Digitalization and Boards of Directors:

A New Era of Corporate Governance?

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Abstract

The ongoing megatrend of digitalization is significantly affecting societies and organizations. How organizations deal with the impact of digitalization may determine whether or not they will be competitive in the future. The board of directors may hereby play a key role for the organization to adapt to the changing strategic context. But based on various corporate failures, boards' work and their effectiveness have recently been questioned. Are todays' boards equipped to create values for organizations in the future? We address this important research question by introducing a framework where digitalization is predicted to influence boards in two areas. First, we argue that boards in the future consist of virtual networks of people where needs to monitor management diminish and shared leadership approaches are emphasized. Second, we suggest that boards work according to a dynamic board agenda based on organizational threats and opportunities. The agenda is built around learning and knowledge management and is reflected in the committee structure. Using dynamic capabilities arguments, we propose a framework with the ambition to contribute to the understanding of what makes boards fit future organizational needs. With such an approach, this is the first study that contributes to knowledge on boards by examining how boards need to adapt to meet the challenges in a digital world. The implications for theory and practice call for changed perspectives on what boards do and how they look like.

Keywords: Board of Directors, Digitalization, Dynamic Capabilities

1. Introduction

In a fast changing world where digitalization has been significantly changing societal, organizational, and individual behavior and continues to do so with even greater pace, the question arises if the boards we see in the corporate world today are able to create value for organizations and society tomorrow. How will boards in the future look like, how do they attain information and competencies, what will be the tasks they perform, and what are the topics discussed in the boardroom? We want to address these questions and start a critical discussion in order to lay a research foundation that may help to make boards of directors ready for a new era of corporate governance.

A digital revolution is now taking place, which is frequently referred to as the third industrial revolution, the "information age" (Brown & Marsden, 2013). Digitalization refers to concepts such as the availability of large amounts of data (big data), increased (algorithm-driven) analytical and processing capabilities, and crowd/sensor approaches through which information flows increase. The growing momentum of the digitalization is impacting society and organizations and therefore constantly changes the strategic context of organizations. The impact digitalization may have is shown by a statement of a banking CEO that "the industry is in the midst of a transition that occurs once every 100 years" (Hirt & Willmott, 2014). This demonstrates the need for organizations to react to the threats and opportunities of the changing context in order to maintain or strengthen their sustained competitive advantage. The potential impact of these emerging threats and opportunities is perfectly illustrated by John Chambers, the Chairman of Cisco (McKinsey, 2016). He argues that "technology will become the company" and thereby emphasizes the fundamental transformation and disruption of organizations caused by digitalization. The consequences of digitalization are not solely felt in the IT department, but affect the entire organization (Valentine, 2014). In this regard, one of the most important consequences of digitalization is the change in the way that different businesses compete with each other (Riasi & Pourmiri, 2015). Digitalization has made the current business environment more competitive

than any other time in the history (Ansari & Riasi, 2016). The companies that have the infrastructures and knowledge to take advantage of these changes are the only ones that can succeed in this competitive environment (Ansari & Riasi, 2016; Riasi & Pourmiri, 2015).

One main lever to react to these changing organizational conditions may be found at the apex of the organization, the board of directors. Boards may be the organizational unit having the greatest potential impact on organizational performance and behavior. They are involved throughout the different phases of the strategic process and influence organizational decision-making (Huse, 2007). As Leblanc and Gillies argue, "nothing is more important to the wellbeing of a corporation than its board of directors" (2005, p.6). Therefore, we decided to focus on boards for the purpose of this study, even though there are other organizational entities such as the top management team that may have an impact on how changes are addressed. When examining how digitalization may impact boards, we apply a multi-theoretical approach focusing on dynamic capabilities combined with arguments from different theoretical perspectives such as team production theory and shared leadership theory.

Almost 50 years ago, boards were observed to basically rubber-stamp managerial decisions only (Mace, 1971). Since then a vivid debate has started what boards are supposed to do and whom they are accountable to. However, most of the guidelines introduced today still emphasize director independence in order to effectively monitor management on behalf of shareholders (Fama & Jensen, 1983). This matches the public debate about the accountability of boards, but ignores much of what we know. In a volatile, rapid changing business environment after the financial crisis where corporate scandals (such as Volkswagen) are still present, the question how boards may contribute to organizational value creation arises more than ever. These discussions are increasingly relevant, as organizations may look significantly different in the future. With these changes we may see that organizations are closed or reconfigured under alternative governance structures where boards have different accountabilities and value creation has other implications (Tihanyi, Graffin, & George, 2015). In line with these developments, scholars have started to critically question boards' ability to effectively perform control tasks (Boivie, 2015) or even question their organizational relevance in general (Gillespie & Zweig, 2010). Being at this turning point, we see the need to break free of the inertia in relation to boards that we carry with us, and critically discuss the changes required to meet future demands. The consequences of not raising this issue now, ignoring the changing corporate environment and its effects on boards, might lead to boards having no impact at all. This development might have started already as "the focus of boards worldwide has increasingly shifted to compliance rather than excellence" (Heidrick & Struggles, 2014).

However, we consider the board as an organizational unit that can potentially impact value creation and contribute to a sustained competitive advantage. Based on this assumption, we propose two main areas where digitalization may have the greatest impact on boards and thus requires a reconsideration of boards. First, we suggest that boards may become a virtual network of capable people. Whereas boards today consist of a stable number of members who are assigned mainly based on their independence towards the focal firm, we propose that future boards consist of a network of capable people, who are temporary called to the board based on their competencies matching the organizations' challenges in the competitive environment. This will further affect board requirements such as leadership excellence in reconfiguring and orchestrating the resources of the board. Second, we propose that instead of focusing on certain tasks being performed, boards focus on a dynamic agenda of topics and are involved in a way that value is created for the organization. This has further implications on topics such as knowledge management, knowledge sharing, and organizational learning behavior. As these processes will be thoroughly embedded into the organizational structure, this also affects e.g. the committee structure. We do not attempt to provide an exhaustive list here but are convinced that in order to establish boards that are capable of creating value for organizations, this framework contributes to an understanding on what is important in the future.

The paper proceeds as follows. We start with a brief introduction of the theoretical framework emphasizing the importance of dynamic capabilities. We then present the major implications digitalization has on organizations. We introduce a framework for how these changes may affect boards and embed this into the relevant literature. In each of the two areas we make propositions how boards may answer the digital threats and opportunities to contribute to organizational value creation. By doing so, we present an agenda for future research that matches the needs board may face in the future. We close with an invitation to practitioners and policy makers to move beyond the lessons learnt from the past.

2. Dynamic Capabilities

The theory of dynamic capabilities has gained increased attention by management scholars in recent years (Barreto, 2010). We refer to dynamic capabilities as "the capacity of an organization to create, extend or modify its resource base" (Helfat et al., 2007, p.4). Within organizations, dynamic capabilities are maintained through underlying

processes of sensing, seizing, as well as reconfiguring and orchestrating assets (Helfat & Peteraf, 2015; Teece 2007), which take place in teams (such as boards) and among individuals. Whereas sensing refers to the recognition of opportunities before they occur and identifying competitive threats (Helfat & Peteraf, 2015), seizing is about responding to opportunities and threats that have been sensed. In the digital era, the forms in which sensing and seizing takes place are changed as technology allows for new opportunities in transforming data into information (George, Haas, & Pentland, 2014). Reconfiguring and orchestrating assets is about enhancing, combining, and configuring firm assets on different levels of the organization (Helfat & Peteraf, 2015).

We argue that applying the theoretical framework of dynamic capabilities contributes to a better understanding of how organizations will be able to cope with the impact of digitalization. Intensified competition, globalization and technological developments have driven firms to constantly adapt, develop and reconfigure their resources and capabilities to fit the competitive environment (Tecce, 2007; Wang & Ahmed, 2007). This captures the importance of dynamic capabilities in a digital world, as they link firms' strategic choices and environmental circumstances. It addresses how organizations direct their resources and capabilities to achieve a sustained competitive advantage in environments significantly impacted by new technologies. The theory perfectly suits our purpose as dynamic capabilities have been argued to be especially relevant in environments exposed to the threats and opportunities associated with rapid technological change and development (Teece, 2007). In the following chapter we present an overview of the major implications digitalization has on organizations, drawing from arguments within the dynamic capabilities framework.

3. The Impact of Digitalization on Organizations

The digital era already has a tremendous impact on society and organizations (Ko & Fink, 2010; Newell & Marabelli, 2015), and it is most likely to do so in future, with even increasing extent and pace. Digitalization has a fundamental impact on societies around the world, affecting our daily lives in terms of e.g. consumption behaviour, expectations regarding products and services, and the evaluation of consumed goods (Zuboff, 2015). This changing consumer behaviour affects how organizations do business, challenge their sustained competitive advantage and increase demands on product, process, and market innovation. Besides these effects of digitalization, organizations also face consequences such as the availability of large amounts of data, the emergence of technologies and a changing landscape of organizational threats and opportunities.

As digitalization has the power to "rewriting the rules of competition" (Hirt & Willmott, 2014), it is obvious that the associated effects provide major opportunities but also burry tremendous risks. This is perfectly illustrated in the case of Sony Pictures (Elkind, 2015), where "a cyber-invasion brought Sony Pictures to its knees and terrified corporate America". The hack revealing sensitive internal information hit the company's executive completely unaware, and being unable to respond properly finally resulted in a canceled movie release and the loss of millions of dollars. This shows how a hands-off approach to digitalization can leave companies increasingly vulnerable to competitive, financial, compliance and reputational risks (Nash, 2012; Valentine, 2014). Even though future developments cannot be predicted accurately and we need to rely on some general assumptions, current developments indicate the implications of digitalization as follows. Although there are most likely other topics to be added, we argue that these are the most important challenges organizations may face and need to deal with in order to maintain or strengthen their competitive advantages.

We assume that literally all organizations will face the impacts of digitalization in the future, thus requiring them to adapt and reconfigure their resources to fit the new environments. In the upcoming paragraphs we describe how a constantly changing strategic context, short-term strategizing, the availability of large amounts of data or crowd-approaches in knowledge sharing provide different opportunities and threats which organizations will be impacted by and have to deal with.

3.1 Changing Strategic Context

Digitalization is causing rapid changes and greater complexities within the strategic environment and therefore significantly affecting how organizations do business (Ko & Fink, 2010). It drives the diminishing of entry-barriers and disrupts existing value-chains, industry structures and business models (Schwab, 2016). This opens the market for focused and fast-moving competitors, resulting in an increased competition on the global level (Hirt & Willmott, 2014). This makes dynamic capabilities an essential success factor for organizations (Lasi, Fettke, Kemper, Feld, & Hoffmann, 2014). At the same time, digitalization can impose major threats as new technologies create a high degree of transparency, making it easy to compare prices, service levels, and product performance, thus leading to the loss of the information monopoly and to a "strictly competitive game" between companies (Ernest & Young, 2011). This

constantly changes the strategic context, where portfolios of temporary advantages are developed opposed to sustained competitive advantages, which might erode quickly (Kriz, Voolab, & Yukselb, 2014).

3.2 Sensor- and Crowd- Approaches

The great use of digital devices, social networks and media entail increasing online collaboration in the so-called "crowd" (Newell & Marabelli, 2014). In the crowd, individuals can access and share information and knowledge at nearly any time and place based on mutual interests and objectives (Newell & Marabelli, 2014). Organizations may take advantage of the crowd whose ideas and expertise provide answers to problems or can be used to sense and seize new opportunities.

Digital devices possess sensors that collect information about individuals, organizations, and society at large (Newell & Marabelli, 2014). Through the use of these tracking devices there is a shift towards a sensor society where digital information is collected about people's preferences, what they do, and with whom they interact (Zuboff, 2015). Organizations may make use of this data to generate knowledge, which enables sensing of opportunities as well as faster and more precise decision-making as general trends can be forecasted and individual preferences analysed (Mayer-Schönberger & Cukier, 2013; McAfee, Brynjolfsson, Davenport, Patil, & Barton, 2012; Newell & Marabelli, 2014). In this regard, online collaborations and information exchange in "crowds" and digital traces of individual activities detected by "sensors" are frequently discussed as aspects that impact data driven knowledge and the generation of big data.

3.3 Big Data

Digitalization induces great changes in the way knowledge is generated by data made available to organizations. This data driven knowledge built upon "large data volumes generated and made available on the internet and the current digital media ecosystems" (Constantiou & Kallinikos, 2015, p.2) is often referred to as "big data". Big data is predicted to impact organizations and their practices tremendously, not only in one area but across disciplines (Dahlberg & Nokkala, 2015, Zuboff, 2015). It might have the power to "become a key basis of competition" (Manyika et al., 2011). The availability of such data as well as the ability of companies to assimilate it and apply it to commercial ends, thus utilizing their absorptive capacities influences the way strategizing and decision-making is performed (Constantiou & Kallinikos, 2015; Newell & Marabelli, 2015).

3.4 Short-term Strategizing

Data and information about consumer needs and competitive environments are produced continually (Dreischmeier, Close, & Trichet, 2015) and using this data as input for the strategy process creates possibilities to sense and seize opportunities quicker. It also requires organizations to possess adaptive capabilities, as real-time responses to strategic issues that often rely on big data "collected through systematic and purposeful processes that address specific information needs" (Constantiou & Kallinikos, 2015, p.4) require strategic flexibility. Accordingly, traditional strategic tools with the purpose to make long term strategic predictions are challenged as it becomes significantly more difficult to forecast future trends and assign responsibilities to execute a long term plan when strategic contexts are continuously changing (Dreischmeier et al., 2015). Instead, organizations adjust to short-term strategic planning where ad-hoc concerns and adaptability to continuously changing requirements become increasingly important (Constantiou & Kallinikos, 2015).

3.5 Disappearance of Organizational Boundaries

Following crowd approach arguments, Newell and Marabelli (2014) argue that knowledge and information sharing will take place beyond organizational boundaries. Sole internal information and knowledge flow may be replaced through systems where external players are involved in ways that these interactions create mutual value (Newell & Marabelli, 2014). Companies need to secure their place in the digital ecosystems, which "are disrupting businesses in nearly every consumer-centric industry through close collaboration among partners, institutions, and customers" (Dreischmeier et al., 2015). They attempt to do so by building alliances with external companies, setting up inter-organizational projects and temporarily acquiring capacities with the aim to achieve common goals. Such collaborations across the broader digital ecosystems may become core to strategizing and require firms to develop their abilities in taking in knowledge, learning from partners and assimilating information into firm-embedded knowledge. At the same time, the disappearance of organizational boundaries enforces the paradox of knowledge sharing versus the protection of core capabilities. The effective management of such strategic paradoxes (Smith, 2014) might become a key success factor.

We argue that boards as the main decision-making body at the apex of an organization may play a key role in how organizations develop their dynamic capabilities (O Reilly & Tushman 2007; Teece 2007) and respond to the

aforementioned implications of digitalization (Valentine, 2014). The threats and opportunities organizations will face are something that boards are becoming increasingly aware of (Ko & Fink, 2010; Valentine & Stewart, 2013), but in practice are relatively little involved in so far (Andriole, 2009). In order to create value for organizations, we contend that boards get involved in the strategic decision process concerning and impacting digital technologies. This is in line with emerging research which suggests that boards can no longer ignore or avoid major strategic decisions concerning digital technologies (Jewer & Mckay, 2012; Valentine, 2014). Boards involved in these decisions can provide significant value by challenging the main assumptions, checking that investment choices and digital technology priorities will maximize returns and minimize risks, and seizing technological opportunities before they fully materialize (Valentine & Stewart, 2013). Boards that hold a narrow, defensive view to these questions risk "flying blind" (Carter & Lorsch, 2004). Furthermore, by taking an active role in these matters they may gain legitimacy as change agents, which impacts how different organizational levels deal with change and how firms may develop dynamic capabilities (Huy, Corley, & Kraatz, 2014).

The way how boards in the future work to contribute to organizational value creation is related to the question how digitalization may impact organizations and challenge their competitive advantage. The discussed developments invite us to examine how boards will be impacted by and respond to the changes caused by digitalization. Our aim is to introduce a framework and present propositions in two main areas where we see adaptation possibilities. In the following chapter we argue for these impacts and responses, and suggest i) that boards may develop to networks, and ii) that a board agenda may replace board tasks.

Digitalization	Changing strategic context	From Boards to Networks	Proposition 1	As the crowd will have (indirect) control power over managerial behavior, the need for boards to control on behalf of shareholders will diminish, thus reducing the emphasis given to board independence.	(Boivie, 2015; Newell & Marabelli, 2014; Orlikowski & Scott, 2014)
	Short-term strategizing		Proposition 2	Boards will become virtual networks of people that constantly sense and seize opportunities to reconfigure the organization.	(Schwab, 2016; Valentine & Stewart, 2013;
			Proposition 3	As boards become virtual networks of people, shared leadership excellence will become increasingly important.	(Pearce & Conger, 2003; Vandewaerde et al., 2011)
	Sensor- and crowd approaches	From Board Tasks to a Board Agenda	Proposition 4	The board will focus on a dynamic agenda based on changed organizational threats and opportunities in a digitalized environment.	(Nicholson and Newton, 2010; Valentine, 2014)
	Big data		Proposition 5	The board agenda will be built around knowledge management, knowledge sharing, and learning behavior to meet the requirements of a constantly changing strategic context.	(Chen et al., 2009; Reychav & Vikas, 2011)
	Disappearance of organizational boundaries		Proposition 6	The committee structure will reflect the changed boardroom agenda (e.g. IT Security Committee, Knowledge Management Committee).	(Capgemini Consulting, 2013; ITGI, 2011)
Organizational level	**Board level**				

Figure 1. Framework about the implications of digitalization for organizations and boards

4. From Boards to Networks

Traditionally much of the literature examining boards have relied on agency perspectives where boards are responsible for controlling managerial behavior on behalf of shareholders (Fama & Jensen, 1983). Especially skyrocketing executive payments led to the dominant perspective that boards may contribute to the organizational performance by controlling executive behavior. As a consequence, director independence has been emphasized (Daily, Dalton, & Cannella, 2003) and research in the last decades to a large degree focused on board compositional factors such as the ratio of outside directors and CEO duality (Finkelstein & Mooney, 2003). However, research continuously struggled to provide evidence for the link between boards and their characteristics, and firm financial performance (Daily et al., 2003). Nevertheless, basically all policies and corporate governance codes around the globe are based on this perspective (see the G20/OECD Principles of Corporate Governance 2015 as a recent example), and boards in recent years became more "independent" than ever before. As such, relying solely on overly simplistic agency theoretical assumptions of complete contracting and rational decision-makers does not seem to have full explanatory power over boards' potential contributions. The lack of empirical evidence, linking board independence with boards' impact on organizational value creation provides further support for these arguments calling for new perspectives on board research (Huse, Hoskisson, Zattoni, & Viganò, 2011). Corporate scandals in the first decade of the new century such as Enron and Worldcom gave further reasons to question the role of boards in general and the main assumptions about the predominant theoretical agency perspectives in particular. Furthermore, as stakeholder perspectives are more and more emphasized (Tihanyi et al., 2015) and managerial actions shift towards

targeting the "triple bottom line" which encompasses profit, people, and the planet (e.g. Jayachandran, Kalaignanam, & Eilert, 2013; McDonnell & King, 2013), a framework considering boards as agents of shareholders doesn't seem to fully capture recent developments.

For long, board tasks other than control were also emphasized (Zahra & Pearce, 1989), and boards may rather be seen as strategic decision-making groups (Forbes & Milliken, 1999). Recently, a huge body of literature started looking into the various dynamics inside and outside the boardroom trying to explain boards' involvement in different tasks and link this with organizational outcomes (e.g. Huse, 2005; Minichilli, Zattoni, Nielsen, & Huse, 2012; Zattoni, Gnan, & Huse, 2015). In order to understand their actual behavior, approaches focusing on board processes were applied (Finkelstein & Mooney, 2003). Without doubt these extensive research efforts have tremendously contributed to our understanding of boards, and set ground for corporate governance guidelines and codes of best practice aiming at organizational value creation.

In this light and taking the changes digitalization brings into account, we argue that the importance of independent directors to effectively control management will erode as the main criterion for board assignments. Where previous information sharing was largely internal, in a digital world the sharing of information extends beyond organizational boundaries. The crowd generates and shares information and knowledge about organizations in form of reviews and comments, being easily publicly available (Newell & Marabelli, 2014). Such reviews and comments have been found to influence how stakeholders view organizations, and they impact how organizations and the executive team behave (Orlikowski & Scott, 2014). As such, the crowd may have indirect control power over the management when information about the organization is easily accessible. Furthermore, as digital traces are continuously left behind and more information is publicly available, management will accept to be increasingly transparent to the crowd and adapt its behavior.

In this regard, using publicly available information, the power of the crowd has already been proven in different contexts. In recent scandals about PhD dissertation plagiarism of German top politicians, official institutions failed but the misbehavior of individuals was detected and signaled by the crowd. Assuming that guidelines ensuring transparency of relevant corporate information are in place, why should it not be the crowd controlling on the relevant stakeholders' behalf? Of course, controversial arguments related to the need of firm-specific knowledge and insights of the board will come up. But in times where the complexity of company structures and processes, globalization, and information amount increases, whether or not boards are at all still capable to control, needs to be questioned (Boivie, 2015). We suggest that this may lead to reduced monitoring needs previously performed by boards, reducing the need for board independence.

Proposition 1: As the crowd will have (indirect) control power over managerial behavior, the need for boards to control on behalf of shareholders will diminish, thus reducing the emphasis given to board independence.

With digitalization becoming a fundamental part of today's business environment requiring rapid responses to the changing strategic context, we argue that boards need to be able to comprehend and anticipate drivers that constitute sources of constant surprises (Valentine & Stewart, 2013). As such, they need to challenge current assumptions of organizations, sense and seize opportunities that the management can implement, but also ratify strategic decisions concerning the reconfiguration of organizations to align them to the external environment. According to Schwab (2016), organizations that are not able to respond to the changing environment will be disrupted.

An important question in this regard is how organizations and its owners are able to ensure that boards contribute to organizational reconfiguration and reinvention before the organization is disrupted. Depending on the national context, the structure of boards and how they are embedded within the organization, the broader governance context may vary tremendously (e.g. one-tier vs. two-tier boards). However, most boards have in common that they consist of a stable number of members who are assigned to the board and are held accountable to fulfill the board's legal duties (Huse, 2007). We want to question the common practice where the same fixed group of members attends board meetings. We rather suggest that boards need to operate as (virtual) networks where formal board boundaries will eventually disappear. With a constantly changing strategic context and the increasing complexity of decision-making caused by digitalization, boards may rather contribute to organizational value creation by continuously selecting, configuring, aligning and modifying its competence structure in a way that matches the challenges of the organization. To address the short-termism of a rapidly changing environment, boards may call in experts (out of the virtual network) based on their individual competencies on short-notice. This may imply that boards consist of a core group of members who on the one hand fulfill the legal duties, and on the other hand have considerable firm-specific competencies and the ability to manage a network of people (which we argue for in the upcoming section). A (virtual) network of non-core members may then create value by providing easy access to

competencies leading to a stronger ability to sense and seize opportunities and threats, faster and more effective decision-making, and thus reducing the likelihood of organizational disruption. With the above arguments we proclaim the following:

Proposition 2: Boards will become virtual networks of people that constantly sense and seize opportunities to reconfigure the organization.

In a digital world where constantly changing environments require a higher capacity to develop dynamic capabilities and handle complexities, board leadership need to be given even greater emphasis (Vandewaerde, Voordeckers, Lambrechts, & Bammens, 2011). We find the shared leadership theory useful for explaining leadership excellence in dynamic and complex environments. Pearce and Conger (2003) define shared leadership as "a dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of group or organizational goals or both". We argue that digitalization will intensify the dynamic interactive influence process in boards, thus requiring more board shared leadership excellence. There are two main arguments for this. First, leadership requirements increase as changes in business environments take place at increasing pace. This requires more proactive leadership, an ability to manage several changes at the same time and make faster decisions (Capgemini Consulting, 2013). These developments put leadership abilities to the test and require leadership excellence to orchestrate the board in a direction that organizational goals can be achieved. As these future demands are likely to exceed individual's capacities, we argue for the importance of a shared leadership approach, performed by the core group of board members. Second, in a board structure extending beyond the formal core group of members, the demands on shared leadership excellence increase, as processes get more complex and as the network of people increases. Under such circumstances, leadership requirements include effective identification and coordination of resources, building inter-organizational partnerships and increased communication demands. With these arguments we assert:

Proposition 3: As boards become virtual networks of people, shared leadership excellence will become increasingly important.

5. From Board Tasks to a Board Agenda

It is somehow surprising that most research on boards has ignored the content of different tasks and what is included in them. In this regard, Nicholson and Newton (2010) argue that it may be time to move beyond examining certain board tasks and rather focus on an agenda-driven perspective. This is in line with Huse (2007), who argues that boards should be involved in a way that value is created for the company, regardless of the tasks performed. We propose that in an era of digitalization this becomes even more important and suggest rethinking the way board tasks are discussed.

In a more and more volatile and fast changing business environment, "nowcasting" based on the availability of big data complements former forecasting strategies (Constantiou & Kallinikos, 2015). Accordingly, boards as the main organizational decision-making entities need to adapt their agendas to the constantly changing strategic context and changing business environments, taking the increased strategic short-termism into account. While responding to these issues, it may not be sufficient anymore to stick to predefined board tasks but rather match the board agenda with the identified short-term strategies in order to discuss and ratify them in real-time. This may also imply that board meetings and interactions between board members and management take place ad-hoc, complemented by few regularly scheduled meetings.

As a consequence of digitalization, the agenda will not only become more dynamic, but the topics on the agenda may underlie a great change based on organizational threats and opportunities. For instance, while digitalization is already felt beyond the IT department and integrated into the processes and structures of (almost) all business units, it is acknowledged as a topic of increasing importance in the boardroom (Valentine & Stewart, 2013). Boards need to sense and identify the topics that can potentially impact the sustained competitive advantage of the company and bring them to the agenda. These topics might be very different in the future compared to what we see now. We do not attempt to provide an exhaustive list, but these may include topics such as the management of cybersecurity risks (Czarnecki, 2015), the integration of technology strategies into organizational strategy (Valentine, 2014), addressing the digital talent gap (Capgemini Consulting, 2013), and the implementation of processes regarding knowledge management and learning behavior.

Proposition 4: The board will focus on a dynamic agenda based on changed organizational threats and opportunities in a digitalized environment.

Organizational knowledge might be one of the most crucial resources that organizations possess (Reychav & Vikas, 2011). The accumulation, organization, and distribution of this knowledge is often referred to as knowledge

management and knowledge sharing. In a world of technology intensification, knowledge sharing and knowledge management both within and across organizational boarders becomes increasingly important in order to enhance dynamic capabilities and thus ensuring excellence and competitiveness (El Said 2015, Reychav & Vikas, 2011). The development of dynamic capabilities must take place in processes of organizational learning (Teece, Pisano, & Shuen, 1997), as learning contributes to the effective adaption to changing strategic contexts and the implementation of new processes in constantly changing environments (Chen, Lee, & Lay, 2009). Accordingly, learning and knowledge sharing allowing leaders to combine and integrate knowledge might enable teams to develop their absorptive capacity (Kor & Mesko, 2013), thus improving their ability to be open to new possibilities and adapt to new strategic contexts.

Knowledge management and knowledge sharing is a major topic boards need to consider for organizations to sustain their competitiveness. It is a thin line using the publicly available information and at the same time protecting the most important firm knowledge (Newell & Marabelli, 2014). Not all knowledge may be precious resources and the use of the crowd provides tremendous potentials when this knowledge is shared outside organizational borders. As this type of knowledge sharing may come with major downsides as well (Smith, Baxter, Boss, & Hunton, 2012), boards on the one hand need to decide how to manage and share knowledge, and on the other hand need to get involved in effectively managing the associated risks. Furthermore, boards may address and refine strategic plans that touch organizational learning processes in order to develop dynamic capabilities and assure that the organization adapts to new strategic contexts and changing environments. Deliberate learning mechanisms where knowledge is codified and articulated may be efficient for developing dynamic capabilities, but also for learning that encourages discontinuity from past paths entailing creative search, strategic sense making and creation of new knowledge trajectories (Barreto, 2009). Based on these arguments, we suggest that the board agenda will be built around knowledge management and learning behavior.

Proposition 5: The board agenda will be built around knowledge management, knowledge sharing, and learning behavior to meet the requirements of a constantly changing strategic context.

The changing board agenda based on the shifts in organizational threats and opportunities may as well affect the committee structure of an organization. Committees are in general installed where special expertise going beyond regular board competencies is needed. Currently it is most likely that either the audit or the risk committee is dealing with digital issues such as IT governance or the management of cybersecurity threats (Czarnecki, 2015). A special committee dealing with such matters is seldom in place as per today, even though these issues may be the major organizational threats. According to ITGI (2011), less than 25% of organizations have dedicated technology committees. This is even more surprising as boards in general lack the competencies needed to effectively deal with these matters (Valentine, 2014). Czarnecki (2015) even connects this lack of competencies with the corporate failures in the US in the pre-Sarbanes-Oxley era. To prevent such failures, committees are needed to deal with the digital agenda of companies, which the board can seek advice from. Main tasks of such a committee may be for instance to ratify that information systems architecture will support the strategies of the company to validate the effective use of data security tools to evaluate data breach response plans and to oversight the managements' abilities to execute them. This is only one example of how a changing board agenda may change the committee structure. One could easily think of a knowledge management committee, which is accountable for the inter-organizational knowledge management (acquiring, sharing, protecting) and may also deal with managing the digital talent gap (Capgemini Consulting, 2013).

Proposition 6: The committee structure will reflect the changed boardroom agenda (e.g. IT Security Committee, Knowledge Management Committee).

6. Conclusion

The aim of this paper was to propose a future research agenda based on how boards might add value for organizations dealing with the challenges caused by a digital revolution and by doing so to advance the fields of boards of directors and corporate governance. We thus invite other scholars to pick up the propositions made in this study and to contribute to a joint understanding of how boards adapt to meet the future challenges. What these may look like in detail is a question which is hard to answer. Research on the impact of digitalization is scarce and little is understood about the effects on organizations in general and boards in particular. Therefore, we need to ground our work on some general assumptions about what organizations will look like and how they will do business in the future. Nevertheless, we are most likely at a turning point entering a new era of corporate governance. The dramatic changes we predict require that scholars start to rethink and question what we know about boards and corporate governance. Without any doubt, it is important to consider the lessons learnt from the past, but in a more dynamic and fast changing world it might be even more important to think ahead and identify the upcoming topics of importance. We need to develop an

understanding of boards in the future and predict what their role within organizations and the corporate governance framework will be in order to have a real contribution for practice and society. Sticking to the current general approaches in corporate governance might add little value (Ahrens, Filatotchev, & Thomsen, 2011). This is why we are convinced that this is the right time to start this discussion. In this light, we are also happy to see that this important topic has recently gained increased scholarly attention across various disciplines and gets coverage in leading management conferences (see e.g. AOM 2015 Theme: Opening Governance).

Based on the impact digitalization may have on organizations, we find that the dynamic capabilities perspective can be successfully applied to explain what makes boards fit for future organizational needs in two main areas. First, we find that boards may develop towards virtual networks of capable people and how this affects board requirements as well as board leadership. Second, we suggest that the focus on board tasks may change towards an agenda driven perspective as already proposed in a similar way by Nicholson and Newton (2010). In this regard, our findings highlight the increasing dynamics inside and outside the boardroom and we argue about the importance of boards' contribution to organizational dynamic capabilities as well as underpinning forms of knowledge management and learning. With such an approach, we contribute to the understanding of corporate governance in general and boards of directors in particular in a digitalized world. We connect two very distinct streams of literature, namely information system and general management literature. We provide practitioners with important aspects that need consideration in the future when reconfiguring boards in a way that they can contribute to organizational value creation. Furthermore, our study provides policy makers with new insights of board development which may be used to proactively implement codes of best practice in a new era of corporate governance. Such proactivity might ensure corporate governance codes which are beneficial for organizations and society in an increasingly digital world.

The purpose of this study was to provide a starting point for research and practice that can be used for further examination of boards of directors. We acknowledge that we chose a general approach in this study, looking into potential organizational changes that might impact boards in the (near) digital future. By doing so, we recognize that this is a limitation of the study as we do not limit our propositions to any national context and there may be different policies and legislative settings as per today that are contradictory to what we propose. Nevertheless, we want to provide an overview of what might be needed regardless of the national setting and invite policy makers to challenge regulations and codes of best practice in this light. Future research might pick up and adapt our framework to examine it in a specific context. In addition, as the direct effects of digitalization such as directors' digital capabilities and the use of technology in the boardroom are not within the scope of this study, this might be an interesting avenue for future research. Further, we do not attempt to provide a holistic overview of all changes that may take place, but try to suggest specific areas we assume worth to be looked into. As we limit the focus of our study to the identified propositions, we do not focus on areas that may stay unchanged such as the tasks of executive nomination, compensation, and termination. We want to encourage other scholars to add to this list and contribute towards a holistic perspective on boards. Furthermore, the propositions presented in this study may be operationalized, empirically tested and conceptually discussed in greater detail. With such an approach, research on boards may have real and applicable practical implications. This may make boards fit to meet future demands in a digitalized world and contribute to value creation and sustained competitive advantages in the organizations of tomorrow.

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