

Board-Level Competency and Firm Performance in the Information Age

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This article examines how Information Technology (IT) governance impacts on the board of directors concerning firms' performance. The review covers the concepts of firm performance (financial and non-financial) and the board level IT competence. Most studies dwell on the financial aspects to the neglect of the non-financial elements. Also, less emphasis was on the younger board concerning age diversity. Similarly, the studies emanate generally from North America, with a lack of such from Europe, Asia, South America, and Africa. Besides, big organisations had coverage to the disadvantage of the medium-sized firms that are more in number and also contribute more to the GDP and exports of nations. The research suggests that a board composition that promotes the representation of directors with relevant IT competencies can offer valuable insights to mobilise and reconfigure IT assets to create firm value.

Keywords: *Agency theory, board level IT competence, board of directors, firm performance, IT governance, resource-based view.*

Introduction

Contemporary organisations depend profoundly on Information Technology (IT) and progressively apply it in running business activities and procedures. Thus, IT dependence joined with the growing complication and interrelated features of IT and infrastructure, alongside the pressures to these systems and related rising risks, are all significant matters that encourage organisations' requests to execute internal IT controls to mitigate the associated risks (Stoel & Muhanna, 2011). The rudiments of corporate governance of IT managers to provide managerial, operational, and practical measures aimed at safeguarding the privacy, integrity, readiness, and evidence about the system (International Organisation for



Standardisation/International Electrotechnical Commission, 2005; IT Governance Institute [IGTI], 2005). In a way, information monitoring constitutes a significant part of corporate governance (Lunardi, Becker, Macada, & Dolci, 2014; Webb, Pollard, & Ridley, 2006). IT governance (ITG) is a part of the duties or responsibilities of the board of directors (BODs) and the management team (ITGI, 2003). ITG supports organisations and firms to overcome the threats which may surface due to the usage of IT devices (Mohamed & Singh, 2012); as well as the evaluation of the productivity of IT investment (Weill & Ross, 2004), which eventually may have a positive effect on the performance of firms (Scheeren, Filho, & Tavares, 2013).

Prior research on information systems leadership has emphasised the importance of the BODs in developing ITG (Andriole 2009; Huff et al. 2006); but has mostly limited itself to examining how specific board characteristics influence the level of IT investment or the creation of a Chief Information Officer's (CIO) position in the organisation. For example, boards with more IT experienced external board members, and younger committees are associated with more substantial IT investments and the presence and role of a CIO (Kambil & Lucas, 2002; Karake, 1995). Nonetheless, there is a shortage of literature examining how the IT knowledgeable board of directors as a strategic decision-making and monitoring mechanism directly affects IT capability (IT management and operations) and firm performance.

Theoretical Underpinnings

The authors draw on the resource-based view theory (Barney, 1991; Barney & Hesterly, 2006) to suggest that the board functions as a resource provision mechanism. In other words, the board provides the pivotal firm access to 'external linkages and access to resources to limit its dependence on external entities' (Benaroch & Chernobai, 2017). Following the above reasoning, IT competence is an essential resource for a firm. Jewer and McKay (2012), further find that the IT competency of the board of directors positively affects their involvement in IT governance. The authors interpret their findings as support for strategic choice theory (Child 1972; Judge Jr & Zeithaml, 1992), which suggests that the board of directors' acts as a change agent between the focal firm and its external environment. That is, the board members exhibit influence in designing a strategic decision-making process to address external pressures (Judge Jr and Zeithaml, 1992). IT competence then is an essential condition for the board to be effective in fulfilling its role as a change agent.

Drawing on these theories, we claim that directors' prior experience in a non-executive function in the IT sector constitutes a rigorous source of IT competence to perform the above IT monitoring and IT service function roles. That is, the experience gathered by the board of directors within the IT sector fosters a continuous acquisition of IT knowledge and skills. Thus, in turn, it is possible to build reliable IT competency in performing IT governance monitoring and IT service functions. Moreover, the experience gathered by the board of directors within

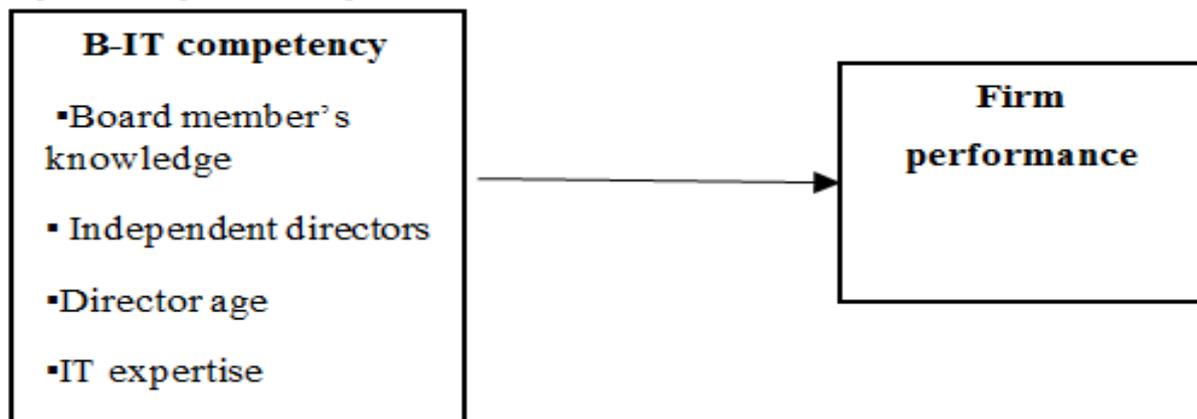
the IT sector exhibits IT skills and the ability to design superior IT capabilities, which can further help the focal firm to address competitive challenges exerted by the external pressures (Weill et al., 2019). In sum, agency theory, resource, base view theory, together provide a set of assumptions that permit to conceptualise the board IT competence as a theoretical construct. We assert the board IT competence embeds both the IT monitoring and IT service provision aspects of the board's role, which is vital and directly affects the firm performance and capability (IT management and operations).

In this context, we develop the premise that the IT experience in the BODs is positively related to firm performance. Using agency theory, and resource-based view theory, it is possible to recognise the board IT competence and examine its impact on firm performance. Drawing on to previous information systems literature, shareholders value the strategic importance of having an IT competent board. We conceptualise and measure three alternative measures of IT competencies at the board level. First, we measure prior executive or board experience in the IT sector. That is, we measure whether the board of directors at one point in his career has had a high-profile function in an IT firm, which would allow that board to develop a profound knowledge of IT. This study is to encourage the investigation of the board's monitoring function to reduce managerial inefficiencies and avoid failures that affect the business (Hillman & Dalziel, 2003). The execution of this role effectively hinges on the board's level of IT competency, derived from the ITG mechanisms employed by the board and their associated characteristics. These mechanisms include the BODs and their IT capital (knowledge, independence, skills, education, etc.). As there is no clear-cut evidence in terms of having a balance in respect of age, this study hopes to support an investigation as to whether the impact of age in the boardroom on IT issues and firm performance is significant. Thus, the agency problem will be mitigated with encouragement for a balanced board as per B-ITG matters are concerned. A further reason for the inclusion of age diversity is that studies on this variable, IT capabilities and firm performance are still at the infancy stage.

Conceptual Framework

Figure 1 below depicts the relationship between board-level IT (B-IT) competency and firm performance. The BIT competency is the independent or predictive variable, and firm performance stands for the dependent or outcome variable.

Figure 1. Proposed Conceptual Framework



Hypotheses Development based on Conceptual Framework

Firm Performance

The creation of the TOE framework happened in Firms' business value usually indicates the overall performance of firms. Therefore, a firm's health in terms of systemic, financial, and social dimensions fall under firm performance (Zahra & Pearce, 1989). The systemic aspect emphasises existence and development; the financial element covers wealth creation and sustenance, and the social dimension emphasises on responses of organisations to societal demands.

Nevertheless, this study proposes a somewhat simple view and emphasises mainly on financial and non-financial dimensions due to two significant factors. In the first instance, the systemic and social aspects related to firms' bottom-lines with a reflection on firm performance (Habbershon et al., 2003; McGuire et al., 1988). Again, directors find it comfortable to reflect, observe, and report on total firm performance.

Financial performance measures have many perspectives, which comprise of stock measures (Banker et al., 2011), accounting measures (Bharadwaj, 2000), top executive team perceptions (Wu, Straub, & Liang, 2015), and the board perception (Turel & Bart, 2014). However, board ITG research has fundamentally emphasised on board members' knowledge. Four primary reasons inform the choice of this measure. The first is that boards possess favourable standing to evaluate financial performance due to the availability of adequate financial understanding to explore firm performance concerning industry standards and other forms of validation procedures. Second, there has been a demonstration of the validity of such measures (Turel et al., 2017; Turel & Bart, 2014). Third, the disclosure of real financial performance by directors about their firms, many times, exposes them to legal risks. Finally, benefits become derived

from perceptive financial performance measures in comparison to objective metrics, mainly if the information provider is knowledgeable (Tallon, 2010).

Moreover, the non-financial indicators are now gaining attention for the benefit of evaluating the results of firm performance (Madrid-Guijarro et al., 2011; Steyn-Bruwer & Hamman, 2006). Specifically, the latter situation is concerning the precision and consistency of accounting proofs used by the firm, which inevitably may impact the analysis under consideration (Chuvakhin & Gertmenian, 2003). Further, making only the financial statements the main base for evaluating performance may mitigate the suitable and adequate examination of the firms (Madrid-Guijarro et al., 2011).

So, concerning the above issues, researchers (Adedeji et al. 2019; Madrid-Guijarro et al., 2011; Steyn-Bruwer & Hamman, 2006) have suggested the adoption of non-financial indices in the exploration of firm performance, with the request for more investigations (Purves, Niblock & Sloan, 2015). Despite the variations that are available between the indicators, a couple of studies (Samuel et al. 2019; Beaver et al., .2005; Hossari, 2006) argue that a mixture of the items can improve the attainment of firm performance, particularly when they are related to other corporate or institutional elements. Therefore, firms' financial and non-financial performance is now the adopted dimensions for determining corporate results. Nevertheless, the institutional factor of board-level IT competency becomes significant in the exploration of firm performance for instituting their relationships.

Board-level IT Competence

Consistent with Benaroch and Chernobai (2017), board IT competence is “the board’s ability to perform its ITG monitoring and service functions.” The term monitoring essentially captures the board’s responsibility in monitoring actions and decisions of executive management on behalf of shareholders (Fama, 1980; Shleifer & Vishny 1997). The above responsibility is consistent with agency theory (Jensen & Meckling 1976), which describes that the BODs serve as a monitoring mechanism for protecting the shareholders’ interest from the opportunistic behaviour of managers. In this view, IT governance monitoring mainly warrants the board of directors to provide oversight on IT investment decisions (Ho et al., 2017), and the control and mitigation of IT risk including competitive threats (Higgs et al., 2016; Ho et al., 2011; Parent & Reich, 2009; Xue et al., 2011; Yang et al., 2018).

On the other hand, according to Benaroch and Chernobai (2017), the service function of IT governance involves “a range of activities, including reinforcing the public image of the firm’s IT capability, providing IT expertise and IT counsel to management, enabling preferential access to external IT providers and other third parties, and aiding in the formulation of IT strategy.” Therefore, IT competency refers to the degree to which a board possesses IT

expertise and engages IT governance mechanisms to govern IT. Meanwhile, IT expertise and IT governance mechanisms are not the same but needed for evaluating IT competency.

Furthermore, expertise means “the characteristics, skills, and knowledge that distinguish experts from novices and less experienced people” (Ernst & Young, 2006). On the other hand, Boards’ IT governance mechanisms enhance the ability of the board to acquire, interpret, and disseminate information, thus, improving the strength of the board to govern IT. However, boards’ IT governance from past studies claim that boards may experience drawbacks in their IT governance responsibilities due to a deficit of IT knowledge (Bart & Turel, 2010; Huff et al., 2006). However, Perez-Arostegui et al. (2012) emphasise the definition of IT as a competence that consists of IT setup, IT technical and administrative knowledge, and the combination of IT with firm strategy. Hence, the submission is that IT competence has a significantly positive effect on the quality of firms’ performance.

Considering the board of directors as an organisational resource (Hillman & Dalziel, 2003), board IT competence can serve as an essential source to achieve firm performance. Specifically, board-level IT competence should help a firm to make a high degree of synergy in activating and installing IT-based resources in conjunction with other resources and capabilities of the firm. Boards with a higher proportion of IT competence certainly can make better IT decisions, improve digital business strategy formulation, and enhance the governance of IT risks (Nolan & McFarlan, 2005; Parent & Reich, 2009).

The above can, in turn, help the big firms to create a distinct IT capability for competitive advantage achievement. Mata et al. (1995), using the resource-based view of the firm, concluded that “only IT managerial skills are likely to be a source of sustained competitive advantage.” In other words, the most profound determinants of achieving competitive advantage are the upper echelons of the organisation. Therefore, it is the claim that, if directors have developed valuable IT management skills through their prior affiliation to IT sector firms, this increases the board’s IT competence and its ability to guide critical IT decisions.

In this view, the existing corporate governance literature shows that board expertise directly influences firm performance. For instance, Klein (1998) finds that a proportion of internal directors is positively related to accounting and market-based performance measures. DeFond et al. (2005) observe a positive market reaction to the engagement of financial accounting experts involved with the audit committees. Huang et al. (2014) further show that for firms engaging in acquisitions, prior M&A experience in the board of directors helps improve long-term performance. Board expertise is consequently an essential driver of firm performance. Extending this notion to an IT setting, board IT competence can directly influence firm performance similarly. Assuming that board IT competence is heterogeneously distributed across firms (Turel & Bart, 2014), the tendency is for an advanced level of board IT competence

to positively impact firm performance. Therefore, Turel and Bart (2014) conclude that irrespective of the strategic importance of IT, the involvement of the BODs in IT directly affects organisational performance. Again, a study by Jewer and McKay (2012) corroborates this finding, showing that a higher level of board involvement positively impacts the contribution of IT to organisational performance. Higgs et al. (2016) further show that the technology committee at the board-level serves as a signal to indicate the firm's capacity to perceive and retort to security fissures.

The authors believe board-level technology expertise (in a technology committee) reduces the adverse abnormal stock returns due to external cracks. Hence, while shareholders may perceive IT competence at the board level as a potential mechanism to improve firm value, the IT monitoring function of the board might directly influence the operational effectiveness and efficiency of the pivotal firm as well. In other words, through efficient oversight of IT, activities can help IT competent boards review and monitor the progress of implementation of new or on-going technology projects. As a result, these firms may experience improvements in accounting performance next to market-based performance.

The Relationship between Board IT Competence and Firm Performance

This study aims to acknowledge that non-executive positions have a considerable impact on firms' IT-related decisions to provide appropriate strategic advice and support (Banker et al., 2011; Lim et al., 2013b; Schein, 1992). Specifically, the argument is that IT competences are better-developed or more valuable when matched with monitoring and advising experience. A non-executive, who has worked for an IT firm in a non-executive position such as an independent director, not only gathers invaluable IT skills but also builds expertise in managing and integrating these IT skills in the organisation. For example, a non-executive position as an independent director demands greater involvement in designing IT governance practices at the firm level (Weill & Ross, 2004).

Moreover, IT governance decisions involve topics such as IT investment prioritisation, IT portfolio management, IT planning; and IT risk management warrant an active involvement of the non-executive board (Weill & Ross, 2005) to ensure the realisation of corporate objectives. Hence, it is likely that these non-executive boards gain considerable insights into the strategic integration of IT resources during their tenure. Therefore, prior experience as a senior executive in an IT-intense role can engage an individual in gaining IT competence at a strategic level, and directors having previous experience as a non-executive board in an IT firm can actively enhance the board's IT competence. Therefore, the board of directors with a higher level of executive-based IT competence can be instrumental in improving the performance of firms.

Based on the context above, the understanding becomes that the IT experience in the BODs is positively associated with firm performance. Therefore, in line with the agency theory and resource-based view theory, it is possible to recognise the board IT competence and examine its impact on firm performance. However, based on previous information systems literature, the focus has extensively been on the role of non-executives in IT and their subsequent impact on firm performance.

From the views of Kambil and Lucas (2002), board members' level of education and the engagement of board members with technical degrees produce a higher IT budgets link, and more regular board appraisals of IT matters. Also, Cadbury (2000) states that the directors' intellectual ability concerning their educational values, professional mission, and relevant continuous developmental programs attended are essential requirements for crucial contributions during board deliberations. However, in a way, Van and Ingely (2003) opine that the board's endeavours that connect the board to its public mitigate risks and gather from the external spheres resources relevant to the firm's performance. Thus, included in these resources, is access to funds as well as to right image and sustainability. However, Wellalage and Locke (2013) report that education shows a negative impact on firm performance. Those above have given mixed results.

Furthermore, Kambil and Lucas (2002) affirm that the availability of board members with sound IT background creates a positive relationship with IT spending and value from IT. In the same vein, Stearns and Mizruchi (1993) found a link between board members' backgrounds and the needs of the firm. They also believe that education prepares a board member for the application of resources (which include IT) to manage the firm, just as a technical degree should make a board member provide the most input on information technology. Furthermore, directors, many times, are connected with several firms and have sector and governance experiences (Zahra & Pearce, 1989). Thus, firms can come in contact with IT resources, information, skills, and capital that may elude the management team. The external IT skills may consist of the IT monitoring practices evolved from other firms or experiences gathered from a contracting vendor. Meanwhile, contact with IT capital may cover the ability to secure finance for a system execution project.

In previous studies, the importance of BODs as an internal control device attracts attention (Brickley et al., 1994). The BODs obtain their decision making and monitoring powers from the shareholders of the firm. Therefore, it must ensure management actions placed to discourage managers' resourcefulness that can reduce the interest of shareholders (Fama, 1980). An independent director refers to a director with no significant relationship with the firm (for instance, present and previous staff, family relations of staff or other persons not assumed independent, and workers of other firms, which obtain generous gifts from the firm). However, previous accounting study opines that the reliability of financial accounting reports

is positively related to the independence of the BODs. Beasley (2000) admits that external directors have a higher motivation to sustain their reputations in the directors' outside market. Therefore, in his evaluation of the association between the composition of the board of directors and financial statement fraud, he found that firms with fraud experiences have lower percentages of outside members than no-fraud firms.

Also, Dechow et al. (1996), investigate firms in terms of accounting enforcement actions by the SEC and found firms with misstated earnings having management dominated BODs. Based on several case studies, King and Mcauley (1997) focused on the participation of the BODs in IT evaluation. So, boards with more outside directors better enforce board monitoring duty, which includes engaging competent executive team members, overseeing the creation of control processes, and establishing a thorough internal audit function.

The studies by Kambali and Lucas (2002) also suggested that a strong, negative relationship exists between younger boards and performance in terms of IT rank, IT investment, and the appointment and duties of a CIO. Wellalage and Locke (2013) found that age increases firm performance while other studies such as Ali et al., (2012), posit that the higher the diversity of the board in terms of age, the lower the performance of the organisation when using ROA. Also, Talavera et al. (2018) conclude that the impact of diversity concerning age on organisational performance was negative in the banking sector due to the board's divergent thinking, which makes them less functional when compared with boards with less age diversity. Thus, age diversity can have both positive effects such as creativity and adverse effects where different views could produce variations in thoughts and hamper the efficiency of the board and therefore have implications on decision-making and performance. That is, the board's independence has a negative association with firm financial performance.

Overall, the conception and operationalisation of the board IT competence are in two alternative ways. It is the competence developed by individual board members by working in the technology sector. Secondly, this experience is from the executive position as an IT-experienced external board member. The purpose of this alternative approach is twofold. First, to show that irrespective of the senior executive position held in the past, the experience acquired by the board members in the IT sector is instrumental to firm performance. Second, if the board member had gained experience in the capacity of IT-experienced external board members in the IT sector, this will exert a more significant impact on firm performance. In sum, drawing from the above discussions, the following are the proposed hypothesis from this research:

H1a: Board members' knowledge of IT is positively associated with firm financial and non-financial performance.

H1b: IT-experienced external board members are positively associated with firm financial and non-financial performance.

H1c: Firms with a large number of independent directors on their boards have a positive association with firm financial and non-financial performance.

H1d: Younger boards are negatively related to firm financial and non-financial performance.

Summary of Previous Studies

Table 1 below depicts a summary of past research efforts on the Board IT competence. Unfortunately, no trace of research in this study area is traceable to the developing or emerging economies of Africa, Latin America and Asia. Thus, a situation of this nature reveals a gap exists, which requires the attention of the practitioners and researchers in academia. The significance is more pronounced, especially now that we are in the information and communication technology age.

Table 1: List of Board IT competence articles

| Reference | Empirical (E)/ Conceptual (C) | Methodology | Country | Antecedents |
|-------------------------------|----------------------------------|---|---------------|---------------|
| Jewer and McKay (2012) | E | Literature review, in-depth interviews with ten corporate directors and survey (sample of 188 board members) | Canada | IT competency |
| Kambil and Lucas (2002) | E | Survey (sample of 37 CEOs) and board data collected from various sources | United States | IT competency |
| Andriole (2009); | E | Literature review, survey (sample of more than 50 CIOs and CTOs) and interviews | United States | Director age |
| Mähring (2006) | C | Literature review | Sweden | Director age |
| Valentine and Stewart (2013a) | E | Literature review, revelatory case study, survey (93 responses) and content analysis of online governance discussion forums | Australia | Director age |

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|--------------------------------|---|---|-------------------------|-------------------------------|
| Coertze and Von Solms (2013) | E | Qualitative content analysis of corporate websites and integrated reports (sample of 20 South African, 18 United Kingdom and 19 American organisations) | South Africa, UK, U.S | IT expertise |
| Coertze and Von Solms (2014) | C | Discussion paper | United States | IT expertise |
| Nolan and McFarlan (2005) | C | Discussion paper | United States | IT expertise |
| Parent and Reich (2009) | E | Literature review and multiple case study (six organisations) | U.S., Canada, Australia | IT expertise |
| Turel and Bart (2014) | E | Survey (sample of 171 board members of Canadian firms), content analysis of responses and structured email-based interviews | Canada | IT expertise |
| Valentine and Stewart (2013b) | C | Literature review | UK, Australia | IT expertise |
| Valentine and Stewart (2015) | E | Literature review and survey (sample of 177 chairmen/women, directors and experienced IT and non-IT executives and consultants) | Australia | IT expertise |
| Yayla and Hu (2014) | E | Cross-sectional time-series analyses of data collected from various sources (sample of 113 firms) | United States | IT information at board level |
| Oliver and Walker (2006) | C | Hypothetical case study | Australia | IT information at board level |
| Posthumus and von Solms (2008) | C | Discussion paper | South Africa | IT information at board level |

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|-------------------------------|---|---|---------------|---------------|
| Héroux & Fortin (2018) | E | a mail survey (sample of 66) senior executives/officers in charge of IT (Vice-president [VP] IT, CIO, Manager, or Director in charge of technology, or Chief Technology Officer) of a sample of Canadian organisations | Canada | IT competency |
| Benaroch and Chernobai (2017) | E | a sample of 110 operational IT failures from U.S. public financial firms. | United States | IT expertise |

Furthermore, there is a need for authors to focus more on both conceptual and empirical studies to further create awareness on the current developed concepts to improve on the knowledge base of researchers and the need to encourage BODs to acquire and implement IT devices and programs respectively. The latter can bring about increased firm performance, which can attract more interest in terms of investment opportunities from both local and global investors (individuals, firms, and governments). Similarly, the attraction of knowledgeable IT individuals to the industry and public sectors can increase, and the result will be better productivity and more profits to enhance the health status of the stakeholders.

In a like manner, various collaborative efforts can be encouraged among practitioners and the academic researchers to enhance further the body of knowledge concerning the training and development of the different categories of the workforce within both the private and public sectors, also to standardise thought processes and agreement for the formulation and implementation of IT strategies for active empowerment of those at the board level in the different organisations. The improvement in the skills of the BODs about IT matters inevitably will help to douse the degree of pressure at every level of operations in the organisations.

Most of the studies, apart from being conceptual, focused on survey research. Thus, a gap exists from the perspective of the longitudinal studies as well as qualitative analysis. Similarly, mixed research methods require further emphasis to balance the outcome of research efforts and also sharpen the skills of the researchers, which can make for effective acceptance of research result.

Conclusions, Limitations, and Areas for Future Research

Many firms struggle at the board level, to reckon with the right sources in creating IT competence. To address this issue, firms can benefit from appointing IT, competent board members. Notably, a board composition that enhances the representation of directors with vital IT competences can make use of valuable intuitions to activate and reconfigure IT assets to



advance IT capability. Boards with a higher proportion of IT skills certainly can make better IT decisions, improve digital business strategy formulation, and enhance the governance of IT risks.

From a practical implication aspect, the study also offers several recommendations to the BODs in the advent of emerging technology challenges concerning the engagement of external directors with IT experience and younger board to address the matters relating to board diversity in corporate management. However, based on the reviewed agency and resource-based view theories, hypotheses were formulated to enhance the basis for empirical studies by academicians and practitioners alike. The study also shows that coverage of the literature centres on big firms to the disadvantage of the medium-sized firms apart from the concentration of research on the advanced nations of U.S.A and Canada. Similarly, coverage was mostly on financial performance to the exclusion of the non-financial aspects considered of relevance by stakeholders for investment decision-making.

The limitations connected with this study include the lack of focus on the other ITG mechanisms of board-level IT committee and board-level ITG with attention on the relational mechanism and structural aspect, respectively. Due to less emphasis on the younger board inclusion for research, future studies will produce outstanding revelation if adequate attention is allowed concerning this gap in the research efforts. A further reason for the inclusion of age diversity is that reviews on this variable, IT capabilities and firm performance are still at the infancy stage especially in the emerging and developing nations of Latin America, Asia and Africa.



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