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Board engagement with digital technologies: a resource dependence framework

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Board Engagement with Digital Technologies:
A Resource Dependence Framework

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ABSTRACT

This qualitative exploratory inquiry examines the perspectives of 26 board members in medium-sized, privately held companies operating in the United Kingdom. The study question investigates how digital technologies (DTs) impact board director capabilities. Considering different board members' experiences, the research draws attention to the influence of digital technologies on the way that board directors work. Thematic analysis offers a rigorous approach to analysis and enables a deeper understanding of individual director experiences. Findings indicate that DT impacts all board directors in four major areas: gathering, interpreting and sharing information; board stewardship; blue-sky strategizing; and scoping predictive strategic priorities. Theoretical contribution is to Resource Dependence Theory (RDT) as an outcome-focused lens, which best captures a firm's interest in digital technological advantage through board contribution and outcomes. In conclusion, practical insights for board members and regulators are highlighted.

Keywords: Digital technologies; digital transformation; corporate governance; resource dependence theory; board of directors; digitalization

Board Engagement with Digital Technologies: A Resource Dependence Framework

INTRODUCTION

Corporate boards are responsible for setting a corporation's agenda and strategies; appointing and monitoring officers and agents to act on behalf of the firm; and for providing resources and acting on other significant matters affecting the corporation (Jain and Zaman, 2020; Hillman and Dalziel, 2003). Corporate governance research and strategic firm decision-making studies draw sharp attention to the influence of digital technologies (DTs) at board level for firm performance (Manita *et al.*, 2020; Verhoef *et al.*, 2021). The board's capability to provide resources such as advice and counsel, and access to external networks and provisions is dependent on how directors engage with DTs as strategic tools. In this regard, resource dependence studies have mainly focused on directors' capacity to attract resources for the firm (Daily and Dalton, 1994; Pfeffer and Salancik, 1978). There remains a research gap for studies examining the influence of DT on board members. This may pose awareness, competency, and skill challenges pertinent for director learning. Meanwhile, the appropriate use of DT offers the opportunity for enhancing efficient (process) and effective (dynamic) contributions to resilient board strategizing (Hilb, 2020). Some recent studies consider DT's impact as a need for external audit improvements of governance mechanisms (Manita *et al.*, 2020); whereas intraorganizational studies focus more on directors' lack of awareness about the latest digital innovations for firm advantage. Such considerations indicate limitations to firm strategic scoping capability (Merendino *et al.*, 2018), which can lead to poor or partially consensual decisions, with potentially irreversible financial and resource-related implications for companies. Longer term, the firm's social and sustainable value, along with industry position, then erodes as a result (Jain and Zaman, 2020). Consequently, inadequately equipped or less digitally savvy directors may misinterpret and neglect the external changes in

competition caused by digitalization, the attraction and allocation of digital capabilities, and make less clear sense in their board judgements. Having a confident grasp of the implications of DT is important for a director's 'independence', to assert evidence-based challenges or support of a position during critical board discussions. Inevitably, a broader understanding of DT underpins the directors' and board's facilitation of a firm's sustained competitive advantage (Balnes *et al.*, 2019).

A review of current trends in board-level research revealed mainly theoretical debates about the challenges and opportunities DT poses to directors. The research gap we address is 'how are emerging digital technologies (DT) impacting on board director capabilities?' The understanding of director capabilities draws attention to digital technologies influencing the way a board director works and strengthening their engagement in DT for setting strategic priorities.

Progressive decisions made by board members are the result of individual analysis and interpretation of contextual datasets and information that have been deliberated and judged by the board. This can include ongoing oversight, monitoring, handling of crises, mergers or acquisitions, investment or innovation (Cheffi *et al*., 2019). Recently, and more so in the last year, DT has increasingly underpinned and impacted the decisions taken by boards of directors. The implications of board decisions have wider and longer term consequences for society (Stahl *et al.*, 2020), that is, they affect a wider range of stakeholders and the natural environment (Shepherd *et al*., 2019). We aim to address the gap in empirically informed resource dependence frameworks considering how DT is changing the way of board directors work.

This study is qualitative and the dataset was gathered amid the Covid-19 lockdowns. We carried out online in-depth interviews via Zoom. Our sample group included experienced directors that had been in more than two different boards during their careers. Contrary to quantitative approaches that may measure the impact of DT in terms of numerical, tangible performance patterns (e.g., share price, time spent, resources, investment value), we adopted an exploratory,

constructivist approach that allowed us to develop a more meaningful, richer, in-depth understanding of the unique perceptions and experiences that directors have had regarding DT's impact on the execution of their duties.

We engaged thematic analysis (Gibbs, 2007) and the open coding method (Khandkar, 2009) which inductively supported our interpretation of primary interviews. We do not aim to generalize the findings. We explored the experiences of board members of medium-sized UK companies, with operations in Europe.

Empirical contributions are suggested by promoting discussions on ethical and societal implications of a high level of automation within and outside the board (Stahl *et al.*, 2020). Accountability for the impacts of the board of directors' decisions (Sarrazin and Willmott, 2016) and monitoring of digitalization in companies may be subject to broader public/independent regulation remits, or to be part of a joint effort between public and private sectors for the upskilling of the workforce (Anand *et al*., 2016; Forum, 2020).

We adopted the Resource Dependence Theory (RDT) lens to explore board issues associated with acquisition, use and impact of resources, and strategic alliances, rather than just motives or behaviour. This strengthens the director's status as an independent advisor to the executive (Pfeffer and Salancik, 2015) to attract external resources, and adapt and transform internal resources. Our unique empirical contributions are the incorporation of director's engagement with DTs resulting in novel managerial, social and economic implications. First, we found DTs allow closer and frequent contact between board members and TMT members, either executive or non-executives, with managerial affects. The fundamental effects of director's approximation with operations are reported to be positive because a board member can look at the details of how things are done in their companies. Additionally, a director can know people better, have closer contacts with key staff members, and oversee details of any ongoing project.

Consequently, the stewardship role of the board is fortified by better communication flow within and outside the boardroom. A negative possible impact on the morale of the executive team due this closer director proximity, and there is a consensus between participants that a board member engaged with operational activities can lead to micromanagement and misrepresent the role of the board. However, participants generally accept that data analytics give the board of directors a comprehensive understanding of management pressures when they require an extra resource. Therefore, the board of directors' decision-making can consider factors that may enhance finance and improve customer satisfaction. The Board has access to analytical tools, allowing visualisation of employees' performance, the quality of the company's talent pool, and skills gaps in the workforce that need board attention. For example, a people science dashboard uses big data analytics and artificial intelligence to provide insights to the board of directors into the workforce. These elements emphasise the RDT perspective that focuses on problems associated with acquiring resources from the environment to understand better individuals' behaviour (Carpenter *et al.*, 2007). Second, in the social aspect, the restrictions imposed by Covid-19 crisis have broken board members resistance to the adoption of apps and software as a service. Director's frequent usage of DTs enable faster, more frequent, formal, and informal communication between directors, TMT members, key members of staff in their organisations, and strategic partners. However, directors are challenged by the higher adoption of digital technologies, which seems to reduce interpretation a director can have of body language and spontaneity of face-to-face interactions.

A director having direct access to operational data through DTs accelerates the board role to drive governance in strategic directions, scanning misalignment between strategy and execution. Therefore, directors are more likely to decide based on their detailed knowledge of operations instead of weak performance feedback signals (Bergh *et al.*, 2019). Director's engagement with topics related to DTs, for example, cyber security and data governance seem to be an essential part

of the board of directors' stewardship role, but our findings reveal that board members feel ill-equipped to ask the right questions that can add DTs considerations for strategic definitions, which can have economic implications for the whole society. However, our findings suggest directors are not confident that their companies are deploying the correct mechanisms to avoid breaches and major cyber security problems.

This study's contributions to the RDT and board of directors' theory are threefold. First, the level of digital literacy of board members is a factor that drives the role of the board as a resource provider, which extends discussions about the role of the board of directors to contribute to the company's strategies through its links to the external environment and ability for internal resource allocation (Drees and Heugens, 2013).

Second, we extend propositions about board member limitations to adapt the board dynamics, and incorporate DT in strategizing. For example, DT impacts on strategic decision-making and temporal tensions in the boardroom (Merendino et al., 2018).

Third, the study confirms and extends conceptual discussions on the role of DT to fortify relationships within the board and top management team (TMT) that can enhance the stewardship capacity of the board (Kakabadse and Kakabadse, 2020). For example, digital communication in the form of instant messaging services, for example, help directors to stay in direct contact with key employees, which, while having its benefits, can increase conflicts between the board and TMT (Chrisman, 2019).

Through the RDT lens, a new conceptual model is suggested, which captures board member perceptions of the benefits or challenges framed as major elements of board-level digital governance.

THEORETICAL APPROACH

Board of Directors as Strategic Resource Designers

We reviewed corporate governance theories to position our focus on a perspective that would allow a penetrating investigation about board members' experiences with DT. After reviewing theoretical perspectives of corporate governance, dynamic capability and knowledge-based view assumptions and some mechanisms regarding the role of the board of directors, we find the RDT lens (Hillman *et al.*, 2009) better informs the board of directors' role in the context of digital transformation. RDT focuses on the company's relationship with external resources (Ozturk, 2020), board contributions to the process, control, and delivery of firm resources by way of timely strategic decisions (Sánchez *et al.*, 2017).

RDT sees the board of directors' role as focusing on bringing resources such as skills to the firm, and access to key constituents like suppliers and policymakers (Hillman *et al.*, 2000), which contrasts, for example, with Agency Theory that sees the board as a monitoring instrument, with the TMT being responsible for the execution of strategy and having in-depth knowledge of the company's operations. Therefore, board members need engagement with advancements in the external environment to allocate resources between the old and the new business models (Vial, 2019; Weber and Tarba, 2014) and contribute to competitive advantage (Steinbach *et al.*, 2019). We introduce, in Table 1, the theoretical perspectives considered in our analysis along with the elements of RDT that we use to investigate DT's impacts on board dynamics.

Insert Table 1 Corporate Governance Lens and Theoretical Underpinnings of Digital Transformation here

The emergence of DT accelerates fundamental changes in business models (Verhoef *et al.*, 2021), customer value creation (Matarazzo *et al.*, 2021), and enterprise architectures (Kaidalova *et al.*, 2018). Scholars suggest the board of directors needs to respond to digital transformation challenges and opportunities by contributing to value creation (Grove *et al.*, 2018); attracting new capabilities (Verhoef *et al.*, 2021); improving decision-making quality (Ghasemaghaei and Calic, 2019); engaging more frequently and deeply on strategy and risk (Aberg, 2017); and increasing digital skillsets in board composition (Mathew *et al.*, 2020). Additionally, an RDT lens is suggested for board members to establish links that regulate the interdependencies and connections with the environment (Pfeffer and Salancik, 2015), providing essential resources to facilitate innovation and capitalize on disruptive DT (He *et al.*, 2020).

However, current studies of board dynamics forged by deliberation (Schneider and Leyer, 2019), concentration of power/political behaviour (Shepherd *et al.*, 2019), information asymmetries between executives and board members (Sharpe, 2013), and absence of realism suggest that board directors fail to acknowledge the impact of digital transformation. Thus, there is a gap in current studies in terms of how the board of directors engage with technological advancements and adopt DT in governance mechanisms, which are capable of adapting board dynamics and strategies in rapidly evolving scenarios (Abbady *et al.*, 2019; Chiang *et al.*, 2018).

Influence of Digital Technologies on Firm Governance

There is little doubt about the implications of DT for companies, along with the importance of appropriate governance mechanisms that can be effective in the context of digitalization. Merendino *et al.'s* (2018) study of engaging big data in board decision-making found that directors' know-how was inadequate. A shortfall in director cognitive abilities led to them feeling overloaded with information and having a limited analytical ability to extract and legitimize relevant insights.

Information is a critical element of the decision-making process, as it is based on information that director's interpretation and judgement is forged. Scholars have long taken a particular interest in how technology can support information processing related to decision-making (Shrestha *et al*., 2021). The board of directors relies on the executive team to produce reports that can represent the reality of the assumptions in the companies. However, there is an informational deficit, or asymmetry, where one part of the relationship has more or better information than another (Salehi, 2014; Sharpe, 2013; Bergh *et al.*, 2019), with which a board member works when monitoring their executive teams' decisions. The sources of asymmetries can be intentionally or unintentionally created, for example, when executives keep information about market intermediaries or hide non-observable managerial information from the board (Bergh *et al.*, 2019).

Structural barriers can inhibit the flow of information and prevent collaboration between board members and executive teams that can negatively impact stewardship and monitoring role of the board (Solomon, 2019). From a strategic management and RDT perspective, authors have identified information asymmetries as a source of competitive advantage, market-level efficiencies (Makadok, 2011), and a critical reason why some companies outperform others (Kraaijenbrink *et al.*, 2010). Information asymmetries exist in all exchange relationships. However, in a board of directors' strategic decision-making, such asymmetries are stressed as each board member brings unique knowledge, values, priorities, and goals, which is difficult for others to know (Afuah and Tucci, 2012). Additionally, non-executive dependence can inhibit these directors from challenging their counterparts on the board (Kamalnath, 2019; Simões et al., 2013). Scholars have discussed corporate governances' mechanisms to mitigate information asymmetries between the executive and board directors. For example, board structure, non-duality of CEO as a Chair and composition (Crow *et al.*, 2014), monitoring agent conduct, gaining access to firm's internal information flows

and providing incentives that encourage agents to act in their owner's interests (Sanders and Carpenter, 1998; Schulze *et al.*, 2001).

Digital technologies can make information widely available, reducing the costs of acquisition of information and communication, therefore improving information flow to the board, which Sharpe (2013) suggests facilitates consensus- based decision making by reducing dependence and dominance of cumulative information between board members. Digitalisation can facilitate and balance information asymmetries when both sides of a relationship benefit (Bergh *et al.*, 2019). For example, between firms and analysts (Rhee and Fiss, 2014), CEOs and board of directors (Zhang Yan Anthea *et al.*, 2014), principals and agents (Grundei, 2008; Sanders and Carpenter, 1998), partners in vertical exchange relationships (Lumineau and Oxley, 2012), and within larger conglomerates of companies (Luo and Chung, 2005). Therefore, digital technologies can be a mechanism for a director to check CEOs honest regarding the information provided to the board, and the information received from the executive team which supports a director decision-making.

Mathew *et al.* (2020) assert that digitally skilled directors are better drivers of financial performance, and they can facilitates board access to information, therefore levelling information asymmetries. Meanwhile, Balnes *et al.* (2019) highlight that it is the board that needs to construct strategies for upskilling staff, raising capabilities and increasing the use of tools in effective data analysis at all levels of a company to support strategic board decision-making.

Stafford and Schindlinger (2019) add that board members must be comfortable with digitalization, rather than simply delegating technology issues to employees, committees or external technology providers and consultants. Most commonly, boards are relying on outsourcing to external stakeholders to manage big data activities (Merendino, *et al.*, 2018). Furthermore, there is an increase of artificial intelligence (AI) adoption that has predictive decision-making capacity

and resource dependence implications for the role of a board. However, the board director strategic decision-making capability has to create value for competitive advantage contribution (Hilb, 2020; Libert *et al.*, 2017).

Most recently, scholars alert directors and firms to address and adopt DT governance mechanisms for improving the oversight and monitoring of the potential consequences of AI and decision-making systems. Automation strategies must be rigorously discussed at the highest level (Thuraisingham, 2020). Processual governance of firms may improve; however, automated and AI-enabled decisions will limit the discretionary power of senior managers and boards (Manita et al., 2020). Importantly, any AI system cannot appreciate the context in which decisions occur or the full implications of the AI-generated decision. Thus, fair and valid assessments require strategic human interventions and legitimacy for firm performance (Bolander, 2019).

Another important aspect of DT is the rise of cyber-attacks that expose risks to governance mechanisms and board members' monitoring role (Kellermann and McElroy, 2020). There remain gaps in theoretical and empirical examination of guidance for boards of directors (Schinagl and Shahim, 2020). Scholars and industry specialists highlight how governance frameworks will need to change along with individuals' attitudes towards cyber security in order to establish a governance culture of digital security by the board (Agrawal *et al.*, 2018; Kellermann and McElroy, 2020). There appears to remain a gap in board involvement with digital security that promotes weak security culture. This may expose board of directors who are legally responsible for any event or incident (Schinagl and Shahim, 2020).

The board of directors are at the centre of the digital ecosystem. Directors need to make sense of and judge the potential value creation, risks for reputation, assurances for compliance to attract external resources, and transform internal capabilities that maintain companies' relevance in the marketplace. Figure 1 illustrates the complexity of involving DT in board dynamics.

Insert Figure 1 Influence of Digital Technologies on Firm Governance here

The existing research on boards of directors needs to extend for a more holistic view, addressing the impacts of DT on businesses operating in an increasingly digitalized world. Board members' acknowledgement of and advocating for the benefits of DT is pivotal in assuring a brand's reputation, and undertaking adequate risk assessments of the algorithmic direction (Kellogg *et al.*, 2020) of the workforce, cloud computing migration (Brandis *et al.*, 2019) and big data governance (Abbady *et al.*, 2019).

Most existing studies are conceptual frameworks focusing on implications of DT on board dynamics. The few empirical studies available reveal only the limitations and constraints board members are confronted with in relation to DT. The studies have not fully explored directors' experiences of and their involvement in digitalization.

RESEARCH METHODOLOGY

The study is qualitative, and the approach consists of two layers of exploratory questions: main themes and follow-up questions. The qualitative method provides a deeper exploration of directors' experiences regarding the impacts DT has in their work. For our study question, regarding DT's impact on board members' ways of working, the board members' experiences were revealed through a constructivist approach in which we captured the meanings and knowledge from interactions with board members.

Reflecting the directorship focus of the study and research question, the use of convenience sampling and participants' interviews was deemed appropriate *(*Etikan *et al., 2016).* All participants were experienced directors, with careers in more than two boards, and a combination of non-executive directors, Chairs, and CEOs from diverse industries (see Table 2), enabling us to

gain a rich understanding of the topics explored in the context of UK mid-sized companies. The UK context was chosen as 100% of boards in this nation have a non-duality composition (Struggles, 2014). This model of governance provides a particularly interesting perspective, in terms of relationships between non-executive directors and executive directors that can add value to our research. For example, with regards to board composition, it is not only important when related to non-duality of roles or the demographics of board members, but also when considering the depth of diversity in the industry backgrounds of its members, which is key with respect to their specialities and whether they can help executives to explore opportunities beyond familiar domains.

Board directors were approached during the Covid-19 lockdowns through a combination of criteria and selected networks such as the snowballing method of introduction or through the professional networking and social media site, LinkedIn. All live, virtual interviews were agreed and undertaken via Zoom. A consensus among managerial studies confirms that gaining this level of access to senior informants for lengthy interviews is rare (McNulty and Pettigrew, 1999; Simões *et al.*, 2013). However, amid the restrictions imposed during the Covid-19 pandemic, online video conferencing tools have gained significance (Janghorban *et al.*, 2014). Participants seemed more comfortable with online communication tools during this time, offering the distinct advantages of availability, administrative flexibility, and convenience for virtual data collection.

Insert Table 2 Participants' Profiles here

Data were gathered through in-depth, semi-structured interviews, which allowed exploration of participants' experiences regarding the challenges posed by DT, the changes DT is

making on the way board members work, and their short- and longer term views of the consequences for strategizing (Saldaña, 2015). Thematic questions were used to guide the interviews with participants(see Appendix A). Interviewees were encouraged to speak freely about their experiences (Elliott and Timulak, 2005). Among the topics covered were the participants' previous and current roles (Table 2), the context in which the board meetings occur, the role of the board and its members, changes in communication, information-gathering, interaction within and outside the board, the role of DT in promoting changes in board composition, potential benefits and challenges brought by DT, and the incorporation of DT in strategizing. Interviews were carried out from May to November 2020 with 26 active board members (Table 2). The average length of each interview was around 1 hour, thus generating a total of 30 hours of audio-recorded material, and more than 360 pages of transcripts, which proved longer than previous studies, with "elites" participants, mentioned in the literature, in which interviews often lasted around 45 minutes (Aberbach and Rockman, 2002). The interviews were audio-recorded and transcribed, and identities anonymized.

Multiple themes were developed in and across the interviews, which were categorized/reduced using standard thematic qualitative coding techniques, and the overarching common themes emerged as trends across the sample set (see Table 3).

It is not our aim to generalize findings across small and medium-sized enterprises (SMEs) or large organizations, but to explore a broad view of experienced directors in mid-sized UK-based companies.

Data Analysis

The research applies inductive reasoning to connect data gathered and establish a coherent argumentation, with no generalization of the study findings, considering the complexity, subjectivity, and contextualization of the experiences of board members in real business situations

(Ketokivi and Mantere, 2010; Klein, 2015). The credibility of our study is grounded in the robustness of the method used to gather primary data. The application of the chosen method is appropriate to the nature of the research questions. The sampling of experienced board members, from a range of industries, also gives more credibility to the study while keeping focus on the main questions. Saturation is reached where similar themes are re-emergent, and few additional insights are revealed (Saldaña, 2015).

Data collection and analysis were carried out concurrently (Belotto, 2018) as an ongoing iterative process between sample building, data collection, and analysis to accumulate insights and information (Saldaña, 2015). Open coding was engaged throughout; the transcripts were systematically analysed to reveal several categories, types and relationships of meanings (Gibbs, 2007). The transcriptions were analysed in a reflective back and forth process (Gibbs, 2007) by three researchers, which helps to minimize bias, increasing confidence in the acceptability of the results.

Following the transcripts, the dataset was open coded, categorizing the text into emergent themes and conceptual categories (Gibbs, 2007). Focus was essentially on staying loyal to the interviewees' exact wording in the context of their technological engagement, and the final analysis was conducted carefully by the research team who agreed a set of four core themes (information for decision-making, blue-sky strategizing, stewardship and strategic priorities) and 12 conceptual categories (information-gathering, board composition, adoption of DT, biases, context, new product development, relationship with TMT, skills, communication, value creation, sensemaking and board composition), which were used to frame and strengthen the reliability of the findings (Belotto, 2018; Gibbs, 2007).

Insert Table 3 Emergent Sub-themes and Themes here

The researchers identified 83 quotations for the first core themes – information for decision-making; 37 quotations for the second core theme – blue-sky strategizing; 53 quotations for the third core-theme – stewardship; and 39 quotations for the fourth core theme – strategic priorities. The themes assigned emerged from the analysis and interpretation of participants' statements.

FINDINGS AND DISCUSSION

In normal circumstances, it seems that changes in the competitive environment, pressure from regulators, the whole of society, and even digital transformation were not able to motivate changes in how UK board members work, deliberate, meet, communicate, interact, monitor, and steward their companies.

However, suddenly the world was affected by the Covid-19 pandemic. As such, participants emphasized that the board of directors were forced to promote fast changes in board dynamics. Consequently, DT seems to be at the top of the board of directors' agendas, described by some participants as "digital-first", or "now it is everything digital". Board members who were previously resistant to communications through online tools, such as Zoom have had no other medium to support the overseeing of their companies during the lockdowns.

Information-gathering for Decision-making

Findings elucidate that DT is bringing about modifications in the way board members gather, share, analyse, and interpret information. The decision-makers typically do not have access to all information required to make informed judgements, and information asymmetries between board members and the TMT interfere with the analyses, valuation, and outcomes of decisions (Eisenhardt, 1989; Ortega & Braun, 2011). However, DT is granting board members faster,

unprecedented access to online information, from many sources and about diverse topics. Amid the Covid-19 pandemic, participants indicated board meetings are shorter and more frequent than before lockdowns.

Board members can tailor complementary information. They are assigned to a part of the business and can drill down to get more data, using DT to expand information availability. Sources of online information, even social media, appear to be supporting the emergence of themes for discussions in the boardroom. This finding corroborates Sharpe (2013) to reaffirm that board members use DT to help overcome information inaccuracy, to check on CEO honesty, and to better monitor and counsel the TMT.

Some respondents indicate that having access to real-time information can be important for strengthening corporate governance as it can reduce internal executives' information advantage (Salehi, 2014), which previous research (Klein, 2015) suggests increases conflicts of interest between agents (Sharpe, 2013).

Data technology enriches analysis and presentation of the dataset. First, the information can be shared well in advance, rather than a few days or hours before the board meeting. This attribute allows more time for directors to analyse the data and add to it from their own findings, and it also promotes a more focused debate.

Second, participants indicate that data technology allows a board member to delve deeper into the detail, bringing directors into closer proximity with the business on an operational level, which may impact their stewardship role (Chrisman, 2019). Direct access to detailed information can support directors who challenge the information provided in the board pack.

Third, DT is enabling board members to carry out tasks much quicker. They use the technology to feed decision-making. DT can contribute to faster rational decisions, as high availability and real-time access to information seem to reduce the reliance on intuition and past

experiences (Bradley, 2019; Liebowitz *et al.*, 2019), which is beneficial when creating winning strategies (Yanqing *et al.*, 2019).

The adoption of interactive and real-time DT has benefits for decision-making, as board members inquire more profoundly into the details at that moment and receive more immediate responses. However, some participants still draw decisions only on historical information in board packs. The scarcity of online and real-time access to information disrupts and postpones analysis and assessment of alternatives and makes decisions slower than the pace imposed by DT (Balnes *et al.*, 2019), and it may lead to a loss of decision-making autonomy, which is one of the central discussion points of RDT theorists (Drees and Heugens, 2013).

Blue-sky Strategizing

Board members influence top team 'blue-sky strategizing' through a set of actions: formal and informal dialogues between board members and executives (Bailey and Peck, 2013). The board then set parameters for content strategy that management subsequently follow (Hendry *et al.*, 2010). The board of directors' involvement with blue-sky strategizing has gained importance, more so in the last few years (Yar Hamidi and Machold, 2020). More significant uncertainty in the external environment *(exacerbated by the Covid-19 crisis),* due to fast changes in customer behaviour (Singh *et al.*, 2019), business models (Pérez-Castillo *et al.*, 2020), and societal and political instability worldwide (Le Bris *et al.*, 2019) forces new and novel changes. In this regard, board members invest more time upfront in defining and shaping the possibilities ahead, and in monitoring current strategies in line with longer term investment in digitalization (Grove *et al.*, 2018).

For board members, blue-sky strategizing considers technology's involvement in more customized experiences and contemporary perspectives, with a holistic understanding of customers, employees, operations, and finances, as unique needs arising from digitalization.

Directors believe DT enables the exploitation of opportunities in a way that will create a value proposition tailored to each customer's needs. The technology is required to exploit variety and opportunity. This widens board discussions for those considering digitalization to extend strategies or protect firms' competitive advantage (Mathew *et al.*, 2020).

Participants of the study indicate a diversity in DT in which companies can invest. A business's digital footprint includes a social media presence, facial recognition, customer information, footfall, and spending habits. Such a range of knowledge and data can empower board members to predict future scope.

The adoption of DT then leads to a greater diversity of board discussions, for example, about the challenges and opportunities presented by data governance and cybersecurity. As a consequence of these broader themes of discussion, a sub-theme emerges in the findings about board composition: participants report trends regarding the skills and demographics of board members themselves. Some boards are hiring younger professionals, considered 'digital natives', rather than those having acquired familiarity with digital systems as an adult in the workplace.

Key findings include experiences of cybercriminal activity, data science, AI, big data, digital transformation, and how companies can plan and respond to a critical area of knowledge that the board of directors must possess. Study participants report how new skills could fundamentally change discussions from a significant financial-based argument to a more customer-centric, and data-driven approach.

However, we can see that evolution of board composition is not consistent with some participants revealing that they delegate discussions or pass analytic elements to another committee or department. Participants indicated that this can be specific to UK boards, as they are considered more traditional and comfortable with status quo. These findings extend and contribute to the RDT perspective with regards to the need to change board composition by recruiting independent board

directors who could contribute more to the firm strategy, and less to monitoring (Boeker and Goodstein, 1991; Louca *et al.*, 2020) to maximize performance, and improve compatibility of its organizational systems with those of the resource provider (Drees and Heugens, 2013). We add DT to discussions on RDT, which considers board 'interlocks' (the service of a director on multiple boards), creating a connection between the focal organization and another, to enhance opportunities for developing capabilities (González, 2019), and launching new products without requiring corresponding exhaustive investments (Drees and Heugens, 2013). Additionally, digital native board members can be a network of information and offer access to important technological resources – an interpretation highly consistent with RDT (Davis and Cobb, 2010a; Hillman, 2005). In conclusion, skilled human capital helps the board to offer expert advice to the CEO about strategy (Louca *et al.*, 2020) which is demonstrated to have a positive effect on firm performance.

Board Stewardship

The main finding relates to the effect of granularity of visibility, which refers to board member access to operational evidence and information such as sales pipeline, people management, and project management. Study participants suggest a common opinion that boards need to spend more time within their organization and less time on distant fiduciary duties. However, Muth and Donaldson (1998) suggest that board member proximity with top management can create adverse effects on managerial morale (Chrisman, 2019); nevertheless, our findings did not fully support this.

Participants reveal that having direct access to operational data through DT accelerates the board's ability to drive governance in strategic directions, scanning the misalignment between strategy and execution.

In one interview, a participant shares how they use a cloud-based system to pull information from the cloud about sales meetings to negotiate core products. The data revealed that no such meetings were planned. This gives higher visibility to boards of directors on sales activity. The board is able to enquire about detail and direction, reinforcing the right behaviour and focus of the sales teams, within the strategy.

Operational data seems to have an impact on directors' decisions, for instance, having information about customers' demographics has driven a board decision to deploy more resources for childcare in a chain of schools. Moreover, analysing the number of new customers in the last quarter of 2020, a board decided to appoint a board member to the health and safety committee to follow provisions about social distancing.

Another impact of DT on the board of directors has been what a participant called 'adoption of a more customer lead framework'. This effect is due to data granularity, and analytics about customers' behaviour, and preferences provided to the board of directors, which has been reported to enable improvements in value proposition delivery to customers.

The adoption of AI systems and data analytics supports board members' better understanding of the people in their organization. A participant stated that a so-called people science dashboard system uses big data analytics and AI to provide insights into the people in the workforce to the board of directors. This finding complements previous suggestions of other quantitative key performance indicators (KPIs) in digital dashboards to support the board of directors' contributions on digitalization (Grove *et al.*, 2018), and a better conceptualization of performance measures that boards can realistically influence (Boivie *et al.*, 2016).

These findings emphasize the RDT perspective, which focuses on problems associated with the acquisition of resources from the environment to gain a better understanding of the behaviour of individuals within the organizations (Drees and Heugens, 2013). We find that, once board

members start understanding some of the employee and customer dynamics, there is a stronger likelihood of them engaging with the relevant executives in the organization to support them to make decisions in how to run the business, which is evidence that board members are coaching the executive team members.

We conclude the analysis of this theme by proposing that DT can be a moderating factor, alleviating the frictions that emerge from the monitoring role of the board. Thus, our proposition extends the lens of RDT that a board brings benefits to TMTs (Hillman *et al.*, 2009) through information in the form of advice and counsel, and access to channels of information between the firm and the environment (Pfeffer and Salancik, 2015; Provan, 1980). In this regard, shareholders may have a complex task in choosing board members that are able to monitor and advise (Louca *et al.*, 2020).

Scoping Predictive Strategic Priorities

Study participants emphasize how DT is critical to nurturing competitive advantage. Participants were asked to indicate the key strategic priorities for their board of directors for the next three to five years due to the advancements of DT, which complements our conceptual model (Figure 2).

Insert Figure 2. Impact of Digital Technologies on Board of Director's Work here

Our findings indicate that board members prioritize an understanding of how technologies impact contextual, political, economic, social, and environmental forces. The context is in relation to insights into customers' purchasing behaviour, or the acknowledgement of the employees' engagement within the company, and the focus on investments to churning the data, getting closer

to customers. Participants indicate a prioritization of investments that equip the board and the executive team to absorb intelligence and insight, and, to some degree, predictive support capability. This is aligned with conceptual models suggesting AI may have predictive utility to reduce uncertainty (Hilb, 2020). This perspective can expand the scope of RDT to a holistic examination of the main concepts of the theory, instead of only within the framework of strategic actions, which is considered a limiting factor for RDT (Ozturk, 2020).

Another strategic priority that participants indicate is the ability of the board of directors to identify and forge external partnerships in order to build, plan, and design a company's capacity in terms of employee skills, investments in digital technology, migration to cloud services, and strategic partnerships. In their emphasis on the criticality of these partnerships, participants placed importance on nurturing mutually beneficial opportunities emerging from DT as collaborative value creation between networks.

Regarding the investment and use of technologies (resource lens), this is not simply about the cost of acquisition, but also engaging in, training, and maintaining these technologies as a potential benefit or loss derived from long-term use and outcomes (Sharpe, 2013).

THEORETICAL IMPLICATIONS

This paper primarily contributes to corporate governance and board of directors' studies investigating mechanisms to improve the way board of directors' work and how to enhance board contribution for value creation and strategizing.

Board of directors' choices about strategic priorities considering DT emphasize the mediating board function (Bainbridge, 2012), and contribute to the central proposition of the RDT perspective that considers how organizational survival lies in the ability to procure critical resources from the external environment (Casciaro and Piskorski, 2005). Directors can use DT as

an instrument to reduce uncertainty (Hillman *et al.*, 2009)*;* lower transaction costs (Barringer and Harrison, 2000) by making information more readily available; lower dependence among buyers and suppliers to develop alternatives more readily (Davis and Cobb, 2010b)*;* and, furthermore, increase the flow of essential resources (internal/external) via the exchange of information between members, executive teams, suppliers, and partners (Casciaro and Piskorski, 2005). Inter-organizational relationships, enhanced by changes in board composition, mainly with digitally savvy members, help an organization acquire and allocate resources to reduce uncertainty and interdependence (Auster and Choo, 1994; Salancik and Pfeffer, 1978).

The emphasis on the board of directors' contributions towards building capabilities and capacities across the company, which seems to be improved and facilitated by the usage of DT, extends discussions about rational organizational responses to environmental dependence (Sanders and Carpenter, 1998) by board members paying greater attention to strategy alignment to the broader environmental context while not neglecting decision-making (Filatotchev *et al.*, 2020). Our finding regarding DT balancing information asymmetry between board members and providing to directors direct access to information extends discussions about the executive's information power, which it is suggested improves decision-making quality (Shamim *et al.*, 2020). Therefore, these findings extend discussions that consider strategic controls are less concerned with short-term financial objectives and may be focused instead on assumptions and actions related to long-term sustainable value creation and risk assessment (Filatotchev *et al.*, 2020).

This study extends and contributes to the RDT lens, as significant changes to the firm's environment reflect a need for changes in board composition (Boeker and Goodstein, 1991; Lang and Lockhart, 1990; Salancik and Pfeffer, 1978). The different types of resources that directors classified as "business experts", "support specialists", and "community influential" can bring to

the companies high digital capabilities. Then, DTs can represent a renaissance in boards through a focus on the resource provision role of directors (Hillman *et al.*, 2000).

Another important contribution of this study concerns the capability of directors to get closer relationships and contacts with stakeholders through DT. Thus, it extends discussions; for example, Muth and Donaldson (1998) suggest that board member proximity with top management can have adverse effects on managerial morale (Chrisman, 2019)*;* there is a need for directors to have a robust approach to stewardship (Kakabadse and Kakabadse, 2020); and it is important for directors to be familiar with the company's challenges, capabilities, and capacities (Maharaj and Rookmin, 2009).

PRACTICAL IMPLICATIONS

The contributions of this study may be useful for firm policies and board assessment/evaluations, and in guiding board stakeholders, executives, or regulators. For boards it is a framework that focuses on members' skills, and board structure and composition for better governance (Balnes *et al.*, 2019; Barriuso *et al.*, 2019; Mathew *et al.*, 2020; Grace *et al.*, 1995; Salehi, 2014). Board members and executives can benefit from the findings to support starting points of analysis and discussions about which DT, characteristics, implications, and considerations need to be addressed while strategizing.

Additionally, board members and regulators might consider discussing the reasons for a low level of board involvement with data governance, and a lack of specific regulations that can support monitoring of the results from automated decision-making and data governance. The results of these investments can have positive implications for society; for example, upskilling the workforce, to build systematic mechanisms for data governance and increase transparency of automated decisions, both in operational and managerial levels.

The changes DT promote within and outside the boardroom require individual changes in directors' behaviour, skills, and attitudes to adapt and exploit opportunities. Therefore, the findings of this study can be used as a starting point for the development of metrics and standards that can promote changes in the requirements of a director to execute their duties in a progressing digital ecosystem.

Practical contributions to the stewardship practice of the board can be emphasized by participants' statements about the usage of digital technologies to communication and interaction within board members and top management team draw consensus that digitalisation brings board members closer to their operations. Directors in the board of digital native companies utilise digital tools to manage employee morale, connect staff with the company's culture and objectives, create an atmosphere of community, and use digital employee footprint to support decisions from a talent management perspective. TMT are promoting and training staff accordingly to their performance and engagement with the company. Directors are getting to know their organisations better because they have access to more people through digital technologies, which gives directors access to parts of the companies that they would not have seen otherwise.

CONCLUSION

This study presents a unique framework that can be used by boards of directors for prioritizing the importance of DT and how it impacts board members' activities. The study integrates director/board literature streams across board member understanding about DT with how these technologies affect their work and board outcomes (Stahl *et al.*, 2020). This study provides the first framework for board engagement with DT through the RDT lens (Hillman *et al.*, 2009), drawing attention to the pivotal role DT plays in board judgements and for board-level strategic priorities.

In conclusion, four major integral themes emerge as impacting on the board director's role and work: information- and evidence-gathering, board stewardship, blue-sky strategizing, and predictive strategic priorities. This brings to our attention director role evolution, as attributes towards technological savviness and the time devoted to this aspect in board discussion/dynamics shape the quality of stewardship (Chrisman, 2019; Donaldson and Davis, 1991) revealing contributions to RDT, as shown in Table 4.

Insert Table 4: Contributions of this Study to the Resource Dependence Theory here

Emerging from this study is how directors' use of DT can balance information asymmetries amongst board members themselves and reduce information ownership by executive team or external stakeholders (Sharpe, 2013) . In particular, there seems a distinction between longer standing board directors and younger, emerging, new generation board directors.

LIMITATIONS AND FUTURE RESEARCH

This is a qualitative exploratory study, based on in-depth interviews. The findings are contextual to the nature of the sample, and less generalizable to other sizes of organizations (Saldaña, 2015). However, the study adopted a consistent, in-depth, and rigorous qualitative thematic analysis.

Future research may explore a larger sample, specific sectors, or differing company sizes. One may also focus on the impacts of DT in a narrow segment of the economy or country. Other studies may adopt longitudinal methods. Further qualitative studies may explore the social impacts of DT. The study findings provide a basis for future research concerning convergence of board's monitoring and stewardship characteristics. More quantitative research on the impact of DT is warranted to address information asymmetry.

FIGURES AND TABLES

TABLE 1

Corporate Governance Lens and Theoretical Underpinnings of Digital Transformation

Theoretical Perspective	*Agency Theory*	*Institutional Theory*	*Stewardship Theory*	*Resource Dependency Theory*	*Stakeholder Theory*	*Dynamic Capability View*	*Knowledge-based View*
Origin	Economics and Finance	Organizational studies	Human Relations and organization theory	Sociology	Management theory, politics and law	Management theory	Organizational Learning Theory
Role of the board of directors	To act as a monitoring or directing tool in the broad sense of mission or directive for management.	To act to modifying the basic principal-agent conflict.	To facilitate empowering structures.	To act as a linking tool between the organization and its environment.	To act as a vehicle for coordinating stakeholder interests.	To identify risks and opportunities, acting actively to create value through capabilities.	To ensure mechanisms are in place for data acquisition, interpretation, and knowledge generation from the data.
Key Authors	Eisenhardt, K. (1989); Jensen, M. et al., (1976); Cohen et al., (2002; 2004).	John W. Meyer and Brian Rowan (1977); DiMaggio and Powell (1983).	Donaldson, L. and Davis, J. H. (1991); Muth, M. and Donaldson, L. (1998); Grundei, J. (2008).	Hillman et al., (2000); Useem, M. (2006); Palmer (1983); Pfeffer, J. and Salancik, G. (2015); Casciaro and Piskorski, 2005.	Heath, J. and Norman, W. (2004); Donaldson and Preston (1995).	Barreto, I. (2010); Eisenhardt, K and Martin, J. (2000); Makadok, R. (2001); Rauch, M. S.et.al.,(2015); Teece.D, Pisano.G and Shuen.A (1997).	Conner,C. and Prahalad (1996); Grant, R. (1996); Wernerfelt, B. (1984).
Primary assumption	Managers will work towards their own self-interests, unless suitable policing methods are employed.	Considers the importance of context and external environment, as strong influencers of policymaking; therefore, decision-making in the boardroom.	Managers will work in the best interests of the organization and/or owners and, thus, require structures to facilitate and empower. Tactic to benefit organizational performance.	Boards of directors are a linking mechanism between the organisation and the business environment in which it operates. Professional arrangement representing a linking mechanism between the organization and the business environment.	Boards of directors will work towards achieving corporate goals by balancing the interests of (sometimes conflicting) stakeholder groups. Professional arrangement representing a nexus of contracts or relationships.	Companies need to acquire capabilities to develop business to create new environments (markets). Companies sharing best practices.	Tacit knowledge or 'know-how' may help the firm to deploy its resources in a more productive way.
Some key mechanisms	Non-duality of CEO and Chair; Board composition with non-executive and executive directors; Economic incentives.	Country- and firm-level corporate governance mechanisms; Modifying the fundamental principal-agent conflict.	Economic and non-economic incentives; Shared leadership, Collective responsibility, and Intrinsic rewards.	Management of conflict; Bargaining power and instability; Alliance formation and organizational autonomy and legitimacy; Inter-organizational power balance; Strategic resource control The use of boards of directors as mechanisms to gain resources and minimize inter-organizational dependence.	Balancing the interests of all stakeholder groups; Managing potential conflict stemming from divergent interests from management, shareholders and stakeholder.	Incremental innovation (exploitation) strengthening and utilizing capabilities for a company's existing business; and Radical (exploration) innovation: corporation searching out or building new capabilities in pursuit of the creativity needed to pioneer the new business models and new businesses of the future.	Data diagnosticity refers to the retrieval of deep and sophisticated information from data to make valid and reliable interpretations and assessments.
Application to board dynamics	Tactic to counter agency problems.	Tactic to benefit organizational processes and social behavior.	Tactic to benefit organizational performance.	Professional arrangement representing a linking system between the board and external bodies.	Professional arrangement representing a nexus of contracts or relationships.	Specialised knowledge of individuals (directors) is integrated to form organisational-level or group-level knowledge.	Knowledge of directors to support data governance to improve decision-making quality.
Some assumptions to be explored in the context of digital transformation	Alleviation of bounded rationality, and information assymetries between members.	Digital transformation impacts on employment, and sustainable practices.	Digital technologies acting as a moderator factor that alleviates the tensions caused by the proximity between board members and staff.	Digital technologies alleviating information assymetries, build competitive advantage, promote proximity of board members with executive and non-executive members.	Digital technologies moderating politization of the company, and enabling board members monitor role.	Directors' mental models to perceive, analyse and process changes in the environment.	Knowledge of directors to support data governance (quality of data that feed artificial intelligence models; cyber security assumptions).

Source: Adapted from (Glinkowska and Kaczmarek, 2015; He *et al.*, 2020).

TABLE 2

Participants' Profiles

Participant	Age	Gender	Industries	Company size	Number of boards in career	Headquarter	Actual position
1	over 50	Male	Technology, Services, Education, Consultancy, Bank	11 to 50	>10	England	Chair
2	40 to 50	Male	Consultancy	1 to 10	>10	England	CEO
3	over 50	Male	Hospitality and Consultancy	11 to 50	>10	England	Non-Executive Director
4	over 50	Male	Technology	50 to 250	>10	England	CEO
5	over 50	Male	Consultancy, Finance, Charity, Education	50 to 250	>10	England	Chair
6	over 50	Male	Services, Consultancy, Health	> 500	>10	England	Chair
7	over 50	Female	Education, Consumer Goods and Technology	> 500	7	England	Chair
8	over 50	Male	Technology and Bank	> 500	6	England	Non-Executive Director
9	over 50	Male	Financial Services - Bank	> 500	6	England	Chair
10	over 50	Male	Hospitality and Consultancy	11 to 50	6	England	Chair
11	over 50	Male	Technology, Logistics, Pharma	> 500	5	England	Chair
12	over 50	Male	Consultancy, Finance, Technology	50 to 250	5	England	Non-Executive Director
13	30 to 40	Male	Education and Consultancy Services	251 to 500	4	England	Chair
14	over 50	Male	Education and Technology	1 to 10	3	England	Chair
15	over 50	Male	Financial Investments in Retail	> 500	3	England	Chair
16	40 to 50	Female	Services Board	50 to 250	3	England	Executive Director
17	40 to 50	Male	Education, Media, Charity	> 500	3	England	Chair
18	over 50	Male	Manufacturing	1 to 10	2	England	President
19	30 to 40	Male	Technology	11 to 50	2	England	General Manager
20	over 50	Male	Consultancy	11 to 50	2	England	Chair
21	over 50	Female	Technology	> 500	2	England	Non-Executive Director
22	over 50	Male	Health Digital Services	11 to 50	2	England	CEO
23	over 50	Male	Technology, Services, Education, Consultancy	> 500	>10	England	Chair
24	over 50	Male	Investment bank companies	> 500	>10	Netherlands*	Chair
25	over 50	Male	Construction and syntetic food	11 to 50	4	Spain*	CEO
26	over 50	Female	Infrastructure Construction, Retail, Bank,Universities	> 500	>10	England	Chair

**Head Office in Netherlands and Spain—firms operating in the UK*

Source: Compiled by the authors

TABLE 3

Emergent Sub-themes and Themes

Quotations	Sub-themes	Themes
"The bigger problem is if you have homogeneous boards, in which all think the same, that is when it goes wrong. So it is the diversity of boards, of thinking in different angles that is creating a better decision making process. Technologies are helping somehow this process. The world changes quicker so that data we know today it is not always as relevant because tomorrow something else might happen." - Participant 8	Board composition	Information for decision-making
" There might be less human and biases coming between the data and the board members and have human voices."- Participant 5	Biases	
"A technology based decision was to build a product with mobile applications in the android and IOS and going native in both."- Participant 22	New Product Development	Blue sky strategizing
"I think the landscape changes so quickly that all of us must have a degree of technology skill and technology understanding. You cannot possibly stay on top of every example, every change, every development. So you have to rely on you know that the executive flow through and of course we use consultants all the time" - Participant 7	Skills	
"There are discussions on how data is prepared and ways we can increase either accuracy or clarity of the data, so to make it as clear on effective and efficient as possible. I would say there is always a discussion in the way data is presented on the board". - Participant 28	Data Governance	Board Stewardship
"I would like to think the executives, where I am chair, they have been incredibly well supported. But they have also been challenged and tested. So the board can reassure themselves that things have been done properly, that we have protected people that we have done as good as we can." - Participant 11	Relationship with Top Management Team	
" You could not create this business model without technology. So 30 years ago, the technology was not there to do it on, but would have been completely manual. It would be like using the charity shops that you see on the High Street." - Participant 16	Value Creation	Strategic Priorities
"Two other challenges that the business faces that are defined by the PESTEL forces, so to speak, medical forces being all the political, economic, social, technological, legal and environmental factors that the provision of information using technologies." - Participant 10	Sensemaking	

Source: Compiled by the authors

TABLE 4

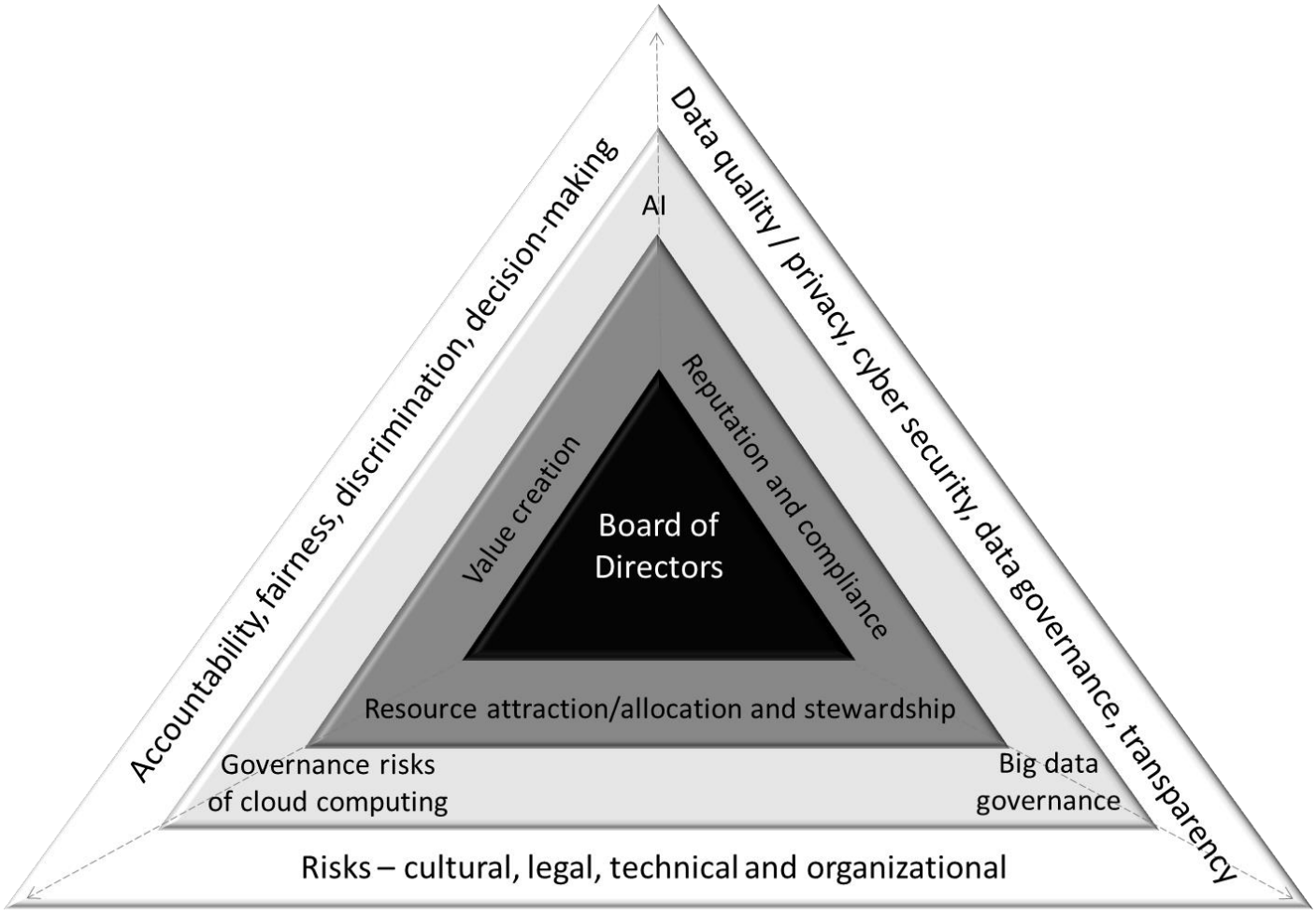
Contributions of this Study to the Resource Dependence Theory

Themes	Key findings	Contributions to Resource Dependency Theory
Information gathering for decision-making	Faster, unprecedented access to online information, from many sources, and about diverse topics; Real-time information; detailed information; board members are tailoring and complementing board packs. Non-executive directors having access to direct information can improve their contributions to value creation, as they will have more time to digest data, and exercise independent judgment.	Board of directors can use digital technologies as an instrument to reduce uncertainty, lower transaction costs by making information more readily available, lowering dependence among buyers and suppliers to develop alternatives more readily (Davis & Cobb, 2010b). Digital technologies impact to discussion on the perspectives that consider cooperation and information sharing are important for success of the value chain and the work of the board (Hillman, A. J., Cannella, A. A., & Paetzold, R. L. 2000); Information asymmetries enhancing power imbalance between directors (Tsang, E. W. K.1999). Digital instruments might be able to help directors collect crucial information from big data, aiding directors to execute their fiduciary and statutory obligations (Kamalnath, 2019). Digital technologies facilitate real-time dialogue between intended stakeholders and, therefore, become strategically important (Farrokhi et al., 2020). Business intelligence tools improve autonomy of non-executive directors. It extends propositions made by Sharpe (2013) that it is crucial, as decision-makers try to offset the effects of structural independence through interpersonal influences and cohesion. Digital technologies has the potential to balance information asymmetries, which can enhance the role of the board as a decision-making group that outperforms individual decision makers (Brodbeck et al., 2007).
Blue sky strategizing	Demand pressure from segmented customers to adopt a greater focus in use of digital technologies of company processes; Involvement for more customised experiences and contemporary perspectives, with a holistic understanding of customer, employee, operation, finance, as unique needs arising from digitalisation; The directors consider digital technologies enable exploitation of opportunities in a way that will create a value proposition tailored to each customer needs; Digital technologies leads to diversity of board discussions; new knowledge and skills in the boardroom vary from cybersecurity experts to former founders of technology companies.	Digital technologies as enablers of renaissance in boards through a focus on the resource provision, advice and counsel role of directors (Drees & Heugens, 2013; Hillman et al., 2000, 2009). The emergence of digital technologies confirming the need to change board composition as the environment of the firm changes significantly (Boeker and Goodstein, 1991; Lang and Lockhart, 1990; Salancik and Pfeffer, 1978). This finding about the need for board member's diversity of knowledge, experiences and skills expands discussions on gender (Miller and Triana, 2009) and ethnicity (Hillman et al., 2000) that may contribute to firms' performance (Crow et al., 2014).
Board stewardship	Granularity of visibility, which refers to board member access to operational evidences and information such as sales pipeline, people management, and project management. Board needs to spend more time within their organisation and less time on at a distant fiduciary duties. Digital technologies, accelerates the board role to drive governance in strategic directions, scanning of misalignment between strategy and execution.	Digital technologies are a moderator factor that alleviates the frictions that emerge from the monitoring role of the board; It extends the lens of resource dependency of board brings benefits to top management teams (Hillman, A. J., Withers, M. C., & Collins, B. J. 2009) through information in the form of advice and counsel, access to channels of information between the firm, environment, and legitimacy (Pfeffer and Salancik , 1978; Provan, 1980).
Scoping predictive strategic priorities	Digital technologies are critical to nurturing competitive advantage. Participants indicate prioritisation on investments that equip the board and the executive team to ingest intelligence and insight, and to some degree, predictive support capability. Board of director's have a responsibility to support upskilling of the workforce in digital skills. The ability the board of directors to identify and forge external partnerships to architecture capacities.	Adding to discussions about the importance of digital technologies driving both dimensions of interorganizational relationships, interdependence-dependence asymmetry, and joint dependence (Gulati & Sytch, 2007), as a means of reducing uncertainty, enhancing firms' performance, and multilateral and socially constructed relationships between companies. Expand the scope of the RDT to a holistic examination. Contributes to the central premise of the RDT that considers organizational survival lies on the ability to procure critical resources from external environment (Casciaro & Piskorski, 2005)

Source: Compiled by the authors

FIGURE 1

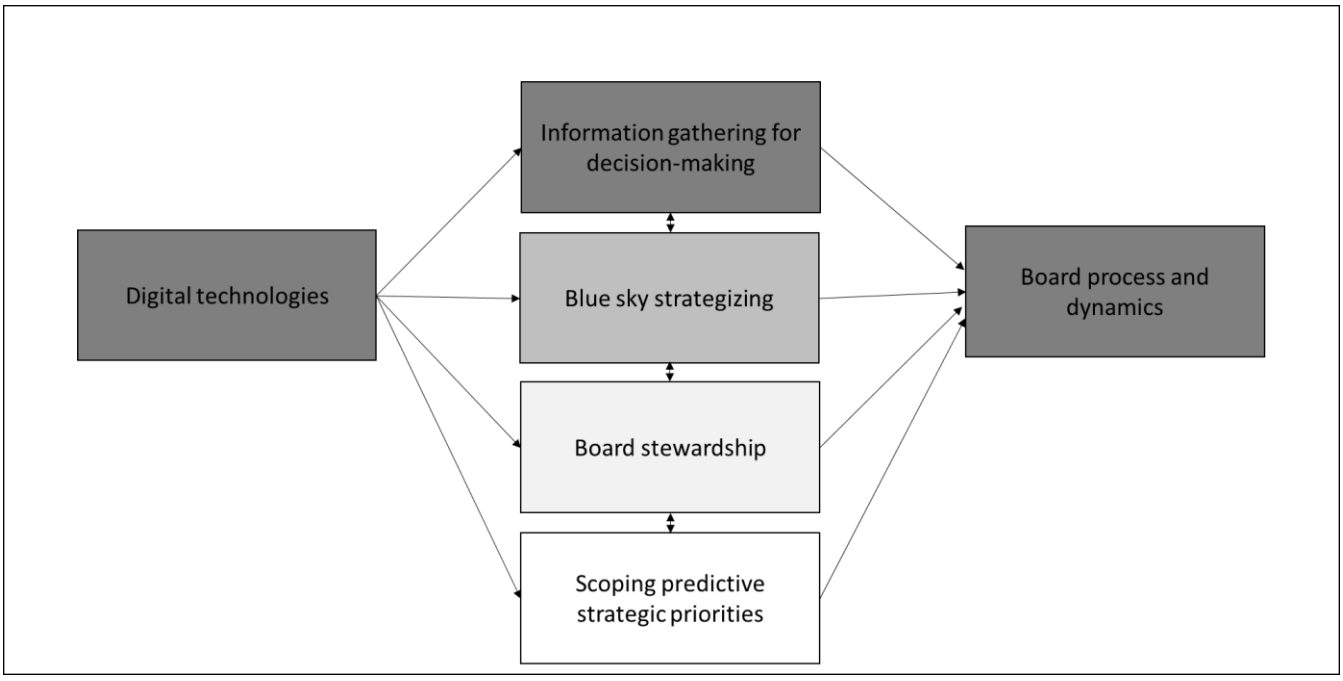
Influence of Digital Technologies on Firm Governance



Source: Compiled by the authors

FIGURE 2

Impact of Digital Technologies on Board Director's Work



Source: Compiled by the authors

APPENDIX A

Thematic questions

Theme 1: Context of board meetings and decisions

How would you describe the context in which your board meetings happen? (I am interested to know the environment, level of pressure, relationships between members, as many details you provide, the better).

Theme 2: Investments and Influences of digital technologies in your company, and in your industry (blockchain, artificial Intelligence, data Analytics, big data, machine learning, or any other digital communication tools) –Across the sector, are you aware of companies that effectively use AI systems, or other digital technologies? If yes, how these insurgents changed board level decision-making? Which area of operations do you think AI or other digital technologies could add the most value? Has this been explored? Do you foresee areas in which AI use could widen or enhance current revenue streams? How does the board keep abreast of AI and digital technologies developments, both in terms of AI services available and relevant legislation that could impact the company's use of AI (GDPR for example)? Does the board monitor the advancements of new technologies applied in the industry? Is there a Matrix or Framework the board follows to monitor, or and Index which steers digital value creation in the industry and for the company?

Theme 3: Influences and changes in the boardroom due to digital technologies – How Board Composition changed? How Communication between board members and Top Management Team changed? Does Access to information and information asymmetry improved, and how? How your decision-making changed due to digital technologies? Are you more analytical (data driven decisions – usage of big data)? Are the decisions made faster due to the technology? If yes, how? 1.How digital technologies help you to make sense of information, business requirements, competition, and financial KPIs in the creation of business differentiators for your company? What about the skills required from board members, are there any developments due to digital technologies? How the board strategies consider the level of engagement of board members and top management in skills developments – upskilling? Are there any changes in the relationship between board members, non-executives and Top Management due to digital technologies?

Theme 4: Digital Technologies and Strategic Value Creation through your value chain (Suppliers, Customers, Shareholders, Competitors) – Does the company has a program to educate and monitor value creation from investments in new technologies (AI, machine learning, data analytics, blockchain? How decisions about investment changed due technologies? How is return on investments in new technologies monitored?

Theme 5: Board Capabilities: What are the strategic priorities for the board due to advancements in digital technologies in 3 to 5 years from now? What are the major impacts of digital technologies in your company, and industry?

So how competent is your cyber risk governance framework? Is it robust enough to cope? Are your software and operating systems up-to-date? Where is your data kept? Would your organisation be able to continue ‘business as normal’ if you had a cybersecurity breach?

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