estimation of developed countries

Variable	Model i	Model ii	Model iii	Model iv
	0.02***	0.01***	0.852***	0.85***
L1	(12.25)	(32.54)	(54.27)	(57.21)
	–0.521***	0.21***	0.15***	0.17***
L2	(–28.54)	(41.47)	(25.19)	(28.51)
			–58.45***	–17.52***
RD			(221.52)	(–597.25)
	0.45	–1.59		–1.52
CEOD	(0.41)	(–0.96)		(–0.85)
	0.00	0.08		0.07
BI	(0.58)	(0.851)		(0.21)
	0.04	0.02***		0.02
BS	(0.85)	(20.85)		(0.451)
	0.04	–0.04		–1.85
FD	(0.57)	(–0.27)		(–0.54)
	–0.36***	–0.18***	–0.85***	–0.69***
FS	(–28.56)	(–1523.41)	(–1265.21)	(–1145.21)
	–0.28***	0.08***	0.95***	0.07***
LEV	(–26.52)	(258.32)	(1125.2)	(145.23)
	0.04	0.12	0.08	0.58
SG	(0.52)	(0.84)	(0.55)	(0.45)

Note: The asterisks *, ** and *** denote significance at 10%, 5% and 1% levels, respectively

Language of commerce, accounting practices, legal traditions, availability of background firm information, geographic size, development of money/capital markets, and size of firms are different in developing and developed countries. In addition, each country has its unique ways of managing innovation and governance. Although management of corporate innovation with corporate governance is not the same across the world because of different accounting practices (Mulili & Wong, 2011), legal traditions, geographic size, money capital market and size of the firm, corporate innovation can, to some extent, impact the relationship between governance and firm performance. Regarding signaling theory, when a firm board is involved in and makes decisions about R and D projects, it could signal to the investors the potential of the firm to increase ROA. The assets of the firm are used effectively with innovation and new technology to increase corporate returns. This signal can be observed in developing and developed countries depending on the supporting environment of information disclosure and information transparency (Buertey and Pae, 2021; Bhatia, and Makkar, 2019; Ali, Frynas and Mahmood, 2017).

CONCLUSION, IMPLEMENTATION, AND RECOMMENDATION

This study examines the mediating effect of corporate innovation on the relationship between corporate governance and firm performance across firms in developing and developed contries. The findings indicate that corporate governance factors are associated with both innovation and performance of firms in developing and developed countries, but in different ways. In developed countries, innovation fully mediates the relationship between corporate governance and firm

performance However, in developing countries, innovation partially mediates the relationship between corporate governance and firm performance. The study shows that in developed countries, board independence and female directorships do not have a significant direct impact on firm performance, yet it impacts firm performance via corporate innovation. In contrast, there is a significant direct relationship between these factors and performance of firms in developing countries. From the empirical results, all generated hypotheses are supported.

In developing countries, corporate performance is associated with corporate governance through negative corporate innovation. Different factors of corporate governance generate different impact. CEO duality and female directorship corporate negatively associate with firm performance though negative corporate innovation. However, board size positively relates to corporate performance via negative corporate innovation.

This study contributes to previous literature as it indicates a significant difference in the mediating effects of corporate innovation between listed firms in developing and developed countries on the relationships between CG factors and firm performance. It emphasizes distinct supporting environments for generating innovative activities, products and services in different countries, particularly between developed and developing countries. Corporate boards can transfer positive signals to investors by investing in innovation. Moreover, innovation could be measured by various indicators. While other studies evaluate innovation based on product and services offerings to the market (Kijkasiwat and Phuensane, 2020; Wellalage and Fernandez, 2019), as well as the International Organization for Standardization (ISO) (He and Shen, 2019), this study sheds light on corporate innovation demonstrated by research and development expenses (Huang and Hou, 2019; Lööf and Nabavi, 2016) in both developing and developed countries.

For corporate governance topics, many prior studies adopt stewardship theory, agency theory, stakeholder theory, and resource dependence theory (Kyere and Ausloos, 2021; Paniagua, Rivelles, and Sapena, 2018; Shi, Connelly, and Hoskisson, 2017) to elaborate the direct relationship between governance factors and firm performance. However, to explain the mediating effects of innovation on this relationship, this study adopts signaling theory to elaborate innovation as a compounding factor affecting the relationship between corporate governance and firm performance. While signaling theory holds a prominent position in literature from a range of management disciplines, including strategic management, entrepreneurship, and human resource management (Connelly, Certo, Ireland and Reutzel, 2011), this study contributes to finance literature by employing this theory from a financial perspective. While some studies do use signaling theory for a theoretical framework, there is limited comparison of listed firms in developing and developed countries (Bae, Masud, Kaium, and Kim, 2018; Li, Li, Liu, and Wang, 2017).

This study can be helpful for policy makers and management in identifying the influence of innovation on firm value, particularly the different elements of corporate governance structure that are significant in developed and developing countries. Additionally, it is useful for foreign and local investors to evaluate innovation activities. In future research, scholars can consider other indicators such as trademarks, patents, and copyright as measures of corporate innovation. These indicators can show how firms can incorporate technology and innovation into their

products or processes. Moreover, in exploring the causal relationship among corporate governance indicators, innovative factors, and firm performance (Utama and Utama, 2019; Catalyst, 2004; Sarpong-Danquah, Gyimah, Afriyie and Asiamah, 2018), further research could examine if corporate governance structure mediates or moderates the relationship between innovation and firm performance. Additionally, future studies could assess whether better performance in firms drives good corporate governance, or if high performance firms invest more on innovation which reduces the impact of management systems and internal conflicts. Signaling theory in tandem with other theories, for instance, social network theory, could be used to further explore these relationships.

ACKNOWLEDGMENTS

We are thankful to two anonymous referees for their meaningful comments and constructive suggestions that have improved the paper.

REFERENCES

Adedeji, B.S., Ong, T.S., Uzir, M.U.H., Abdul Hamid, A.B. (2020). Corporate governance and performance of medium-sized firms in Nigeria: does sustainability initiative matter? *Corporate Governance*, *20*(3), 401-427.

Agarwal, R., Campbell, B. A., Franco, A. M., & Ganco, M. (2016). What do I take with me? The mediating effect of spin-out team size and tenure on the founder–firm performance relationship. *Academy of Management Journal*, *59*(3), 1060-1087.

Ali, W., Frynas, J. G., Mahmood, Z. (2017). Determinants of corporate social responsibility (CSR) disclosure in developed and developing countries: A literature review. *Corporate Social Responsibility and Environmental Management*, *24*(4), 273-294.

Alnabsha, A., Abdou, H.A., Ntim, C.G., Elamer, A.A. (2018). Corporate boards, ownership structures and corporate disclosures: Evidence from a developing country. *Journal of Applied Accounting Research*. *19*(1), 20-41.

Alsayegh, M. F., Abdul Rahman, R., Homayoun, S. (2020). Corporate economic, environmental, and social sustainability performance transformation through ESG disclosure. *Sustainability*, *12*(9), 3910.

Anning-Dorson, T. 2018. Innovation and competitive advantage creation. *International Marketing Review, 35*(4), 580-600.

Arellano, M., Bond, S. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies, 58*(2), 277-297.

Audretsch, D., Sanders, M., and Zhang, L. (2021). International product life cycles, trade and development stages. *The Journal of Technology Transfer, 46*(5), 1630-1673.

Awasthi, K. (2017). Taking Stock of the Principal–Principal Agency Perspective: A Review and the Way Ahead. *International Business Strategy*, 17-42.

Azila-Gbettor, E.M., Honyenuga, B.Q., Berent-Braun, M.M., Kil, A. (2018). Structural aspects of corporate governance and family firm performance: A systematic review. *Journal of Family Business Management, Vol. 8*(3), 306-330.

Bae, S. M., Masud, M., Kaium, A., Kim, J. D. 2018. A cross-country investigation of corporate governance and corporate sustainability disclosure: A signaling theory perspective. *Sustainability, 10*(8), 2611.

Baldwin, J. R., Gellatly, G. 2003. *Innovation strategies and performance in small firms*. Cheltenbam, UK: Edward Elgar Publishing.

Balsmeier, B., Fleming, L., Manso, G. 2017. Independent boards and innovation. *Journal of Financial Economics, 123*(3), 536-557.

Baron, R. M., Kenny, D. A. 1986. The moderator-mediator variables distinction in social psychological research: Conceptual, strategic and statistical consideration. *Journal of Personality and Social Psychology, 51*(6)*,* 1173-1182.

Bennouri, M., Chtioui, T., Nagati, H., Nekhili, M. 2018. Female board directorship and firm performance: What really matters? *Journal of Banking and Finance, 88*, 267-291.

Bernile, G., Bhagwat, V., Yonker, S. 2018. Board diversity, firm risk, and corporate policies. *Journal of Financial Economics, 127*(3), 588-612.

Bhagat, S., Bolton, B. 2008. Corporate governance and firm performance. *Journal of Corporate Finance, 14*(3), 257-273.

Bhatia, A., and Makkar, B. (2019). CSR disclosure in developing and developed countries: a comparative study. *Journal of Global Responsibility*.*11*(1), 1-26.

Bhatt, P. R., Bhatt, R. R. (2017). Corporate governance and firm performance in Malaysia. *Corporate Governance: The International Journal of Business in Society, 17*(5), 896-912.

Bianchini, S., Krafft, J., Quatraro, F., and Ravix, J. L. (2018). Corporate governance and innovation: does firm age matter?. *Industrial and Corporate Change, 27*(2), 349-370.

Bird, R., Huang, P., Lu, Y. (2018). Board independence and the variability of firm performance: Evidence from an exogenous regulatory shock. *Australian Journal of Management, 43*(1), 3-26.

Blundell, R., Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115-143.

Buallay, A., Hamdan, A., and Zureigat, Q. (2017). Corporate governance and firm performance: evidence from Saudi Arabia. *Australasian Accounting, Business and Finance Journal, 11*(1), 78-98.

Buertey, S., and Pae, H. (2021). Corporate governance and forward-looking information disclosure: evidence from a developing country. *Journal of African Business*, *22*(3), 293-308.

Burrus, R. T., Graham, J. E., Jones, A. T. (2018). Regional innovation and firm performance. *Journal of Business Research, 88*, 357-362.

Catalyst (2004). The Bottom Line: Connecting Corporate Performance and Gender Diversity. Catalyst: New York.

Chbib, I., Page, M. (2020_. Board composition and firm performance: The case of FTSE all shares. *IUP Journal of Corporate Governance, 19*(1), 7-27.

Chege, S. M., Wang, D., Suntu, S. L. (2020). Impact of information technology innovation on firm performance in Kenya. *Information Technology for Development*, *26*(2), 316-345.

Chen, Y., Jermias, J. (2014). Business strategy, executive compensation and firm performance. *Accounting and Finance, 54*(1)*,* 113–134.

Choi, J. J., Park, S. W., Yoo, S. S. (2007). The value of outside directors: Evidence from corporate governance reform in Korea. *Journal of Financial and Quantitative Analysis*, *42*(4), 941-962.

Ciftci, I., Tatoglu, E., Wood, G., Demirbag, M., Zaim, S. (2019). Corporate governance and firm performance in emerging markets: Evidence from Turkey. *International Business Review, 28*(1), 90-103.

Clarkson, P. M., Li, Y., Richardson, G. D., Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, Organizations and Society*, *33*(4-5), 303-327.

Connelly, B. L., Certo, S. T., Ireland, R. D., Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of Management*, *37*(1), 39-67.

Danoshana, S., Ravivathani, T. (2019). The impact of the corporate governance on firm performance: A study on financial institutions in Sri Lanka. *SAARJ Journal on Banking and Insurance Research, 8*(1), 62-67.

Eagly, A. H. 2007. Female leadership advantage and disadvantage: Resolving the contradictions. *Psychology of Women Quarterly, 31*(1), 1-12.

Ehikioya, B. I. 2009. Corporate governance structure and firm performance in developing economies: evidence from Nigeria. *The International Journal of Business in Society, 9*(3), 231-243.

Fernández-Sastre, J., Montalvo-Quizhpi, F. (2019). The effect of developing countries' innovation policies on firms' decisions to invest in RandD. *Technological Forecasting and Social Change, 143*, 214-223.

Filatotchev, I., Poulsen, A., Bell, R. G. (2019). Corporate governance of a multinational enterprise: Firm, industry and institutional perspectives. *Journal of Corporate Finance, 57*, 1-8.

Fosberg, R. H. (2004). Agency problems and debt financing: Leadership structure effects. *Corporate Governance: The International Journal of Business in Society, 4*(1), 31-38.

Gooderham, P., Minbaeva, D. B., Pedersen, T. (2011). Governance mechanisms for the promotion of social capital for knowledge transfer in multinational corporations. *Journal of Management Studies, 48*(1), 123-250.

Green, C. P., Homroy, S. (2018). Female directors, board committees and firm performance. *European Economic Review, 102*, 19-38.

Gudjonsson, S., Kristinsson, K., Gylfason, H. F., Minelgaite, I. (2020). Female advantage? Management and financial performance in microfinance. *Business: Theory and Practice, 21*(1), 83-91.

Gunday, G., Ulusoy, G., Kilic, K., Alpkan, L. (2011). Effects of innovation types on firm performance. *International Journal of Production Economics. 133*(2), 662-676.

Haniffa, R., Rahman, R. A., Ali, F. H. M. (2006). Board, audit committee, culture and earnings management: Malaysian evidence. *Managerial Auditing Journal, 21*(7), 783-804.

Haynes, K. T., Hillman, A. (2010). The effect of board capital and CEO power on strategic change. *Strategic Management Journal, 31*(11), 1145-1163.

He, W., Shen, R. (2019). ISO 14001 certification and corporate technological innovation: Evidence from Chinese firms. *Journal of Business Ethics, 158*(1), 97-117.

Huang, C. H., Hou, T. C. T. (2019). Innovation, research and development, and firm profitability in Taiwan: Causality and determinants. *International Review of Economics and Finance, 59*, 385-394.

Humphries, S.A., Whelan, C. (2017). National culture and corporate governance codes. *Corporate Governance, 17*(1), 152-163.

Huu Nguyen, A., Thuy Doan, D., and Ha Nguyen, L. (2020). Corporate governance and agency cost: Empirical evidence from Vietnam. *Journal of Risk and Financial Management, 13*(5), 103-118.

IFRS Foundation (2018). *Use of IFRS Standards around the world.* https://www.ifrs.org/content/dam/ifrs/around-the-world/adoption/use-of-ifrs-around-the-world-overview-sept-2018.pdf

Iqbal, S., Nawaz, A., Ehsan, S. (2019). Financial performance and corporate governance in microfinance: Evidence from Asia. *Journal of Asian Economics, 60*, 1-13.

Isidro, H., and Sobral, M. (2015). The effects of women on corporate boards on firm value, financial performance, and ethical and social compliance. *Journal of Business Ethics, 132*(1), 1-19.

Iyengar, R. J., and Sundararajan, M. (2020). Is firm innovation associated with corporate governance?. *International Journal of Innovation Management, 24*(03), doi.org/10.1142/S1363919620500279.

Jamil, A., Mohd Ghazali, N.A., Puat Nelson, S. (2021). The influence of corporate governance structure on sustainability reporting in Malaysia. *Social Responsibility Journal, 17*(8), 1251-1278.

Jia, N., Huang, K. G., and Man Zhang, C. (2019). Public governance, corporate governance, and firm innovation: An examination of state-owned enterprises. *Academy of Management Journal, 62*(1), 220-247.

Kakabadse, N. K., Yang, H., Sanders, R. 2010. The effectiveness of non-executive directors in Chinese state-owned enterprises. *Management Decision, 48* (7), 1063-1079.

Kao, M.-F., Hodgkinson, L., Jaafar, A. (2019). Ownership structure, board of directors and firm performance: evidence from Taiwan. *Corporate Governance*, 19(1), 189-216.

Khan, A., Muttakin, M.B., Siddiqui, J. (2013). Corporate governance and corporate social responsibility disclosures: Evidence from an emerging economy. *Journal of Business Ethics 114***,** 207–223.

Khan, S. N., Hussain, R. I., Maqbool, M. Q., Ali, E. I. E., Numan, M. (2019). The mediating role of innovation between corporate governance and organizational performance: Moderating role of innovative culture in Pakistan textile sector. *Cogent Business and Management*, *6*(1), 1-23.

Khanna, T., Kogan, J., Palepu, K. (2006). Globalization and similarities in corporate governance: A cross-country analysis. *Review of Economics and Statistics*, *88*(1), 69-90.

Kijkasiwat, P., Phuensane, P. (2020). Innovation and firm performance: The moderating and mediating roles of firm size and small and medium enterprise finance. *Journal of Risk and Financial Management*, *13*(5), 97.

Krause, R., Semadeni, M., Cannella Jr, A. A. (2014). CEO duality: A review and research agenda. *Journal of Management*, *40(1),* 256-286.

Kumar, P. C., Tsetsekos, G. P. (1999). The differentiation of emerging equity markets. *Applied Financial Economics*, *9*(5), 443-453.

Kyere, M., Ausloos, M. (2021). Corporate governance and firms financial performance in the United Kingdom. *International Journal of Finance and Economics, 26*(2), 1871-1885.

Lagasio, V., Cucari, N. (2019). Corporate governance and environmental social governance disclosure: A meta-analytical review. *Corporate Social Responsibility and Environmental Management*, *26*(4), 701-711.

Leung, T. Y., & Sharma, P. (2021). Differences in the impact of R&D intensity and R&D internationalization on firm performance–Mediating role of innovation performance. *Journal of Business Research*, *131*, 81-91.

Lee, R., Lee, J. H., Garrett, T. C. (2019). Synergy effects of innovation on firm performance. *Journal of Business Research, 99*, 507-515.

Li, C., Li, J., Liu, M., Wang, Y., Wu, Z. (2017). Anti-misconduct policies, corporate governance and capital market responses: International evidence. *Journal of International Financial Markets, Institutions and Money*, *48*, 47-60.

Liao, Z., Liu, P., Liu, S. (2021). A meta-analysis of environmental innovation and firm performance. *Journal of Environmental Planning and Management*, *64*(11), 2047-2065.

Liew, C. Y., Alfan, E., Devi, S. (2015). Family firms, expropriation and firm value : Evidence from related party transactions in Malaysia. *Journal of Developing Areas Special Issue*, *49*(5), 139-153

Liew, C. Y., Alfan, E., Devi, S. (2017). Family firms, expropriation and firm value: Evidence of the role of independent directors' tenure in Malaysia. *International Journal of Organizational Leadership*, *6*, 42-64.

Liew, C. Y., Devi, S. S. (2020). Family firms, banks and firm value: Evidence from Malaysia. *Journal of Family Business Management*, *11*(1), 51-85.

Lööf, H., Nabavi, P. (2016). Innovation and credit constraints: Evidence from Swedish exporting firms. *Economics of Innovation and New Technology*, *25*(3), 269–282.

Lopez-Gracia, J., Mestre-Barberá, R. (2015). On the relevance of agency conflicts in SME debt maturity structure. *Journal of Small Business Management*, *53*(3), 714-734.

Low, D. C., Roberts, H., and Whiting, R. H. (2015). Board gender diversity and firm performance: Empirical evidence from Hong Kong, South Korea, Malaysia and Singapore. Pacific-Basin Finance Journal, 35, 381-401.

Lu, J., Wang, W. (2018). Managerial conservatism, board independence and corporate innovation. *Journal of Corporate Finance*, *48*, 1-16.

Mahmood, Z., Kouser, R., Ali, W., Ahmad, Z., Salman, T. (2018). Does corporate governance affect sustainability disclosure? A mixed methods study. *Sustainability*, *10*(1), 207-227.

Manogna, R. L., Aswini Kumar, M. (2021). Does investment in innovation impact firm performance in emerging economies? An empirical investigation of the Indian food and agricultural manufacturing industry. *International Journal of Innovation Science, 13*(2), 233-248.

Manrique, S., Martí-Ballester, C. P. (2017). Analyzing the effect of corporate environmental performance on corporate financial performance in developed and developing countries. *Sustainability, 9*(11), 1957.

Maseda, A., Iturralde, T., Arosa, B. (2015). Impact of outsiders on firm performance over different generations of family-owned SMEs. *Journal of Small Business Management, 53*(4), 1203-1218.

McCabe, M., Nowak, M. (2008). The independent director on the board of company directors. *Managerial Auditing Journal, 23*(6), 545-566.

McGahan, A. M., and Silverman, B. S. (2001). How does innovative activity change as industries mature? *International Journal of Industrial Organization, 19*(7), 1141-1160.

McKelvie, A., Brattström, A., Wennberg, K. (2017). How young firms achieve growth: Reconciling the roles of growth motivation and innovative activities. *Small Business Economics, 49*(2), 273-293.

Merendino, A., Melville, R. (2019). The board of directors and firm performance: Empirical evidence from listed companies. *Corporate Governance: The International Journal of Business in Society, 19*(3), 508-551.

Mishra, S., and Mohanty, P. (2014). Corporate governance as a value driver for firm performance: evidence from India. *Corporate Governance.14*(2), 265-280.

Mohammad, W. M. W., Wasiuzzaman, S., Salleh, N. M. Z. N. (2016). Board and audit committee effectiveness, ethnic diversification and earnings management: A study of the Malaysian manufacturing sector. *Corporate Governance: An International Review, 16*(4), 726-746.

Momin, M. A., Parker, L. D. (2013). Motivations for corporate social responsibility reporting by MNC subsidiaries in an emerging country: The case of Bangladesh. *The British Accounting Review, 45*(3), 215-228.

Mubeen, R., Han, D., Abbas, J., & Hussain, I. (2020). The effects of market competition, capital structure, and CEO duality on firm performance: A mediation analysis by incorporating the GMM model technique. *Sustainability, 12*(8), 3480.

Muttakin, M.B., Mihret, D.G. and Khan, A. (2018). Corporate political connection and corporate social responsibility disclosures: A neo-pluralist hypothesis and empirical evidence. *Accounting, Auditing and Accountability Journal*, 31(2), 725-744.

Nicholson, G. J., Kiel, G. C. (2007). Can directors impact performance? A case-based test of three theories of corporate governance. *Corporate Governance: An International Review, 15*(4), 585-608.

Nielsen, L. (2011). *Classifications of countries based on their level of development: How it is done and how it could be done*. IMF Working Paper No. WP/11/31, 1-46.

Panda, B., Leepsa, N. M. (2017). Agency theory: Review of theory and evidence on problems and perspectives. *Indian Journal of Corporate Governance, 10*(1), 74-95.

Paniagua, J., Rivelles, R., Sapena, J. (2018). Corporate governance and financial performance: The role of ownership and board structure. *Journal of Business Research, 89*, 229-234.

Pillai, R., Al-Malkawi, H. A. N. (2018). On the relationship between corporate governance and firm performance: Evidence from GCC countries. *Research in International Business and Finance, 44*, 394-410.

Rashid, K. (2008). *A comparison of corporate governance and firm performance in developing (Malaysia) and developed (Australia) financial markets* (Doctoral dissertation, Victoria University).

Reijonen, H., Komppula, R. (2007). Perception of success and its effect on small firm performance. *Journal of Small Business and Enterprise Development, 14*(4), 689-701.

Rejeb, W. B., Berraies, S., Talbi, D. (2019). The contribution of board of directors' roles to ambidextrous innovation. *European Journal of Innovation Management, 23*(1), 40-66.

Riaz, S., Khan, A. H., Shaheen, M. (2017). Relationship between board size and firm performance: Intervening role of policies. *Bulletin of Business and Economics, 6*(3), 130-140.

Richardson, S. (2006). Over-investment of free cash flow. *Review of accounting studies*, *11*(2), 159-189.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal*, *9*(1), 86-136.

Sarpong-Danquah, B., Gyimah, P., Afriyie, R. O., Asiamah, A. (2018). Corporate governance and firm performance: An empirical analysis of manufacturing listed firms in Ghana. *Accounting and Finance Research*, *7*(3), 111-118.

Shah, S. Z. A., Liang, S., Akbar, S. (2013). International Financial Reporting Standards and the value relevance of R&D expenditures: Pre and post IFRS analysis. *International Review of Financial Analysis*, *30*, 158-169.

Shahzad, F., Ahmad, M., Fareed, Z., and Wang, Z. (2022). Innovation decisions through firm life cycle: A new evidence from emerging markets. *International Review of Economics and Finance*, *78*, 51-67.

Shi, W., Connelly, B. L., Hoskisson, R. E. (2017). External corporate governance and financial fraud: Cognitive evaluation theory insights on agency theory prescriptions. *Strategic Management Journal*, *38*(6), 1268-1286.

Shu, C., Zhao, M., Liu, J., Lindsay, W. (2020). Why firms go green and how green impacts financial and innovation performance differently: An awareness-motivation-capability perspective. *Asia Pacific Journal of Management*, *37*(3), 795-821.

Teece, D. J. (2010). Technological innovation and the theory of the firm: The role of enterprise-level knowledge, complementarities, and (dynamic) capabilities. In *Handbook of the Economics of Innovation* (Vol. 1, pp. 679-730): North-Holland.

Tariq, A., Badir, Y. F., Safdar, U., Tariq, W., and Badar, K. (2019). Linking firms' life cycle, capabilities, and green innovation. *Journal of Manufacturing Technology Management*.13(2), 284-305

Terjesen, S., Couto, E. B., Francisco, P. M. (2016). Does the presence of independent and female directors impact firm performance? A multi-country study of board diversity. *Journal of Management and Governance*, *20*(3), 447-483.

Tuliao, K. V., Chen, C. W. (2017). CEO duality and bribery: The roles of gender and national culture. *Management Decision*, *55*(1), 218-231.

Tulung, J. E., Ramdani, D. (2018). Independence, size and performance of the board: An emerging market research. *Corporate Ownership and Control*, *15*(2), 201-208.

Tung, L. T., Binh, Q. M. Q. (2021). The impact of RandD expenditure on firm performance in emerging markets: Evidence from the Vietnamese listed companies. *Asian Journal of Technology Innovation*, 1-19.

Udin, S., Khan, M. A., Javid, A. Y. (2017). The effects of ownership structure on likelihood of financial distress: An empirical evidence. *Corporate Governance: The International Journal of Business in Society*, *17*(4), 589-612.

Ullah, M.H. and Rahman, M.A. (2015). Corporate social responsibility reporting practices in banking companies in Bangladesh: Impact of regulatory change. *Journal of Financial Reporting and Accounting*, *13*(2), 200-225.

Umrani, A. I., Johl, S. K., Ibrahim, M. Y. (2017). Ownership structure attributes, outside board members and SMEs firm performance with mediating effect of innovation in Malaysia. *Global Business and Management Research*, *9*(1s), 393-402.

Utama, C. A., Utama, S. (2019). Board of commissioners in corporate governance, firm performance, and ownership structure. *International Research Journal of Business Studies*, *12*(2), 111-136.

Uribe-Bohorquez, M. V., Martínez-Ferrero, J., García-Sánchez, I. M. (2018). Board independence and firm performance: The moderating effect of institutional context. *Journal of Business Research*, *88*, 28-43.

Van Hiel, A., Van Assche, J., De Cremer, D., Onraet, E., Bostyn, D., Haesevoets, T., Roets, A. (2018). Can education change the world? Education amplifies differences in liberalization values and innovation between developed and developing countries. *PLoS ONE, 13*(6), 1-8.

Xia, L., Gao, S., Wei, J., Ding, Q. (2022). Government subsidy and corporate green innovation – Does board governance play a role ? *Energy Policy*, 161, 1-15.

Wellalage, N. H., Fernandez, V. (2019). Innovation and SME finance: Evidence from developing countries. *International Review of Financial Analysis, 66*, 101370. doi:https://doi.org/10.1016/j.irfa.2019.06.009

Widiatmoko, J., Indarti, M. G. K., Pamungkas, I. D. (2020). Corporate governance on intellectual capital disclosure and market capitalization. *Cogent Business and Management*, *7*(1), 1-14.

Wijethilake, C., Ekanayake, A. (2019). CEO duality and firm performance: The moderating roles of CEO informal power and board involvements. *Social Responsibility Journal, 16*(8), 1453-1474.

Woudstra, U., Berghout, E., Tan, C. W., van Eekeren, P., Dedene, G. (2017). Resource complementarity and IT economies of scale: mechanisms and empirical evidence. *Information Systems Management*, *34*(2), 185-199.

Wu, T. H., Ting, P. J. L., Lin, M. C., Chang, C. C. (2020). Corporate ownership and firm performance: a mediating role of innovation efficiency. *Economics of Innovation and New Technology*, doi.org/10.1080/10438599.2020.1799140.

Yang, D., Jiao, H., Buckland, R. (2017). The determinants of financial fraud in Chinese firms: Does corporate governance as an institutional innovation matter? *Technological Forecasting and Social Change, 125*, 309-320.

Yasser, Q. R., Al Mamun, A., Suriya, A. R. (2015). CEO duality structure and firm performance in Pakistan. *Asian Journal of Accounting and Governance, 5*, 57-69.

Yasser, Q. R., Entebang, H. A., Mansor, S. A. (2011). Corporate governance and firm performance in Pakistan: The case of Karachi Stock Exchange (KSE)-30. *Journal of Economics and International Finance, 3*(8), 482-491.

Yermack, D. (1996). Higher market valuation of companies with a small board of directors. *Journal of Financial Economics*, *40*(2), 185-211.

Yi, J., Hong, J., Chung Hsu, W., Wang, C. (2017). The role of state ownership and institutions in the innovation performance of emerging market enterprises: Evidence from China. *Technovation*, *62*, 4-13.

Yusuf, F., Yousaf, A., Saeed, A. (2018, December). Rethinking agency theory in developing countries: A case study of Pakistan. In Accounting Forum (Vol. 42, No. 4, pp. 281-292). No longer published by Elsevier.

Zhang, Q., Ma, Y. (2021). The impact of environmental management on firm economic performance: The mediating effect of green innovation and the moderating effect of environmental leadership. *Journal of Cleaner Production, 292*, doi.org/10.1016/j.jclepro.2021.126057

Zhang, Y., Zhang, J., and Cheng, Z. (2021). Stock market liberalization and corporate green innovation: Evidence from China. *International Journal of Environmental Research and Public Health*, *18*(7), 3412.

Zhou, K. Z., Gao, G. Y., Zhao, H. (2017). State ownership and firm innovation in China: An integrated view of institutional and efficiency logics. *Administrative Science Quarterly*, *62*(2), 375-404.