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van Golden, Simone L.; Janssen, Marijn; Kievit, Henk

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How Supervisory Board Members Influence Digital Strategy: Towards a Framework for Digital Strategy Governance

Simone L. van Golden¹ , Marijn Janssen² , and Henk Kievit¹ 

¹ Center for Entrepreneurship, Governance and Stewardship, Nyenrode Business University, Breukelen, The Netherlands

S.vangolden@my.nyenrode.nl, H.Kievit@nyenrode.nl

² TU Delft, Department of Technology, Policy and Management, Delft, The Netherlands
M.f.w.h.a.janssen@tudelft.nl

Abstract. Since digital opportunities will continue altering business models, organizations need to formulate and execute digital strategies to sustain long-term value. A digital strategy is governed by the organization's board. A board consists of executive and non-executive members, whereas in a two-tier system, the non-executive members form a supervisory board that is decoupled from the executive board. We present a framework illustrating how the actions of supervisory board members might influence digital strategy. We developed this framework based on a structured literature review with insights from corporate governance, strategic management, and board-level IT governance. We found that supervisory board members execute a variety of actions to take and shape strategic decisions and shape the strategic content, context, and conduct within their organization. We integrated our findings into sixteen potential actions that supervisory board members can take to influence digital strategy formulation, execution, and context. Further research should evaluate the framework and investigate the impact of their actions on digital strategies.

Keywords: digital strategy · digital strategy governance · supervisory board member · board-level IT governance · board member actions

1 Introduction

Organizations can formulate and execute a digital strategy to create and sustain organizational distinctiveness with digital capabilities. In line with this strategy, organizations explore digital opportunities and integrate these into their business. Since digital solutions can add business value but may also entail organizational risks [1], boards should be involved in digital strategy. Boards that are actively involved in formulating strategy add organizational value. Their involvement improves financial performance, competitive power, and innovation [2]. This implies that active involvement in digital strategy governance might also add organizational value. Unfortunately, there seems to be a lack of

involvement of boards in digital strategy: “Boards of directors do not participate nearly enough in major technology decisions, are surprisingly out of the technology loop on technology issues and are therefore missing opportunities to optimize operational and strategic technology investments” [3, p. 373].

Boards consist of executive and non-executive members. In a two-tier structure, the non-executive board members form a supervisory board. As part of their governance, these supervisory board members control and advise the executive board members, who are responsible for effectively implementing strategic activities to compete with rivals and create long-term value.

How supervisory board members influence digital strategy has not been researched. However, there is related research in adjacent domains such as corporate governance, strategic management, and board-level IT governance from which can be learned.

In the domain of corporate governance and strategic management, researchers investigated different levels of involvement in strategy by non-executive board members [4, 5]. These board members influence strategy by taking strategic decisions, shaping strategic decisions, and shaping content, context, and conduct by which strategy evolves [4–7]. We expect these levels of board involvement also to be applicable to the involvement of the supervisory board members in digital strategy.

In the domain of board-level IT governance, researchers investigated structures, processes, and relational mechanisms [8, 9] that aim to ensure that IT is used effectively such that: “(1) IT is aligned with the enterprise, (2) IT allows the organization to exploit opportunities, (3) IT resources are used responsibly, and (4) IT risks are managed appropriately” [10, p. 224]. Effective use of IT by good board-level IT governance ultimately leads to better organizational performance [8, 10–12].

Different researchers of board-level IT governance investigated how these structures, processes, and mechanisms are used at the board level to govern IT [10, 13–15]. Other board-level IT governance researchers investigated the different roles that boards can fulfill while governing IT [1, 8, 16]. Also, some researchers specifically list questions that boards should ask about digital initiatives, projects, and organizational processes [11, 17–19]. Despite previous researchers of board-level IT governance plea for more research into how boards currently engage in board-level IT governance and actually take their responsibilities [15, 17], we were unable to find scientific insights into how independent non-executive supervisory board members, in a two-tier system, act to influence digital strategy. Empirical research inside boardrooms is needed to understand the complex processes and interactions concerning strategy [20] and the way boards address emerging technological threats and opportunities in their governance [21].

There is a void in research in understanding how the actions of supervisory board members influence digital strategy. In this paper, we develop a framework for digital strategy governance that presents how the actions of supervisory board members might influence the formulation and execution of a digital strategy as well as the context in which supervisory board members act. We focus on a two-tier governance system. We introduce our key concepts in Sect. 2. Next, we structurally review and integrate literature from adjacent domains in Sects. 3 and 4, which leads to our framework in Sect. 5. In Sect. 6 we summarize our findings, discuss the limitations of our research and give suggestions for further research.

2 Literature Background

Since we aim to develop a framework for digital strategy governance that shows how supervisory board members influence digital strategy, we will discuss two relevant key concepts in this chapter: (1) digital strategy and (2) digital strategy governance by the board.

2.1 Digital Strategy

Research shows that a digital ‘mature’ organization distinguishes itself from the rest by explicitly having a digital strategy that builds on the potential of digital technologies [22]. Traditionally researchers investigated the exploitation of IT in support of business strategies, but recent research investigates the exploration of new valuable uses of IT instead [23]. In this scenario, IT strategy is no longer a strategy in functional areas such as operations, purchasing, supply chain, and marketing, but has become an integrated part of a business strategy [24–28]. This means that in this digital era digital strategy should no longer be positioned below business strategy but should be treated as a business strategy itself.

A digital strategy uses digital resources to drive competitive advantage and create differential value [25]. The integration of existing business capabilities with new digital capabilities of powerful, readily accessible technologies can offer a company real distinctiveness which should not be easy to imitate by competitors [29]. Based on Ross et al. [29] and Bharadwaj et al. [25] in this research we define digital strategy as *an organizational strategy formulated and executed by using the capabilities of powerful, accessible technologies to create differential value in constantly changing market conditions*.

An organization should formulate and execute its digital strategy to become digitally mature. This strategy can entail (1) digitization, changing from analog to digital data, (2) digitalization, supporting processes with digital technology, or (3) digital transformation. With digital transformation organizations alter their value creation processes and change their business model. During this change, they need to manage necessary structural changes and organizational barriers which could affect the required transformation in a positive or negative way [30].

A digital strategy can create strategic business value for organizations through (1) improvement of decision-making processes, (2) use of resources in a more efficient way, (3) serving customers in a more effective manner, (4) successfully becoming part of a digital ecosystem or (5) innovating their business model. As such, a digital strategy is a relevant response to market disruptions and necessary to generate long-term value.

A digital strategy consists of different phases and activities. We divide digital strategy into two iterative phases, in line with Peppard & Ward [28] and Azlan Annuar [7]. We call these two phases digital strategy formulation and digital strategy execution. During digital strategy formulation it is necessary to (1) get insight and understand digital opportunities, threats, and their impact, (2) envision business model change alternatives driven by technological possibilities, (3) critically evaluate these alternatives and (4) include relevant stakeholders when defining and communicating the vision [31]. During digital strategy execution, it is relevant to monitor progress but also to constantly sense the environment and decide whether adjustment of the digital course is necessary. Therefore,

a constant iterative process between formulation and execution occurs, which we call digital strategizing.

2.2 Digital Strategy Governance by the Board

Boards can consist of one or two tiers. A two-tier board structure strictly separates responsibilities between executive management and non-executive independent supervisors. Executives run a company, set the strategic direction, and are primarily responsible for its continuity, whereas the non-executive supervisory board needs to ensure the organization's long-term performance by controlling and advising the executives [32–34]. As such, non-executive board members fulfill controlling and advisory roles [20, 35–37] and can be involved in strategy at different levels: by taking and shaping strategic decisions, shaping strategic content, and shaping strategic context and conduct [4, 5, 7].

Boards control managerial IT-related decisions and actions and offer IT-related advice and direction [16] that might influence digital strategy. Board members should “encourage, push for change and progress, see the big picture, and review and question” [38, p. 45] the digital strategy set by executive management. Additionally, board members are supposed to sense the environment and shape the context to execute the digital strategy successfully.

The involvement of boards in strategy varies: All boards take controlling strategic decisions “where influence is exerted inside the boardroom and the board takes decisions to either accept, reject or refer proposals” [5, p. 65]. About half of all boards also shape strategic decisions by giving advice. Only fifteen percent of the boards are deeply involved and shape strategic context, conduct, and content [5], such as IT governance structures and processes and the specific content of the digital strategy. “Some boards may also get too much involved with strategy development and heavily constrain and/or discount executives’ strategic discretion” [32, p. 57].

Although supervisory board members do not set the strategy directly, they can significantly impact it [39]. Given the relevance of digital strategy and the impact supervisory board members might have on it, we investigated how board members of the supervisory board might influence the digital strategy with their actions. Our research starts with a literature review in Sects. 3 and 4 leading to our framework in Sect. 5.

3 Research Method: Systematic Literature Review

We reviewed the existing scientific literature to answer the following research question: *Which specific actions might supervisory board members take that could influence digital strategy?*

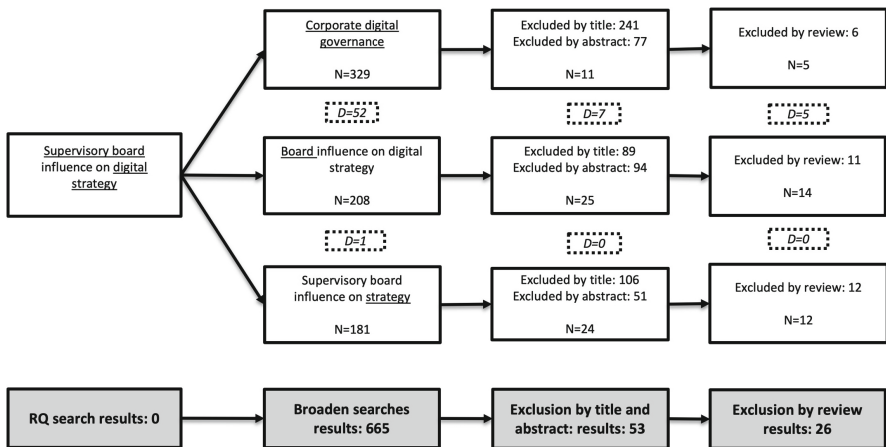
During our literature review, we searched the Scopus database several times. We specifically searched for English-written, peer-reviewed journal papers and conference proceedings with specific terms related to our research question in their title, abstract, or keywords. Our search took place in April 2023.

At first, we searched for papers containing Supervisory Board AND Influence AND Digital Strategy, or similar terms as shown in the search string details in Table 1.

Table 1. Search string of supervisory board influence on digital strategy

Search string	Search string details
Supervisory Board	(non-executive* OR “supervisory board”)
AND	AND
Influence	(strategize OR act* OR influenc* OR govern* OR role OR contribut* OR involv* OR monitor* OR supervis* OR advis*)
AND	AND
Digital Strategy	(digital* strateg* OR “digital* business strateg*” OR “digital* transformation” OR “information technology strateg*” OR “information system* strateg*” OR “IT strateg*” OR “IS strateg*”)

This first search string did not give any results, which confirms a gap in the scientific literature about how supervisory board members influence digital strategy. Therefore, we structurally broadened our search in three different ways, as illustrated in Fig. 1.

**Fig. 1.** A structured literature search in Scopus

First, we expanded our search to the research area of ‘corporate digital governance’. Since we define digital strategy as part of the corporate strategy, supervision of this digital strategy could be part of corporate governance. We used a combination of three search strings and searched for: ((Corporate Governance AND Digital Strategy) OR (Corporate Governance AND Information Technology) OR (Corporate Digital Governance)). The details of these search strings are shown in Table 2. This search resulted in 329 papers as shown in Fig. 1.

Table 2. Search strings of corporate digital governance

<u>Search string 1</u>	<u>Search string details</u>
Corporate Governance	("Corporate Govern*" OR "Corporate strategy governan*")
AND	AND
Digital Strategy	(digital* strateg* OR "digital* business strateg*" OR "digital* transformation" OR "information technology strateg*" OR "information system* strateg*" OR "IT strateg*" OR "IS strateg*")
<u>Search string 2</u>	<u>Search string details</u>
Corporate Governance	("Corporate Govern*" OR "Corporate strategy governan*")
AND	AND
Information Technology	"Information Technology"
<u>Search string 3</u>	<u>Search string details</u>
Corporate Digital Governance	("Corporate Digital* Govern*" OR "Digital* Corporate Govern*" OR "Corporate Technology Governan*" OR "Corporate Information Technology Govern*" OR "Corporate IT Govern*" OR "Enterprise Business Technology Govern*")

Secondly, we broadened our search from the supervisory board level to the board level because we suspect that prior research on one-tier boards might contain board member actions that could also occur in a two-tier structure at the supervisory board level. As shown in Table 3, we combined three strings: (Board AND Digital Strategy), (Board AND IT Governance) and (Board AND Influence AND Information Technology). The combination of these strings resulted in 208 papers (see Fig. 1).

Table 3. Search strings of board influence on digital strategy

<u>Search string 1</u>	<u>Search string details</u>
Board	(Boardroom OR board-level OR "board level" OR board-member OR "board member" OR "board of directors" OR "boards of directors" OR "corporate board*" OR non-executive* OR "supervisory board*")
AND	AND
Digital Strategy	(digital* strateg* OR "digital* business strateg*" OR "digital* information" OR "information technology strateg*" OR "information system* strateg*" OR "IT strateg*" OR "IS strateg*")
<u>Search string 2</u>	<u>Search string details</u>
Board	(Boardroom OR board-level OR "board level" OR board-member OR "board member" OR "board of directors" OR "boards of directors" OR "corporate board*" OR non-executive* OR "supervisory board*")

(continued)

Table 3. (continued)

AND	AND
IT Governance	“IT govern*”
<u>Search string 3</u>	<u>Search string details</u>
Board	(boardroom OR board-level OR “board level” OR board-member OR “board member” OR “board of directors” OR “boards of directors” OR “corporate board*” OR non-executive* OR “supervisory board*”)
AND	AND
Influence	(strategize OR act* OR influenc* OR govern* OR role OR contribut* OR involv* OR monitor* OR supervis* OR advis*)
AND	AND
Information Technology	Information Technology

Thirdly, we searched the Scopus database for literature about the influence of supervisory (and non-executive) board members on strategy in general. We believe that the actions these board members take to influence corporate strategy could also be taken to influence the digital strategy. In this third search, we included the elements Supervisory Board AND Influence AND Strategy, see Table 4, resulting in 181 papers as shown in Fig. 1.

Table 4. Search string of supervisory board member influence on strategy

<u>Search string</u>	<u>Search string details</u>
Supervisory Board	(non-executive* OR “supervisory board”)
AND	AND
Influence	(strategize OR act* OR influenc* OR govern* OR role OR contribut* OR involv* OR monitor* OR supervis* OR advis*)
AND	AND
Strategy	strateg*

As shown in Fig. 1, our search results contained duplicates (D); 52 papers were found in both our ‘corporate digital governance’ search as well as in our ‘board influence on digital strategy’ search. In addition, one paper was found in both our ‘board influence on digital strategy’ search as well as in our ‘supervisory board influence on strategy’ search. There were no duplicates in the ‘corporate digital governance’ and ‘supervisory board influence on strategy’ searches. We eliminated these 53 duplicates, leading to a total of 665 papers that could contain specific actions that supervisory board members might take to influence digital strategy (see Fig. 1).

The 665 papers we found were scanned by title. Based on their title, we excluded the papers that we were sure of that would not provide insight into board-level actions that might influence strategy. As shown in Fig. 1, we excluded 241 of the ‘corporate digital governance’ papers, 89 of the ‘board-level’ papers, and 106 of the ‘strategy’ papers. Next, we scanned the abstracts of the remaining papers and excluded those that did not contain potential influential actions, or were not focused on board-level or board members. Since we were searching for actions that influence the digital strategy, we also excluded papers where ‘digital’ seemed to be the cause or tool and not the outcome, for example, (1) papers investigating the role of technology on governance or strategy and (2) papers investigating the use of digital techniques during board level decision-making. After this, we ended up with 11 papers about ‘corporate digital governance’, 25 papers about ‘board influence on digital strategy’, and 24 papers about ‘the supervisory board’s influence on strategy’. After we excluded the seven duplicate papers, 53 unique papers remained, see Fig. 1.

We reviewed these 53 papers in detail to determine whether they could answer our research question. We excluded papers about the implementation of governance frameworks and structures as well as papers specifically about antecedents of IT governance, IT investments, or strategic board involvement. Finally, we ended up with 26 relevant papers. Of these 26 papers, all 5 results in our ‘corporate digital governance’ search were duplicates of results from our ‘board influence on digital strategy’ search (see Fig. 1), which means the literature search on ‘corporate digital strategy’ did not contribute to our results. Therefore, in the rest of this paper, we will only refer to two categories: (1) board influence on digital strategy, and (2) supervisory board influence on strategy. The resulting 26 papers of our review are presented, split by research category, and sorted by year of publication, in Tables 7 and 8 in the Appendix.

4 Data Analysis

We analyzed the selected papers to develop a framework that indicates how supervisory board members influence digital strategy: a framework for digital strategy governance. In this chapter, we first present some research characteristics, such as publications over time, research methods, and research theories. Thereafter, we answer our research question and give insight into the different types of actions that supervisory board members could take to influence digital strategy. At last, we also describe factors that might influence these actions. Based on our data analysis, we present our framework in Sect. 5.

4.1 Previous Research Characteristics.

As shown in Tables 7 and 8 in the Appendix and in Fig. 2, scientific research into the board’s influence on digital strategy as well as the supervisory¹ board’s influence on strategy started at the end of the ‘90s and still continues. Despite the increase in the strategic relevance of IT, scientific research in the fields related to supervising digital strategy does not appear to be expanding.

¹ Most researchers of the papers we selected as part of our ‘supervisory board influence on strategy’ search, investigated one-tier boards with a specific focus on the role of the non-executive board members.

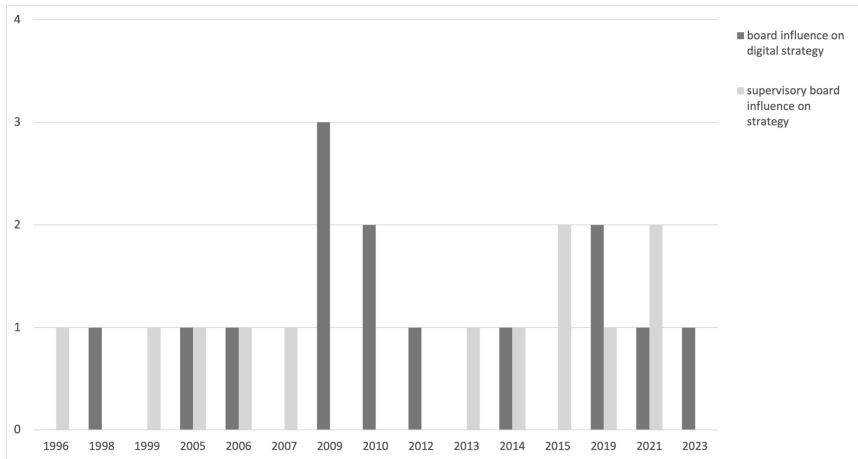


Fig. 2. Year of publication of selected papers

In the rest of this section, we present the different research methods and scientific theories that were applied in the papers we included in our review.

Research Methods

Scientific research into the board's involvement in IT as well as the supervisory board's involvement in strategy is conducted using different research methods as shown in Fig. 3. Researchers in these areas used literature reviews [1, 15, 40], case studies [19, 45], interview techniques [4, 5, 7, 33, 34, 42–44] and surveys [8, 17, 18, 47–50]. One researcher observed board meetings [46] and some researchers supplemented their surveys with interviews [3, 18] or in-depth analysis [10] to conduct mixed-method research. One relevant paper is mainly based on the practical experience of the authors [11]. One paper did not mention a specific research method [41].

The research methods used to investigate this phenomenon, differ per research area as presented in Fig. 3. In the research area of supervisory board influence on strategy only qualitative and quantitative research is conducted. In the research area of board influence on digital strategy, researchers also conducted literature reviews and mixed-method research. The qualitative research method used also varies per research area.

Research Theories

We analyzed the scientific theories mentioned in our paper selection. Our analysis supports the findings of Madhani [51], who states that different scientific theories are applicable at the board level. These different theories support the different roles and responsibilities of board members.

Agency theory supports the controlling and monitoring role of the board as mentioned by most of the researchers [1, 4, 5, 15, 16, 34, 43, 44, 48, 50]. In addition to agency theory, many researchers mention resource dependency theory [1, 4, 15, 16, 32, 33, 48, 50] or the resource-based perspective [10, 15, 16]. In line with the advisory role of the board, researchers often mention stewardship theory [1, 15, 16, 44, 48]. In addition to

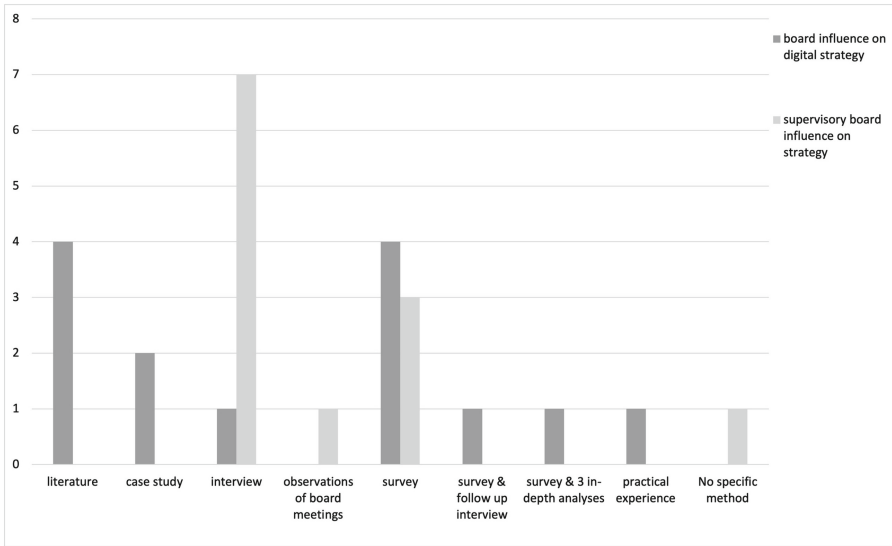


Fig. 3. Research method of selected papers

the aforementioned theories, involvement of boards in strategy can also be supported by stakeholder theory [15, 16] upper echelons theory [32, 40], strategic choice theory [8, 15, 16, 40], signaling theory [16], institutional theory [8, 40], a class hegemony perspective [4, 32, 48], a legalistic perspective [32] and a contingency view [10, 15, 17].

We think that the diversity of theoretical views to explain the involvement of boards aligns with the broad and overarching responsibility that board members bear. Following the lead of other researchers [16, 32, 40, 51] we think that different theoretical perspectives can coexist and offer complementary views to explain board phenomena.

4.2 Actions that Might Influence Digital Strategy

Based on our 26 papers, we identified and listed over 200 potential actions that supervisory boards or their members can take to influence digital strategy. Since some papers are written by the same authors and refer to identical research data, our list of actions contained duplicates. Also, various papers label actions differently but in our interpretation these actions are quite the same and can be merged into the same category.

We interpreted and classified our identified actions in a list of 16 categories that might influence (1) the formulation of digital strategy, (2) both formulating and executing digital strategy, (3) the execution of digital strategy or (4) the board-level context of digital strategy, see Table 5. Supervisory board members might take any of these actions to influence digital strategy as part of their controlling and advising role.

Table 5. Supervisory board member actions that might influence digital strategy

Actions	Influence on digital strategy formulation	Influence on digital strategy execution	Actions that influence board-level context	Found in references
Review and criticize plans	X			[7, 11, 16, 18, 33, 40–42, 44]
Approve plans and budget	X			[5, 7, 18, 19, 33, 42, 49]
Determine KPIs	X			[1, 10, 11, 16, 18, 43, 49, 50]
Ask questions	X	X		[7, 11, 15, 17, 33, 41, 46, 47]
Direct executive attention	X	X		[16, 18, 40]
Approve executive decisions	X	X		[1, 4, 5, 7, 10, 11, 15] [16, 18, 40, 42, 49, 50]
Monitor (and evaluate) executive actions	X	X		[8, 11, 16, 40–44]
Executive coaching and mentoring	X	X		[1, 4, 5, 11, 16, 33, 48]
Provide substantive advice	X	X		[1, 7, 10, 11, 16, 18] [41–43, 48–50]
Sense environment for opportunities and threats	X	X		[7, 11, 16, 18, 40, 48]
Stakeholder management (communication and interaction)	X	X		[10, 16, 41–43]
Monitor (and evaluate) execution of plans		X		[1, 3, 5, 7, 10, 11, 15, 16] [18, 34, 40–45, 48–50]
Use relational capital (network)		X		[1, 3, 11, 15, 16, 18, 41, 48]
Implement or change governance structure or processes			X	[1, 3, 7, 8, 10, 11, 16] [18, 40–42, 44, 45, 50]
Shape values and culture			X	[16, 18, 41, 42, 44]
Appoint and dismiss executives, determine compensation, and steer executive development			X	[11, 18, 42–44]

4.3 Factors that Influence Actions Board Members Take

Most of the papers we reviewed did not only mention actions but also mentioned factors that affect which actions a (supervisory) board member might take. These factors were mentioned related to other outcomes than digital strategy, such as IT governance, workings of the board, board involvement, board effectiveness, firm performance, and non-executive director roles. Although these influential factors were not explicitly investigated in our research context, we expect these to also be applicable to the influence of supervisory board members on digital strategy. We divided these influential factors into

three different context levels: (1) organizational context, (2) board-level context, and (3) board member characteristics, as presented in Table 6.

Table 6. Contextual elements that might affect how supervisory board members act

Factors that might influence how board members act	Organizational context	Booard-level context	Booard member characteristics	Found in references
Ownership structure, power between internal and external stakeholders	X			[43, 44]
Company lifecycle or age	X			[4, 8, 15, 43]
Role of IT in organization (IT usage mode)	X			[8, 10, 11, 15, 17, 40]
Country, Legal environment, IT intensity of industry	X			[15, 18, 49]
Turbulence of the environment (f.e. potential crisis)	X			[18, 34]
Governance structures and processes		X		[3, 4, 15, 16, 18, 40, 43, 44]
Board size		X		[8, 15, 16, 50]
Insider or founder representation on the board		X		[8, 15, 16, 44]
Board independence		X		[50]
Cognitive diversity of non-executive directors		X		[16, 48]
Board IT competency		X		[8, 15, 16, 18, 40]
Board culture and teamwork		X		[4, 5, 44]
Governing style		X		[15, 18, 42]
Director age			X	[15, 40]
Human capital and relational capital			X	[16, 48]
Attitude and beliefs, perceived self-efficacy and motivational factors			X	[15, 48]
IT background, education, experience, (IT) expertise and skills			X	[1, 11, 16, 33, 40, 44, 48]
Skills, the ability to work as a group, sensitivity to board dynamics and personal power and Influential style			X	[5, 33, 42, 43]

5 Towards a Framework for Digital Strategy Governance

Despite we found no scientific literature on the influence of supervisory board members on digital strategy, we developed a framework for digital strategy governance. Our framework presents actions we abstracted from research in corporate governance, strategic management, and board-level IT governance, where we suppose these actions also to apply to digital strategy. Our framework for digital strategy governance is presented in Fig. 4. Central in our framework are the actions of supervisory board members, which influence digital strategy.

A digital strategy consists of two iterative phases [7, 28]. We call these (1) digital strategy formulation and (2) digital strategy execution. By evaluating the performance of past strategies, and considering current strategic performance, the strategic plan might be adjusted [50].

Supervisory board members might take different actions to influence (1) the formulation of digital strategy, (2) both formulating and executing digital strategy, (3) the execution of digital strategy, and (4) the board-level context within which actions take place (see Table 5).

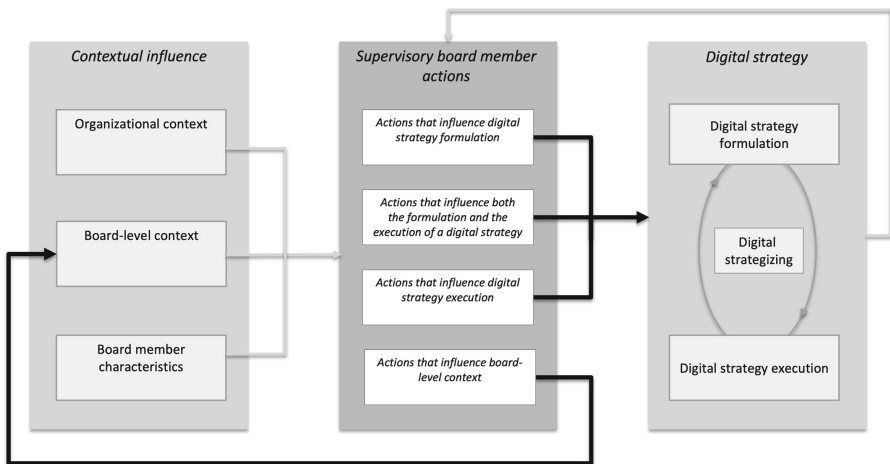


Fig. 4. A framework for digital strategy governance

To influence the formulation of a digital strategy, supervisory board members control executives by reviewing, criticizing, and approving strategic plans [7, 11, 16, 18, 33, 40–42, 44] as well as determining KPIs [1, 10, 11, 16, 18, 43, 49, 50] to be able to control the execution.

During digital strategy execution, determined KPIs can give insight into IT-related risks, such as IT competence risk, infrastructure risk, project risk, business continuity risk, and information risk [11, 16, 43, 45]. To monitor progress, special board meetings might occur [7] where the CIO presents the progress to the full board so that IT-related risks, assets, and projects can be discussed [40].

Furthermore, to influence the digital strategy execution, supervisory board members can interact with external as well as internal stakeholders or use their relational capital to get access to relevant resources such as IT providers [3, 16], capital [16] and expertise [11, 18]. They can also use their network to share problems [41] or to visit other organizations and observe their technology approaches and digital strategies [11].

During both the formulation and execution of a digital strategy, supervisory board members need to assure that decision-making in the board is driven by its strategy [41]. Therefore, they can ask questions [7, 11, 15, 17, 33, 41, 46, 47] and they need to approve strategic decisions with fundamental operational or financial impact [1, 7, 15, 16, 18, 49]. Also, they need to approve major decisions about the use of resources, investments, or divestments [42]. Next to the approval of decisions, supervisory board members need to evaluate if the executives have applied the correct decision-making processes [44] and “evaluate whether the executives have established the correct procedures to adequately manage IT” [16, p. 6049].

Also, during the formulation and execution of a digital strategy, supervisory board members can provide substantive advice [1, 7, 10, 11, 16, 18, 41–43, 48–50] and direct executive attention [16, 18, 40]. To be able to give substantive advice, supervisory board members need to scan their environment [7, 16, 48] and identify threats and opportunities. They can use IT risk management insights from other organizations [18] and need to keep abreast of technological trends [11, 40]. Based on their knowledge and experience they can also coach and advise executives during individual consultations [4, 8, 11, 16, 48] or during strategy-making sessions [48, 49]. Furthermore, they might explicitly direct the executive’s attention [16] to (1) IT issues and risks [10, 18], (2) IT innovation and trends [18], or (3) to put IT on the agenda of the board meetings and strategy discussions [40, 41]. As such, the advice given by the supervisory board members can be risk-related [10, 43], but can also be opportunity-driven [18].

At last, supervisory board members can change the board-level context. “They can create an atmosphere of joint accountability and support regarding IT” [16, 18, p. 62] and facilitate a culture that shares appropriate information and encourages risk awareness [44]. Also, they might change the board-level IT governance structure by initializing a specific IT risk committee [1], a strategic IT committee [3, 8, 10, 11, 40], assigning IT responsibilities to existing committees or assign a board IT representative [11, 45]. The board-level context can also be changed because the supervisory board acts as the employer of all board members. As such, they can even be involved in steering the executive development plans [44]. This implies that supervisory board members influence the expertise on board.

Our framework also indicates which contextual elements might affect supervisory board members’ actions. Contextual elements occur at different levels. At the organizational level, elements such as ownership structure [43, 44], company age [4, 8, 15, 43], the role of IT in the organization [8, 10, 11, 15, 17, 40], legislation and regulations [15, 49], and turbulence of the environment [18, 34], influence the actions of supervisory board members. At the board level, the IT governance structures, processes, and relational mechanisms [3, 4, 15, 16, 18, 40, 43, 44], as well as board size [8, 15, 16, 50], board IT competency [8, 15, 16, 18, 40], and governing style [15, 18, 42], impact the

actions of supervisory board members. At the board member level, different characteristics impact their actions such as beliefs, age, experience, expertise, and skills [1, 11, 16, 33, 40, 44, 48].

Based on our framework we expect that supervisory board members influence digital strategy formulation, execution, and context with more than just asking questions. Their different actions are not only driven by their personal characteristics but are also affected by the organizational and board-level context.

6 Conclusions and Further Research

In this paper, we presented a framework based on different research streams, giving insight into the actions supervisory board members can take to influence digital strategy. As far as we know, we were the first to scientifically review, analyze and integrate literature to develop a framework for digital strategy governance. Supervisory board members can use this framework to become more aware of different alternative actions and the influence of their actions on digital strategy.

Our findings indicate that supervisory board members can ask questions but can also take a variety of other actions to influence the digital strategy. With this repertoire of actions, they can directly influence the formulation and execution of a digital strategy, but they can also influence the board-level context, which in turn appears to affect their own actions. Apart from the board-level context as an influential factor, we also expect the organizational context and the board member characteristics to influence how supervisory board members act.

As with any research, our research has some limitations. First, since we could not find specific scientific literature to answer our research question, we interpreted and integrated literature from adjacent domains. This literature is mostly based on research in one-tier boards. Further empirical and practical research is needed to investigate how supervisory board members in two-tier boards, influence digital strategy. Additionally, since different theoretical perspectives can coexist to explain board phenomena, more research is necessary to investigate how these theories support our framework.

Another limitation concerns our influential factors because we only aggregated contextual factors from papers that contained potential actions of supervisory board members. Papers that did not contain actions were excluded, even though some of these papers specifically investigated antecedents of board-level IT governance or the involvement of boards in strategy. Further research in practice to investigate how any of these factors affect supervisory board members' actions to influence digital strategy is recommended.

In conclusion, our emerging framework for digital strategy governance can be further researched, refined, and evaluated by investigating how our described actions occur in supervisory boards and how they vary in different contexts.

Appendix

Table 7. In-dept reviewed papers of board influence on digital strategy

Authors	Title	Journal
Damodaran L. [19]	Development of a user-centred IT strategy: A case study	(1998) Behaviour and Information Technology, 17 (3), pp. 127–134
Nolan R., McFarlan F.W. [11]	Information technology and the board of directors	(2005) Harvard Business Review, 83 (10), pp. 96–106 + 157
Mähring M. [40]	The role of the board of directors in IT governance: A review and agenda for research	(2006) Association for Information Systems 12th Americas Conference On Information Systems, AMCIS
Parent M., Reich B.H. [45]	Governing information technology risk	(2009) California Management Review, 51 (3), pp. 134–152 + 5
Andriole S.J. [3]	Boards of directors and technology governance: The surprising state of the practice	(2009) Communications of the Association for Information Systems, 24 (1), pp. 373–394
Bart C., Turel O. [47]	The role of the board in IT governance: Current and desired oversight practices	(2009) International Journal of Business Governance and Ethics, 4 (4), pp. 316–329
Bart C., Turel O. [17]	IT and the board of directors: An empirical investigation into the “Governance questions” Canadian board members ask about IT	(2010) Journal of Information Systems, 24 (2), pp. 147–172
O’Shannassy T. [33]	Board and CEO practice in modern strategy-making: How is strategy developed, who is the boss and in what circumstances?	(2010) Journal of Management and Organization, 16 (2), pp. 280–298
Jewer J., McKay K.N. [8]	Antecedents and consequences of board IT governance: Institutional and strategic choice perspectives	(2012) Journal of the Association for Information Systems, 13 (7), pp. 581–617
Turel O., Bart C. [10]	Board-level IT governance and organizational performance	(2014) European Journal of Information Systems, 23 (2), pp. 223–239
Caluwe L., De Haes S. [15]	Board Level IT Governance: A Scoping Review to Set the Research Agenda	(2019) Information Systems Management, 36 (3), pp. 262–283
Turel O., Liu P., Bart C. [18]	Board-Level IT Governance	(2019) IT Professional, 21 (2), art. no. 8676129, pp. 58–65
Caluwe L., de Haes S., Wilkin C., Huygh T. [16]	How boards of directors can contribute to governing IT	(2021) Proceedings of the Annual Hawaii International Conference on System Sciences, 2020-January, pp. 6047–6056
Matta M., Cavusoglu H., Benbasat I. [1]	Understanding the Board’s Involvement in Information Technology Governance	(2022) Information Systems Management

Table 8. In-dept reviewed papers of supervisory board influence on strategy

Authors	Title	Journal
McNulty T., Pettigrew A. [42]	The Contribution, Power and Influence of Part-time Board Members	(1996) Corporate Governance: An International Review, 4 (3), pp. 160–179
McNulty T., Pettigrew A. [4]	Strategists on the board	(1999) Organization Studies, 20 (1), pp. 47–74
Long T., Dulewicz V., Gay K. [43]	The role of the non-executive director: Findings of an empirical investigation into the differences between listed and unlisted UK boards	(2005) Corporate Governance: An International Review, 13 (5), pp. 667–679
Kemp S. [5]	In the driver's seat or rubber stamp?: The role of the board in providing strategic guidance in Australian boardrooms	(2006) Management Decision, 44 (1), pp. 56–73
Long T. [44]	The evolution of FTSE 250 boards of directors: Key factors influencing board performance and effectiveness	(2007) Journal of General Management, 32 (3), pp. 45–60
Eulerich M., Stiglbauer M. [34]	The supervision of strategy and risk in German two-tier boards: Lessons learned from the crisis	(2013) International Journal of Management Practice, 6 (3), pp. 220–234
Azlan Annuar H. [7]	Independent non-executive directors strategic role – some evidence from Malaysia	(2014) Corporate Governance (Bingley), 14 (3), pp. 339–351
Sheaff R., Endacott R., Jones R., Woodward V. [46]	Interaction between non-executive and executive directors in English National Health Service trust boards: An observational study	(2015) BMC Health Services Research, 15 (1), art. no. 470
Deffenbaugh J. [41]	Houston, we've had a problem here: Tackling board governance	(2015) British Journal of Health Care Management, 21 (7), pp. 304–309
Hom C.L., Samson D., Cebon P.B., Cregan C. [48]	Inside the black box: an investigation of non-executive director activity through the lens of dynamic capability	(2021) Asia Pacific Journal of Management, 38 (3), pp. 857–895
De Haas R., Ferreira D., Kirchmaier T. [49]	The inner workings of the board: Evidence from emerging markets	(2021) Emerging Markets Review, 48, art. no. 100777
Cindrić L. [50]	Supervisory Board's Contribution to Corporate Strategy: Evidence from Croatian Companies	(2021) Studies in Business and Economics, 16 (1), pp. 42–50

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