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Special Issue Editorial: Boards of Directors and the Governance of Technology

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EDITORS' COMMENTS

Special Issue Editorial: Boards of Directors and the Governance of Technology

Introductory Comments

The role that digital technology plays in an organization has fundamentally changed since computers were first deployed. Digital technologies are now defining business models, shaping customer experiences, driving intelligent automation, enabling new ways of working and managing, supporting the creation of insights and connecting ecosystems. Through its innovative application, technology can open up strategic opportunities and even disrupt whole industries. As organizations navigated the Covid-19 pandemic, their dependence on digital technologies became apparent; the reality is that most organizations would not survive for long without their IT systems. But, this elevated role of technology raises significant risks.

The failure of digital technology investments can have a material impact on an organization, sometimes even bringing it to collapse.¹ Cybersecurity attacks and data breaches,² critical

1 In June 2013, the U.K.'s Co-Operative Bank reported a capital shortfall of £1.5 billion, as a result of which subordinated bondholders were compelled to convert some or all of their debt to equity giving a controlling interest to the U.S. hedge funds holding its debt. A contributory factor was the bank's attempt to replace its core banking systems, a program that was canceled at a cost of almost £300 million. See Kelly, Sir C. *Failings in management and governance: Report of the independent review into the events leading to the Co-operative Bank's capital shortfall*, April 30, 2014, available at <https://www.iansnaith.com/wp-content/blogs.dir/8/files/2014/05/Kelly-Report.pdf>.

2 On 14 May 2021, the Irish health service suffered a major ransomware cyberattack that caused all of its IT systems nationwide to be shut down. It was the most significant cybercrime attack on an Irish state agency and the largest known attack against a health service's IT systems. See *Ransomware Attack on Health Sector – UPDATE*, Irish National Cyber Security Center, May 16, 2021, available at https://www.ncsc.gov.ie/pdfs/HSE_Conti_140521_UPDATE.pdf.

On September 7, 2017, Equifax, one of the largest credit reporting agencies in the world, reported a cybersecurity incident affecting 143 million consumers. This number eventually grew to 148 million—nearly half the U.S. population and 56% of American adults. See: 1) *How Equifax Neglected Cybersecurity and Suffered a Devastating Data Breach*, Permanent Subcommittee on Investigations, United States Senate, March 2019, available at <https://www.hsgac.senate.gov/wp-content/uploads/imo/media/doc/FINAL%20Equifax%20Report.pdf>; and 2) *Actions Taken by Equifax and Federal Agencies in*

project failures³ and outdated infrastructure can cause serious operational problems and reputational damage.⁴ Technical debt, like financial debt, can be expensive to fund but also limit an organization's operational and strategic choices.⁵

An organization's board of directors plays a crucial role in risk oversight by setting its risk appetite and developing a risk management framework to identify and manage ongoing risks, thereby ensuring resilience. But, at the same time, the board also has to ensure that the organization is set up to capitalize on strategic and operational

Response to the 2017 Breach, United States Government Accountability Office, August 30, 2018, available at <https://www.gao.gov/assets/gao-18-559.pdf>.

In June 2017, a cyberattack cost the Danish shipping giant A.P. Moller-Maersk between \$200 million and \$300 million. See "Cyberattack cost Maersk as much as \$300 million and disrupted operations for 2 weeks," *Los Angeles Times*, August 17, 2017, available at <https://www.latimes.com/business/la-fi-maersk-cyberattack-20170817-story.html>.

3 For example, German retailer Lidl abandoned its €500 million ERP implementation, stating that the strategic goals as originally defined by the investment proposal could not be achieved without having to spend more than it wanted. See Saran, C. "Lidl dumps €500m SAP project," *ComputerWeekly*, August 16, 2018, available at <https://www.computerweekly.com/news/252446965/Lidl-dumps-500m-SAP-project>.

4 In 2022, over the 2022 year-end holidays, Southwest Airlines suffered a meltdown that resulted in thousands of canceled flights and an \$800 million pretax hit for the fourth quarter. The primary cause was the airline scheduling software that couldn't handle numerous changes to crew assignments during severe winter weather. See Tufekci, Z. "The Shameful Open Secret Behind Southwest's Failure," *New York Times*, December 31, 2022, available at <https://www.nytimes.com/2022/12/31/opinion/southwest-airlines-computers.html>.

In September 2023, automotive manufacturer Volkswagen suffered a major IT outage, which caused most of its German plants to halt production. See Steitz, C. *Volkswagen restarts production after suffering major IT outage*, Reuters, September 28, 2023, available at <https://www.reuters.com/business/autos-transportation/volkswagen-major-it-issues-resolved-overnight-2023-09-28/>.

5 See: 1) "Why companies struggle with recalcitrant IT," *The Economist*, July 18, 2020, available at <https://www.economist.com/business/2020/07/18/why-companies-struggle-with-recalcitrant-it>; 2) Ramasubbu, N. and Kemerer, C. "Technical Debt and the Reliability of Enterprise Software Systems," *Management Science* (62:5), May 2016, pp. 1487-1510; and 3) Kruchten, P., Nord, R. and Ozkaya, I. "Technical Debt: From Metaphor to Theory and Practice," *IEEE Software* (29:6), November 2012, pp. 18-21. For a study of the impact of legacy technology on the operations of U.S. government agencies see *Information Technology: Federal Agencies Need to Address Aging Legacy Systems*, U.S. Government Accountability Office, May 25, 2016, available at <https://www.gao.gov/products/gao-16-468>.

opportunities. The board's key purpose is to safeguard the organization's sustainability and success by governing its affairs. In their decision making, boards have a legal and fiduciary responsibility to act in the best interests of the organization and its stakeholders as well as to comply with legal and regulatory requirements. Boards can also have very defined roles and responsibilities, often enshrined in legislation and regulations.⁶

As boards do in financial and other matters, such as mergers and divestments, in today's digital economy, they must assure themselves that executive management is doing the right things, in the right way and optimizing value with respect to digital technology.⁷ This responsibility is eloquently expressed by the South African corporate governance code:

"Technology governance and security have become critical issues. Technology is no longer an enabler; the systems created by an organization provide the platform on which it does business, and technology is now both the source of many of an organization's future opportunities and of potential disruption—an excellent example of how risk and opportunity are increasingly two sides of the same coin.

*Technology is now part of the corporate DNA. Thus the security of information systems has become critical. Technology governance and security should become another recurring item on the governing body's agenda."*⁸

However, governing digital technology poses a host of challenges for boards, including many board members' lack of digital literacy, the absence of globally accepted standards for reporting the progress of projects and the status of digital assets (like the International Financial Reporting Standards for financial reporting⁹),

difficulties in governing multi-year technology investments and inherent risks in technologies such as artificial intelligence (AI). Indeed, a fundamental characteristic of technology is that today's leading edge is tomorrow's legacy, presenting an ongoing challenge with attendant risks.

In this introduction to the special issue, we first provide an overview of the specific context for boards of directors, briefly exploring their function and role, together with the legislative and regulatory environment within which they operate. We do this not just to present the backdrop to the articles in the special issue but also to aid any researcher considering conducting IT governance board-level research, highlighting the particular nuances of boards and their responsibilities. Having examined how boards have historically dealt with technology, we explore some of the technology-governance issues that all boards face. We then identify gaps in our understanding of how boards can be more effective in their technology-governance role. After describing the editorial process for the special issue and the articles included in it, we end with some advice for researchers seeking to research this emerging topic.

Guest Editors' Insights

Fiduciary Accountabilities of Boards

Boards are not usually directly involved in the day-to-day running of an organization; this is the role of the CEO and other chief officers (CFO, CIO, COO, CMO etc.), though some of these may also be members of the board as executive directors (as opposed to non-executive directors). Governance practices need to align the goals of the organization's owners or sponsors with those of management. In the commercial sector, shareholders play a key role in shaping the direction of the company by electing the board of directors whose role is to ensure that the company's decisions, from major transactions to strategy, are in the best interests of the shareholders. In the public sector, directors are appointed by the government, often through a competitive process. Though the public sector

set of accounting rules for constructing the financial statements of companies. They are intended to make these statements consistent, transparent and easily comparable around the world.

6 For research on what boards actually do rather than what they should do and for the views of directors and their work on boards, see Boivie, S. M., Withers, C., Graffin, S. D. and Corley, K. G. "Corporate Directors' Implicit Theories of the Roles and Duties of Boards," *Strategic Management Journal* (42:1), June 2021, pp. 1662-1695.

7 Peppard, J. and Thorp, J. "What Every Business Leader Should Know and Do About Digital," *Cutter Business Technology Journal* (30:1), February 2017, pp. 6-13.

8 King IV: Report on *Corporate Governance for South Africa 2016*, Institute of Directors, Southern Africa, 2016, p. 6.

9 The International Financial Reporting Standards (IFRS) are a

Box 1: Common Types of Board Structures

Some of the more common types of board structures are:

- U.S.-style unitary board: independent non-executive directors plus the CEO, who may also chair the board
- U.K.-style unitary board: a majority of independent directors with a non-executive chair and usually two or more executive directors
- Nordic-style supervisory board: containing only non-executive directors
- German, Benelux and French-style supervisory board: a mixture of non-executive directors and employee representatives elected by employees. The supervisory board provides oversight and monitoring over a management board.

In some countries, such as France, Italy and the Netherlands, company law permits companies to choose between two or even three alternative board structures. In some cases, a two-tier board—a management or executive board and a supervisory board—is mandatory if a company is of a certain size or has a certain number of employees.

Family-controlled businesses and state-owned enterprises often have board structures that reflect their unique circumstances, while conforming to listed company governance requirements where relevant. This is also the case for private-equity-owned businesses, which might have just one or a small number of non-executive directors until preparation for a listing, which will then involve building an independent board.

The role of the non-executive director in an organization where there is a majority shareholder may be quite different from that of a director in a listed company with a broad shareholder base, particularly if the majority shareholder has a seat on the board. The role will likely be advisory as decision making is unlikely to be by consensus because the majority owner will always have the final say.

appointment process may differ, directors' responsibilities are largely the same as their counterparts in the commercial sector.

Different systems of governance operate in different jurisdictions and result in different types of board structures (see the Box 1 for a summary). The dynamics of the board and the responsibilities of directors will vary according to the board structure in operation. The role of the board may also be slightly different in a state-owned or family-controlled business.

Overall, the board of directors plays a critical role in ensuring that the company is operating responsibly¹⁰ and effectively and that it is delivering value to its shareholders and other stakeholders. In representing the interests of shareholders, key roles include:

- Hiring and overseeing senior management and their performance, including their compensation
- Together with management, setting the overall direction and strategy

¹⁰ Corporate responsibility has expanded over the last 20 years from social responsibility to now include the Environmental, Social and corporate Governance (ESG) issues that companies have to take into account in decision making. Many companies now produce ESG reports.

of the company¹¹ and ensuring that management is taking the necessary steps to achieve strategic objectives

- Monitoring financial performance and ensuring that the company is managing its finances responsibly
- Ensuring compliance with legal and ethical standards
- Providing guidance and support to management as needed, particularly in respect to key decisions or challenges.

The structure, responsibilities and powers given to a board of directors are determined by the bylaws of a company or organization. These determine, for example, the number of board members, how they will be elected and how frequently the board will meet. Though

¹¹ Whether a board should set strategy is often a point of debate. Roger Martin makes a convincing argument against a board setting the strategy: "If the board feels it needs to do strategy for the company, it is *prima facie* evidence that it should fire the CEO. If a board that meets just a few days a year can do a better job of setting strategy than the CEO who is in the business 24/7, then the board has the wrong CEO. The right approach is an iterative process in which the CEO is in charge, because it is the CEO's job to formulate strategy, but the CEO wisely gets the maximum amount of advice from the board – assuming that the board has useful insights." See Martin, R. "The Board's Role in Strategy," *Harvard Business Review*, December 28, 2018, available at <https://hbr.org/2018/12/the-boards-role-in-strategy>.

best practices exist, there's no set structure for a board of directors. The composition and role of the board of directors will depend largely on the industry, stage of development, funding and organizational needs.

Unlike most C-suite roles, the role of a board director is also shaped by regulations and legislation. Most countries will have specific laws governing the operations of companies, including taxation obligations, that directors need to ensure are adhered to. Certain industries, for example financial services, medical devices and pharmaceutical, are governed by regulations that specify rules that must be adhered to. In banking, for example, "fitness and propriety" rules mean that some non-executive directors may need regulatory pre-approval for their designated board roles, including the chairman, chair of the audit committee and chair of the risk committee.¹² In Germany, management board members of a bank cannot be appointed without the approval of BaFin, the Federal Financial Supervisory Authority.

In some countries, there are laws giving rights to shareholders over board decisions. Australia, for example, has a "two strikes" law giving shareholders more power to address what they may determine as excessive executive pay packages.¹³ If 25% or more of votes cast at two consecutive annual general meetings of an Australian securities exchange listed company oppose the adoption of a remuneration report, then the company must formally respond by asking all board members, except the managing director, to stand down for re-election within 90 days. In addition, key management personnel whose remuneration is disclosed in the company's remuneration report are excluded from voting because they have a material interest in the outcome.

Many jurisdictions also have specific governance codes, a set of principles and leading practices, that also shape the governance of an organization.¹⁴ The philosophy of these codes

varies from an "apply and explain" approach to the more commonly used "comply or explain" approach. Adoption of any code is voluntary unless prescribed by law or stock exchange listing requirements. For example, the first version of the U.K.'s Corporate Governance Code (often referred to as "the Code") was published in 1992 by the Cadbury Committee.¹⁵ It defined corporate governance as "the system by which companies are directed and controlled," noting that "Boards of directors are responsible for the governance of their companies. The shareholders' role in governance is to appoint the directors and the auditors and to satisfy themselves that an appropriate governance structure is in place."

Over the years, the Code has been revised and expanded to take account of the increasing demands on the U.K.'s corporate governance framework. At the heart of the current version is a set of principles that emphasize the value of good corporate governance to long-term sustainable success.¹⁶ By applying the principles, companies are expected to demonstrate throughout their reporting how the governance of the company contributes to its long-term sustainable success and to wider objectives. Achieving this depends crucially on the way boards and organizations apply the spirit of the principles. The Code does not set out a rigid set of rules; instead, it offers flexibility through the application of principles and through "comply or explain" provisions and supporting guidance. It is the responsibility of boards to use this flexibility wisely and of investors and their

12 See Blinco, S., Galbarz, M., Hohl, S. and Zamil, R. *FSI Insights on policy implementation No 25: Bank boards – a review of post-crisis regulatory approaches*, Financial Stability Institute and Bank for International Settlements, March 2020, available <https://www.bis.org/fsi/publ/insights25.pdf>.

13 *Australian Government, Corporate Amendment (Improving Accountability on Director and Executive Remuneration) Act 2011*, available at <https://www.legislation.gov.au/Details/C2011A00042>.

14 See, for example: 1) *The UK Corporate Governance Code*,

Financial Reporting Council, July 2018; and 2) *King IV: Report on Corporate Governance for South Africa 2016*, op. cit., 2016.

In France, almost all large listed companies abide by the French Association of Private Enterprises (AFEP) – Movement of French Enterprises (MEDEF) Code.

15 *The Financial Aspects of Corporate Governance*, The Committee on the Financial Aspects of Corporate Governance and Gee Publishing, December 1992, available at <https://www.icaew.com/-/media/corporate/files/library/subjects/corporate-governance/financial-aspects-of-corporate-governance.ashx?la=en>.

16 *The UK Corporate Governance Code, Financial Reporting Council, July 2018. See also Key Agreed Principles to Strengthen Corporate Governance For U.S. Publicly Traded Companies*, National Association of Corporate Directors, April 2011, available at [xx MIS Quarterly Executive | December 2023 \(22:4\)](https://www.nacdonline.org/all-governance/governance-resources/governance-research/future-of-the-american-board---reports/key-agreed-principles/#:~:text=The%20Key%20Agreed%20Principles%20to,improve%20the%20internal%20functioning%20of; these principles provide guidance for corporate leaders on improving the internal functioning of America's boardrooms.</p>
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advisors to assess differing company approaches thoughtfully.

Over the years, the courts have often had to decide if a company's board of directors acted appropriately, but have been reluctant to second guess the business decisions of a board even if those decisions have had disastrous outcomes. However, courts have generally recognized that boards have certain duties or responsibilities to shareholders. These fiduciary duties include the *duty of care* and the *duty of loyalty*. Essentially, the former mandates that the board must be acting in good faith for the benefit of the company. Board members must believe that the actions they are taking are in the company's best interest given a reasonable investigation of available options. The latter prescribes that board members may not act in their own best interest or engage in self-dealing while making decisions or taking actions on behalf of the company.

Board responsibilities are sometimes delegated to specific board committees such as audit, compensation, and nominating and governance. These committees are sub-groups of directors who advise the board on a specific area.¹⁷ Occasionally, external experts are invited to serve on a board committee, particularly if they bring specific experience, skills, contacts or knowledge. Though it is unusual for committees to have decision-making authority, they can help the board deal with complex or numerous issues more efficiently. For example, the primary purpose of the audit committee is to provide oversight of the financial reporting process, the audit process, the company's system of internal controls, and compliance with laws and regulations. The nominating and governance committee makes recommendations for new board members, with the nominations being voted on at the shareholder meeting.

In many jurisdictions, specific committees are now required by law or stock exchange rules. For example, in the United States, the Sarbanes-Oxley Act of 2002 requires all U.S.-based publicly traded firms to have an audit committee. The New York Stock Exchange and NASDAQ require

all listed company boards to have compensation and nominating committees. Requirements for membership of these committees are also prescribed.

Information Technology and Boards

Prior to the Internet opening up fully for commercial activity in the early 1990s, it would be fair to say that governance of IT by boards was very limited, if practiced at all.¹⁸ Indeed, few C-suites would even have paid much attention to IT. If boards did exercise oversight, it was perhaps the tracking of a major technology investment like enterprise systems that companies were beginning to roll out at that time or a significant business process re-engineering initiative. While there were examples of leading companies striving to gain a competitive advantage from their technology investments, the vast majority of organizations saw IT as an operational issue, falling under the purview of management. Outsourcing had elevated IT as a risk discussion in some boards, though the vast majority considered outsourcing as eliminating what was perceived as the "IT problem."

Despite the long history of information technology being promoted as a source of competitive advantage,¹⁹ it was the Internet that really raised the potential role of tech for business, starting with e-commerce opportunities, and fueled the beginnings of a conversation about what would eventually be called "digital disruption"²⁰—a concept that captured the interests of some boards. For many organizations, fears about the Year 2000 (Y2K) software problem, and the potential threat to their businesses if the problem wasn't addressed, saw this issue appear on board agendas for several years leading up to the new millennium.

18 Grindley, K. *Managing IT at Board Level: The Hidden Agenda Exposed*, Pitman, 1991.

19 See: 1) Porter, M. and Millar, V. "How Information Gives You Competitive Advantage," *Harvard Business Review* (63:4), July 1985, pp. 149-160; and 2) McFarlan, F. W. "Information Technology Changes the Way You Compete," *Harvard Business Review* (62:3), May 1984, pp. 98-103.

20 Though digital disruption is currently a hot topic, we would like to dial down the discussions. Julian Birkinshaw, for example, presented research in 2022 on the world's biggest firms in which he contended that "digital disruption is real" but that it is "less destructive than you might think." He presented sales data showing that 483 of the 500 firms in the Fortune 500 "have been around, "in some shape or form," since 1995. See Birkinshaw, J. "How Incumbents Survive and Thrive," *Harvard Business Review*, January-February, 2022.

17 For a review of the research on board committees, see Kolev, K. D., Wangrow, D. B., Barker, V. L. and Schepker, D. J. "Board Committees in Corporate Governance: A Cross-Disciplinary Review and Agenda for the Future," *Journal of Management Studies* (56:6), March 2019, pp. 1138-1192.

The Sarbanes-Oxley Act and other regulatory and legal compliance requirements that emerged in the early 2000s, also resulted in IT finding its way onto board agendas, albeit not directly, but with compliance as a surrogate for technology, as many compliance processes were automated using technology.²¹

However, an increasing number of boards really began to pay more attention to IT with the introduction of the iPhone and the emergence of the Internet of Things (IoT), coupled with an expanding conversation about digital business models driven by these technologies. Additionally, some very public cybersecurity breaches and the negative impact these had on the business of the affected companies highlighted cybersecurity as an issue that boards need to be informed about.²² And the ongoing concern about personal data and the more recent GDPR²³ legislation with its significant fines, have also alerted directors of the need to include this issue in board discussions. Both fit very well on a board agenda as risk is central to the language of boards.²⁴ Moreover, recent advances in AI have raised new risk issues, presenting specific challenges for boards.²⁵

However, it would also be fair to say that boards have usually been pushed by regulators to provide the oversight that we would argue is paramount in a digital economy. The risks

of IT outsourcing have long been highlighted by financial services regulators²⁶ and are now covered by regulations.²⁷ The significant financial consequence of non-compliance with the GDPR has ensured the attention of boards. In the U.S., the Securities and Exchange Commission has adopted rules requiring companies to disclose material cybersecurity incidents they experience and to report on an annual basis material information regarding their cybersecurity risk management, strategy and governance.²⁸ In Australia, the independent government body responsible for regulating financial services, the Australian Securities and Investments Commission, has indicated that it will seek to make an example of board directors who are ill-prepared for cyberattacks, by taking legal action against compromised companies that did not take sufficient steps to protect their customers and infrastructure from hackers.²⁹

Despite all these developments, research exploring board governance of IT is sparse.³⁰ Most of the research on the governance of IT has been conducted at the executive committee level, where it tends to focus on structures, processes, decision rights and mechanisms of effective governance.³¹ Even ISO/IEC 38500,

21 Damianides, M. "Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance," *Information Systems Management* (22:1), December 2005, pp. 77-85.

22 For example, the Australian Institute of Company Directors has produced questions that directors should be asking about cybersecurity. See *Cyber Security Governance Principles*, Australian Institute of Company Directors, October 2022, available at <https://www.aicd.com.au/risk-management/framework/cyber-security/cyber-security-governance-principles.html>.

23 The General Data Protection Regulation (GDPR) is the toughest privacy and security law in the world. It was drafted and passed by the European Parliament and came into effect on May 25, 2018. The GDPR imposes obligations on organizations anywhere that target or collect data related to people in the European Union (EU) and levies harsh fines for those that violate its privacy and security standards, with penalties reaching into the tens of millions of euros. See *What is GDPR, the EU's new data protection law?* available at <https://gdpr.eu/what-is-gdpr/>.

24 For a study of risk and IT, see Parent, M. and Reich, B. H. "Governing Information Technology Risk," *California Management Review* (51:3), April 2009, pp. 134-152.

25 See: 1) Silverman, K. "Why Your board Needs a Plan for AI Oversight," *MIT Sloan Management Review*, October 19, 2020; and 2) Berndston, O. *Artificial Intelligence for Boards – Gearing up for the Future of Business*, Institute for Applied Artificial Intelligence, available at <https://aai.frb.io/assets/logos/Applying-AI-Artificial-Intelligence-for-Boards-vf-4.pdf>.

26 At the British Bankers Association Banking Supervision Conference in June 2000, Howard Davis, then Chairman of the Financial Services Authority, the precursor to the U.K. regulator the Financial Conduct Authority (FCA), said: "It is absolutely vital that outsourcing does not involve loss of control over the quality and performance of the function. ... We have come across one or two awkward cases recently where banks have established outsourcing relationships which leaves them far too little control over the performance of functions carried out on their behalf, creating reputational damage and, in the extreme, threatening the viability of the whole business."

27 For example, in Germany the Federal Financial Supervisory Authority (BaFin) has guidelines governing IT outsourcing arrangements that institutions under its supervision must adhere to.

28 *SEC Adopts Rules on Cybersecurity Risk Management, Strategy, Governance, and Incident Disclosure by Public Companies*, Securities and Exchange Commission Press Release, July 26, 2023, available at <https://www.sec.gov/news/press-release/2023-139>.

29 Smith, P. and Mizen, R. "ASIC to Target Boards, Execs for Cyber Failures," *Financial Review*, September 19, 2023, available at <https://www.afr.com/technology/asic-to-target-boards-execs-for-cyber-failures-20230913-p5e4bf>.

30 For a review of the available literature, see Caluwe, L. and De Haes, S. "Board Level IT Governance: A Scoping Review to Set the Research Agenda," *Information Systems Management* (36:3), May 2019, pp. 262-283.

31 For example, see: 1) Wu, S. P.-J., Straub, D. and Liang, T-P. "How Information Technology Governance Mechanisms and Strategic Alignment Influence Organizational Performance: Insights from a Matched Survey of Business and IT Managers," *MIS Quarterly*, (39:2), June 2015, pp. 497-518; and 2) Jafarijoo, M. and Joshi, K. D. "IT Governance: Review, Synthesis, and Directions for Future

the international standard for the governance of IT, is primarily concerned with executive-level governance. Perhaps not unexpectedly, studies show that boards are not as involved in the governance of technology as they should be.³² Even when they are having conversations about technology, it may not always be the right conversation.³³ Given the dependence that organizations have on IT today, and its strategic role, this points to a gap in directors fulfilling their duties as board members. Indeed, research has pointed to the performance benefits of board-level governance of IT.³⁴ There is also research that shows a positive impact on value creation by having a CIO on the board.³⁵

Board-level governance of technology has defensive and offensive components, focusing respectively on risk and value realization. Governance is concerned with monitoring managerial decisions as they relate to digital technologies, as well as policies and procedures for controlling IT resources.³⁶ The board's oversight function aims to reduce managerial inefficiencies and avoid failures that affect the business.³⁷ How effectively the board carries out

this function hinges on its level of digital literacy, derived from the governance mechanisms the board employs and their traits. These mechanisms include board directors' digital literacy (knowledge, experience, skills, education and so on), the presence of a CIO or another senior IT executive on the board, and board-level IT committees.

Issues Boards Face and IT Governance Implications

In providing oversight and in scrutinizing decisions, all boards face challenges with risky decisions like mergers, acquisitions, opening new plants, launching new products, and entering new markets and regions. Research³⁸ that has studied boards has identified concerns that all boards need to be cognizant of and that have implications for the governance of technology. Before exploring these implications, we first highlight the lack of digital literacy of many board members.³⁹

Unlike basic financial competence, board members are generally not expected to have a working knowledge of what it takes to be successful with exploiting data and technology; many governance codes and educational programs for directors still only give cursory attention to technology, if at all. Perhaps as a consequence, the latest research shows that, on average, only a quarter of FTSE 250 company boards in the U.K. have a director with expertise

Research," *Proceedings of Americas Conference on Information Systems*, 2021, available at https://aisel.aisnet.org/amcis2021/strategic_is/strategic_is/5.

32 For an early study see Huff, S. L., Maher P. M. and Munro, M. C. "Information Technology and the Board of Directors: Is There an IT Attention Deficit?" *MIS Quarterly Executive* (5:2), June 2006, pp. 55-68.

33 Milicá, L. and Pearson, K. "Boards Are Having the Wrong Conversations About Cybersecurity," *Harvard Business Review*, May 2023, available at <https://hbr.org/2023/05/boards-are-having-the-wrong-conversations-about-cybersecurity>.

34 See: 1) Benaroch, M. and Chernobai, A. "Operational IT Failures, IT Value-Destruction, and Board-Level IT Governance Changes," *MIS Quarterly* (41:3), March 2017, pp 729-762; 2) Turel, O. and Bart, C. "Board-level IT Governance and Organizational Performance," *European Journal of Information Systems*, (23:2), March 2014, pp 223-239; and 3) Turel, O., Liu, P. and Bart, C. "Board-Level Information Technology Governance Effects on Organizational Performance: The Roles of Strategic Alignment and Authoritarian Governance Style," *Information Systems Management* (34:2), January 2017, pp. 117-136.

35 Bandodkar, N. R. and Grover, V. "Does it Pay to Have CIOs on the Board? Creating Value by Appointing C-level IT Executives to the Board of Directors," *Journal of the Association for Information Systems* (23:4), January 2022, pp. 838-888.

36 See: 1) Andriole, S. J. "Boards of Directors and Technology Governance: the Surprising State of the Practice," *Communications of the Association for Information Systems* (24), March 2009, pp. 373-394; and 2) Mähring, M. "The Role of the Board of Directors in IT Governance: A Review and Agenda for Research," *Proceedings of the 2006 Americas Conference on Information Systems (AMCIS)*, 2006, available at <http://aisel.aisnet.org/amcis2006/377>.

37 Hillman A. J. and Dalziel, T. "Boards of Directors and Firm Performance: Integrating Agency and Resource Dependence Per-

spectives," *Academy of Management Review* (28:3), July 2003, pp. 383-396.

38 See: 1) Fama, E. and Jensen, M. "Separation of Ownership and Control," *Journal of Law and Economics* (26:2), June 1983, pp. 301-325; 2) Byrd, J. W. and Hickman, K. A. "Do Outside Directors Monitor Managers? Evidence From Tender Offer Bids," *Journal of Financial Economics* (32:2), October 1992, pp. 195-221; 3) Davis, J. H., Schoorman, F. D. and Donaldson, L. "Towards a Stewardship Theory of Management," *Academy of Management Review* (22:1), January 1997, pp. 20-47; 4) Perry, T. and Shivdasani, A. "Do Boards Affect Performance? Evidence From Corporate Restructuring," *Journal of Business* (78:4), July 2005, pp. 1403-1432; and 5) Kosnik, R. D. "Green mail: A study of Board Performance in Corporate Governance," *Administrative Science Quarterly* (32:2), June 1987, pp. 163-185.

39 See: 1) Has the elephant finally left the room? Is "talking tech" no longer taboo in UK boardrooms? *The Digital Board*, May 2023, available at <https://static1.squarespace.com/static/60ed6e95f3821e239889b382/t/64523f90ec4141607a5d7603/1683111830999/%28UK%29+Has+the+elephant+finally+left+the+room.pdf>; 2) Cheng, Y.-J. Frangos, C. and Groysberg, B. "Is Your C-Suite Equipped to Lead a Digital Transformation?" *Harvard Business Review*, March 12, 2021; 3) Weill, P., Apel, T., Woerner, S. L. and Banner, J. S. "It Pays to Have a Digitally Savvy Board," *MIT Sloan Management Review*, Spring 2019.

in technology.⁴⁰ A very surprising result came out of the sector breakdown in this research: only 19% of financial services companies have appointed a technology leader to their boards (the lowest percentage of any industry). This is worrying, given that financial services companies are highly regulated and are essentially data businesses that are heavily technology-dependent.

The lack of digital literacy of board members means that few directors will fully understand the implications of the information being presented or know if it is lacking, misleading or incomplete. This problem is exacerbated because of the information asymmetry in reports and documents presented to the board.⁴¹ Management collates and provides the board with information that is necessarily a subset of all the available data. This means that board members depend on the executive team to decide what information is presented and how it is presented to enable them to assess opportunities and risks and to form a view. Of course, the board can request additional information, but this assumes that board members are literate concerning technology and know the questions to pose.

There are globally accepted standards for handling and reporting financial transactions—for example, The International Financial Reporting Standards (IFRS) mentioned earlier. Indeed, companies are mandated to produce annual financial statements presenting their financial position. Most regulatory regimes require that these financial statements are independently audited, with the auditors required to attest that they represent a true and fair representation of the financial affairs of the company, are free from material misstatements and faithfully represent the financial performance and position of the business.

40 Digital Board, op. cit., May 2023.

41 See 1) Ajina, A., Sougne, D. and Laouti, M. "Do Board Characteristics affect Information Asymmetry?" *International Journal of Academic Research in Business and Social Sciences* (3:12), December 2013, pp. 660-675; 2) Tian, J. J. "Board Monitoring and Endogenous Information Asymmetry," *Contemporary Accounting Research* (31:1), October 2012, pp. 136-151; 3) Goh, B. W., Lee, J., Ng, J. and Ow Yong, K. "The Effect of Board Independence on Information Asymmetry," *European Accounting Review* (25:1), 2016, pp. 155-182; and 4) Elbadry, A., Gounopoulos, D. and Skinner, F. *Governance Quality and Information Asymmetry*, Financial Markets Institutions & Instruments, New York University Salomon Center and Wiley Periodicals, 2015.

Moreover, auditors also comment on whether they believe that the company can continue to trade as a "going concern" and has the resources needed to continue operating indefinitely unless there is evidence to the contrary.

There are no such global, or indeed generally accepted, frameworks or standards defining how the performance of IT, the status of IT projects, or indeed the results of digital technology investments, should be prepared and presented. If a non-executive director is a member of several boards, it is very likely that he or she will see reports on technology that will likely contain different information and be constructed in vastly different ways. This can be problematic for board members in making any assessment of technology-related risk.

Part of the problem is the lack of a universally agreed language, something that has plagued the whole area of information technology. In our research, we have also observed in some organizations a culture of only presenting positive information to the board, leaving members with a distorted view of the reality of a situation. In contrast, not wishing to be seen to be withholding information, some leadership teams present the board with so much information that it is overwhelmed and struggles to spot relevant risks.

Another contributory factor is that, because boards meet only a few times per year, they effectively "dip in and out" of what is happening in their organizations and may therefore lose the thread of critical issues and decisions.⁴² Many IT investments require a multi-year program of work to implement them. Governance codes place limits on director tenure, meaning board turnover can sometimes result in organizational "memory loss" and board members not having a complete picture of why specific decisions were made. Issues can be presented in isolation, perhaps over multiple board meetings, which may suggest that they are surmountable, yet when considered together can pose a serious risk.

Boards also have to deal with many issues and decisions and are likely to have several important

42 See: 1) Fich, E. M. and Shivdasani, A. "Are Busy Boards Effective Monitors?" *Journal of Finance* (61:2), April 2006, pp. 689-724; and 2) Francis, B. B., Hasan, I., Koetter, M. and Wu, Q. "Do Corporate Boards Matter During the Current Financial Crisis?" *Journal of Financial Research* (35), April 2012, pp. 521-552.

items on their agendas at any one time. Given that a board typically meets infrequently with limited meeting time, even if technology appears on the agenda, it will likely not get the attention and oversight that it probably deserves. In addition to being a recurring item on a board's agenda, other models for more comprehensive board engagement with technology include establishing a technology subcommittee or a temporary and/or advisory committee, or informal engagement on select topics.⁴³ Increasingly, the CIO is being invited to join the organization's technology committee or is engaging directly with individual board members and the board.⁴⁴

Even with digitally savvy directors and a technology committee, board dynamics can also influence a board in performing its responsibilities. The effectiveness of boards depends on having the right mix of personalities and expertise, facilitated by a culture of mutual respect, trust and, importantly, constructive dissent.⁴⁵ Research has identified particular areas that can impact board performance, particularly board dynamics.⁴⁶

With an increased emphasis on accountability, there is a need for organizations to comply with an expanding amount of regulatory and legal requirements, many of which impact technology (e.g., privacy, environmental). Moreover, the continuity and reliability of most primary and

secondary business processes rely heavily on digital assets. The growing emphasis on Environmental, Social, and Governance issues is putting pressure on boards to provide transparency on how digital assets are governed in their organizations. Voluntary disclosure theory predicts that organizations can improve their liquidity and valuation through providing better information on the way the organization is governed.⁴⁷

Though still immature, we observe that corporate governance codes are gradually including extended views on corporate governance accountabilities. For example, the King IV Corporate Governance Code in South Africa defines key principles and guidelines on how boards should provide oversight and control of digital technologies.⁴⁸ Some national governance bodies have also produced lists of questions that board members should ask with respect to digital technologies.⁴⁹

Editorial Process for the Special Issue

Given the many challenges and opportunities that digital technology presents for boards, we are delighted to introduce our special issue on "Boards of Directors and the Governance of Technology." Below, we describe the editorial process that led to this special issue and provide summaries of the articles included in it. We also highlight the difficulties faced when conducting board-level research and propose a way forward for more practice-oriented IS research.

Our initial call for papers was announced at the beginning of 2022. We invited submissions for practice-oriented research studying:

- The evolving role of boards in digital transformation

43 Forrest, W., Li, S., Tamburro, I. and Van Kuiken, S. "How effective boards approach technology governance," *McKinsey Digital*, September 15, 2022, available at <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/how-effective-boards-approach-technology-governance>.

44 Khalid, K., Leatherberry, T. and McCormack, D. *Technology and the Boardroom: a CIO's Guide to Engaging the Board*, Harvard Law School Forum on Corporate Governance, March 11, 2019, available at <https://corpgov.law.harvard.edu/2019/03/11/technology-and-the-boardroom-a-cios-guide-to-engaging-the-board/>.

45 See, for example: 1) De Smet, A., Lund, F., Weiss L. and Nimocks, S. *Boards and decision making*, McKinsey and Company Podcast, April 8, 2021, available at <https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/boards-and-decision-making>; 2) O'Kelley, R. III and Neal, P. J. "Top Boards Do These 4 Things Differently," *Harvard Business Review*, February 10, 2020; and 3) Sonnenfeld, J. A. "What Makes Great Boards Great," *Harvard Business Review*, September, 2002.

46 See: 1) Renjie, R. W. and Verwijmeren, P. "Director Attention and Firm Value," *Financial Management* (49:2), December 2018, 2020, pp. 361-387; 2) Field, L., Lowry, M. and Mkrtchyan, A. "Are Busy Boards Detrimental?" *Journal of Financial Economics* (109:1), July 2013, pp. 63-82; 3) Fich, E. M. and Shivdasani, A., op. cit., April 2006; and 4) Schwartz-Ziv, M. and Weisbach, M. "What Do Boards Really Do? Evidence from Minutes of Board Meetings," *Journal of Financial Economics* (108:2), March 2012, pp. 349-366.

47 Healy, P. and Palepu, K. G. "Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature," *SSRN Electronic Journal* (31:1-3), 2001, pp. 405-440.

48 Butler, R. and Butler, M. J. "Beyond King III: Assigning Accountability for IT Governance in South African Enterprises," *South African Journal of Business Management* (41:3), September 2010, pp. 33-45.

49 See, for example: 1) Baker, G. S. *20 Questions Directors Should Ask About IT*, 2nd Edition, Canadian Institute of Chartered Accountants, 2012; and 2) Bart, C. and Turel, O. "IT and the Board of Directors: An Empirical Investigation into the 'Governance Questions' Canadian Board Members Ask about IT," *Journal of Information Systems* (24:2), November 2010, pp. 147-172.

- The role of board advisors and their effectiveness
- How to increase the digital savviness of boards
- Overcoming the challenges of information asymmetry between boards and executive management
- Balancing the entrepreneurial drive of executives for innovation and speed while ensuring prudent control
- Identifying, assessing, monitoring and mitigating risk
- Reporting the performance and status of digital technologies
- Risk assessment of IT assets
- Assessing technical debt
- The relationship between the board and management
- Characteristics of boards that influence successful board-level governance of digital technology
- Practices that can be used to implement successful board-level IT governance
- Emerging structures, processes and relational mechanisms that boards of directors use to engage in the governance of digital technology
- Board roles in influencing corporate digital innovation, resilience and sustainability
- Impact of board-level IT governance on digital innovation, quality of IT assets and IT capabilities.

Subsequently, we received 19 extended abstract submissions for possible presentation at a pre-ICIS paper development workshop. Each submission received written feedback from the special issue guest editors. At the workshop in Copenhagen on December 10, 2022, ten accepted extended abstracts were discussed and received feedback from the special issue guest editors, *MIS Quarterly Executive* editorial board members and the workshop audience. By March 1, 2023, we had received eight manuscripts, seven of which were sent for review. Ultimately, two papers were accepted.

Special Issue Articles

The first article by Jeff Proudfoot, Alex Cram, Stuart Madnick and Michael Codden focuses on cybersecurity risk. We have highlighted

above that boards of directors are increasingly responsible for guidance and oversight on cybersecurity risk, and particularly for ensuring compliance with directives from regulators, but are often unequipped to do so. This critically important mandate introduces novel challenges to what is already a complex governance environment. The reported research draws on in-depth interviews with board members and executives, and describes four core cybersecurity challenges that boards encounter. The authors then propose ten recommended actions that boards can undertake in response to these challenges. The authors suggest that boards taking these actions can optimize their ability to provide meaningful, effective governance to address cybersecurity risks.

The second article, written by Benjamin van Giffen and Helmuth Ludwig, explores how boards of directors address governance issues relating to artificial intelligence (AI). The authors find that, though AI is currently receiving a lot of attention (even from non-technical audiences), boards are lagging in making the governance-related implications part of their agendas. Through a series of interviews, workshops and panel discussions with board directors, the authors identify four groups of AI-governance issues that boards should focus on:

1. Risk considerations (e.g., are reputational and ethical risks addressed?)
2. Strategy (e.g., to what extent does AI enable or require a competitive repositioning or the creation of entirely new business models?)
3. Capital expenditures (e.g., does the budget ensure building both a pipeline for experimenting and reusable, scalable platform capabilities)
4. Technology competence (e.g., does the board's competency matrix cover AI appropriately?).

The article illustrates how AI is being governed by boards in these four groups and makes three recommendations for getting started with governing AI.

Suggestions for Future Research on Board Governance of Technology

Though it was disappointing to find that only two manuscripts on board governance of technology are ready for publication, we believe this is now an important topic and will continue to be in the foreseeable future. However, it can be challenging for academics to engage with this topic and create publishable, data-driven articles because they often do not have access to data sources or a deep understanding of the topics that board directors grapple with. We provide the following four suggestions for those who are willing to try:

1. The first prerequisite is to get interested in and excited about the work that boards do and to learn about it. In this introduction to the special issue, we have presented a brief overview to capture the unique role and context within which boards operate, but there are many books, articles and materials that can provide a basic grounding, some of which have been referenced in this introduction. Much can also be gleaned from the curriculum of board education programs. It is crucial that researchers review the regulatory requirements of boards as well as governance codes.
2. Another important step is to get familiar with the day-to-day workings of boards. We suggest that researchers join a not-for-profit board that supports one of their favorite organizations, such as a sports club, church or parent group, and engage in the process of governance and gain some first-hand experience.
3. Reach out to people who are experienced board members and ask about the roles they play, their boards' processes and culture. Start to understand their background and knowledge, and how it relates to governance of technology. Learn about the frustrations felt by board members as they grapple with large reams of reports, unfamiliar topics and the hype cycle of each new technology.
4. Determine the overlap between your chosen topic and boards, especially in the near future. For example, cybersecurity

was top of mind in the early 2020s, Generative AI and AI in general will be important topics for the next few years.

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Joe Peppard (profjoepeppard@gmail.com) is a Professor and Academic Director at the Michael Smurfit Graduate Business School at University College Dublin. His research studies contemporary issues and challenges that executives and board members face in an environment of accelerating technological change. While his research is academically rigorous, he strives to steer a pragmatic path. His aim in his writings and teaching is to help busy executives and board members to be successful. He recognizes they want frameworks and models to help them understand their own predicaments, insights to figure out options and consequences, and clear actionable advice and guidance.

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