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Leader's Personal Need for Structure and the Subordinate's Perceived Autonomy in a Digital Transformation Process: The Moderating Roles of Leader's Trust in Subordinates and Digital Self-Efficacy

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Abstract

Digital transformations challenge traditional leadership models, and new leadership practices are required to manage digital change successfully. The goal of this study was to research the relationship between leader characteristics and employee outcomes in these processes. Since employee autonomy is seen as an essential factor for digital transformations, our study investigated the impact of leaders' personal need for structure (PNS) on subordinates' perceived autonomy in a digital transformation process. The leaders' trust in subordinates and the leaders' digital self-efficacy (DSE) were examined as possible moderators. In order to get a deeper understanding of leaders' intention-behavior relationship, the Reasoned Action Approach was utilized as a theoretical framework. A multilevel modeling approach, that combined data of leaders and their subordinates, was used in this study. The results showed that a leader's PNS was negatively related to employees' perceived autonomy. Further, we found that the negative relationship between a leader's PNS and employee autonomy was moderated by a leader's DSE. Leaders' trust in subordinates was not found to be a significant moderator. However, an unpredicted finding revealed a direct effect of leaders' trust in subordinates on employee autonomy. Our study offers important theoretical as well as practical implications. Based on our findings, organizations are advised to reevaluate their leadership development programs and provide leaders with appropriate training in order to help them to lead a digital transformation successfully. We conclude with recommendations for future research.

Table of Contents

List of Tables and Figures

Introduction

New technologies have changed the way organizations work permanently (Cortellazzo, Bruni & Zampieri, 2019). Since technologies have the potential to reshape and transform business processes in order to meet the demands of the digital age, they are perceived as the driver of a profound transformation (Cortellazzo et al., 2019; Tsai, 2003). Such transformations create new processes and challenges which may require leaders to reassess the skills necessary to lead a digital transformation (Cortellazzo et al., 2019). A digital transformation is defined as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication and connectivity technologies" (Vial, 2019, p.1). More precisely, within a firm, a digital transformation can be characterized as an organizational shift to, for instance, big data, cloud, mobile, and social media platforms (Nwankpa & Roumani, 2016, p.1). Although digital technologies enable new forms of dependencies and collaboration, digital transformations entail ambiguity as well as uncertainty and put pressure on organizations to sustain their competitive advantage as it becomes more difficult to control the firm's operating environment (Vial, 2019). Consequently, this transformation will affect leader responsibilities and how the leader leads and engages employees, which is why the old hierarchical leadership system might not be sufficient anymore, and a renewal of leadership models seems to be necessary in digital change. When organizations conduct digital transformations, there is an increased distribution of information and organizational power becomes more decentralized (Cortellazzo et al., 2019). Hereby, control activities previously exercised by leaders are about to disappear (Schwarzmüller, Brosi, Duman & Welpe, 2018), which indicates the importance of conducting digital change through bottom-up processes. Such processes increase employees' influence in organizations and create an arena for followers to partake in decision-making processes, thus gaining more autonomy at work (Schwarzmüller et al., 2018). Autonomy has been defined as the independence, freedom, and discretion an individual at work has to schedule and determine the procedures necessary to perform said work (Hackman & Oldham, 1976) and has been shown to be one of the most important factors supporting a digital transformation (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018; Schwarzmüller et al., 2018).

For employees to perceive autonomy, the leader needs to delegate tasks and responsibilities (Riisgaard, Nexøe, Le, Søndergaard & Ledderer, 2016). When exploring the determinants of leaders' behaviors in response to disruptive change, managerial cognition is considered to be essential (Osiyevskyy & Dewald, 2015). Since social-cognitive aspects of leaders can impact the decision to delegate authority (Haselhuhn, Wong & Ormiston, 2017), it may be vital to explore leaders' cognitive framework and their attitude towards employee autonomy in the process of delegating in digital change. Although the cognitive aspects of work make up a significant part of leaders' contribution to organizations, there is still a lack of research about these cognitive processes (Pech, 2003; Stubbart, 1989). In addition, factors that influence the intentions of leaders to support their subordinates have often been disregarded in previous studies (Van Dierendonck & Driehuizen, 2015). Since cognitive processes can affect behavioral responses (Nagel, 2013), differences in leaders' cognitive framework could affect how the leaders regulate their behavior. For instance, leaders could differ in their cognitive approach to grant autonomy, which in turn would create differences in how employees are empowered to engage in a digital transformation. In order to explore these differences in leaders' cognitive processing, and to provide a theoretical context for our research, we will use the Reasoned Action Approach (RAA) (Fishbein & Ajzen, 2010). RAA seeks to provide insight into the intention-behavior relation and suggests individual background factors, such as personal dispositions and characteristics, as origins of three different beliefs that produce a readiness to perform a behavior (Fishbein & Ajzen, 2010). *Behavioral beliefs,* which are the beliefs and evaluations a person holds in regard to performing a specific behavior, are considered to be the basis for favorable or unfavorable attitudes towards the behavior (Ajzen, 2012). *Normative beliefs,* which describe the "beliefs about the normative expectations and actions of important referents and motivation to comply with these referents" (Ajzen, 2012, p.18), can lead to social pressure or a subjective norm. Lastly, *control beliefs* are defined as "beliefs about the presence of factors that may facilitate or impede the performance of the behavior and the perceived power of these factors" (Ajzen, 2012, p.18) and can produce perceived behavioral control. In other words, the leaders' attitude towards a behavior, the leaders' perceived norms, and their perceived behavioral control together form behavioral intentions, which in turn influence a behavior (Fishbein

& Ajzen, 2010). In order to manage highly complex and uncertain environments, leaders nowadays are required to cultivate "a high tolerance, if not a passion, for ambiguity" (Finzi, Lipton & Firth, 2017, p.2). Since the process of delegation involves uncertainty and risk (Braun, 2006), the leader's tolerance for ambiguity may be critical when examining the delegation of responsibility to subordinates in digital transformations. As it is still underexplored how leaders' individual differences can impact the decision to delegate (Haselhuhn et al., 2017, p.4), this study investigates how the leaders' tolerance for ambiguity can impact leaders' intention to delegate and grant autonomy to subordinates in digital transformations and whether this process is moderated by leaders' trust in subordinates and leaders' digital self-efficacy.

In order to address leaders' tolerance for ambiguity, we will investigate leaders' personal need for structure (PNS) in the context of a digital transformation and its effect on employee autonomy. PNS describes an individual's reaction to ambiguity and can be seen as a desire for either high structure or low structure (Neuberg & Newsom, 1993). While leaders with a high PNS tend to prefer simplicity, certainty, and predictability, and usually act in a risk avoidant manner, people low in PNS usually prefer and even desire situations that are complex, uncertain, or novel (Meertens & Lion, 2008; Neuberg & Newsom, 1993; Routledge, Juhl & Vess, 2010). Only rather few studies have focused on the effects of PNS in organizational contexts so far (e.g., Elovainio & Kivimäki, 2001; Kivimäki, Elovainio & Nord, 1996; Pundt & Venz, 2017; Slijkhuis, 2012; Slijkhuis, Rietzschel & Van Yperen, 2013). Previous research on PNS has additionally often concentrated on the PNS of the employee (e.g., Slijkhuis, 2012) instead of the leader. As the degree of PNS, and thus their tolerance for ambiguity, may vary from leader to leader, PNS may play a vital role as a background factor that impacts leaders' behavioral beliefs, which could affect their readiness to grant autonomy to their subordinates during digital change.

However, according to RAA, the different beliefs (i.e., behavioral, normative and control) can intertwine in influencing the subsequent behavior (Fishbein & Ajzen, 2010). Therefore, to better understand the whole process suggested in RAA, we discuss the leaders' normative and control beliefs as boundary conditions of the relationship between a leader's PNS and employee autonomy. Since normative beliefs consider, for instance, a leader's perception of

suitable behavior in leader-subordinate relations, we propose that an influencing background factor of these normative beliefs could be a leader's trust in his or her subordinate. A leader's trust in subordinates is "manifested by the assessment of another person's trustworthiness and willingness to be vulnerable through transferring authority or delegating tasks and responsibilities to subordinates" (Ladegard & Gjerde, 2014, p.24). The focus of previous research has typically been on the subordinate's trust in the leader (Ladegard & Gjerde, 2014). We, however, will concentrate on the opposite process and investigate the leader's trust in subordinates, as this field has not been thoroughly studied yet (Chiu & Chiang, 2019; Fulmer & Gelfand, 2012). Since we believe that leaders' trust in subordinates may affect their beliefs about the actions of subordinates, it can be interesting to explore whether leaders' trust in subordinates can affect the leader's reaction to ambiguity, and whether this can moderate the relation between a leader's PNS and a subordinate's perceived autonomy.

Moreover, since the lack of digital skills is one of the top challenges for organizations in such a process (Buvat et al., 2017), we address the construct of digital self-efficacy (DSE), as an extension of Bandura's self-efficacy (1977). DSE is defined as the belief that one can master digital technologies to accomplish their work (Wong, Cerne & Solberg, 2020). Since DSE can impact leaders' perceptions of their capability of and control over digital technologies, leaders' DSE may function as an individual background factor that affects their control beliefs, which can inhibit or facilitate a particular behavior in a digital transformation. As this perception of control might affect the leader's tolerance for ambiguity, we believe that a leader's DSE can moderate the relationship between a leader's PNS and employee autonomy.

So far, only few studies have investigated leader characteristics as potential antecedents of leaders' tendency to delegate and to grant autonomy (Haselhuhn et al., 2017; Slemp, Kern, Patrick & Ryan, 2018). Given the relevance of autonomy in digital transformations, we will discuss differences in leaders' cognitive framework that could affect subordinates' perceived autonomy in this context. Since intentions towards performing a behavior can even follow automatically and unconsciously from underlying beliefs (Fishbein & Ajzen, 2010), it may become critical to explore whether a high or low PNS (i.e., tolerance for ambiguity) in a leader can impact leaders' beliefs and consequent

behavior as well as employee outcomes in a digital transformation. By exploring leaders' PNS, DSE and trust in subordinates as influencing factors for the different beliefs suggested in RAA, our research will contribute to a deeper understanding of leaders' cognitive framework in digital change. More precisely, we will shed light on leaders' behavioral intentions to grant autonomy in a digital transformation. Although RAA has previously been applied to understand behaviors related to health protection and risk (Conner, McEachan, Lawton & Gardner, 2017; Hagger, Polet & Lintunen, 2018), it has to our knowledge never been used to address potential implications of leaders' PNS on employee autonomy in a digital transformation. Taken together, as "extant literature on leadership in the context of digital business transformation is still in its infancy" (Larjovuori, Bordi & Heikkilä-Tammi, 2018, p.2), we contribute to a more comprehensive understanding of the relationship between leaders' characteristics and their inclination to grant autonomy in digital transformations.

Theoretical Review

The Effect of a Leader's Personal Need for Structure on Employee Autonomy

In order for organizations to capture the value necessary to remain competitive in the digital world, they need to address the full complexity of digital transformations, which includes changes in organizational structures, processes, and culture (Vial, 2019). For instance, when an organization undergoes structural changes, employees are often led to assume roles outside of their functions (Vial, 2019). However, it has been shown that employees can resist and demonstrate change when organizations introduce disruptive technology to the workplace (Fitzgerald, Kruschwitz, Bonnet & Welch, 2014; Lucas Jr & Goh, 2009; Singh & Hess, 2017). To overcome resistance when facing change, organizations are required to have processes that enable flexibility (Vial, 2019). In order to obtain flexibility, autonomy is seen as a necessary condition (Morgan, 2015). Consequently, for employees to inaugurate increased initiatives and responsibilities, they need to perceive autonomy because autonomy has been found to promote positive responses to structural changes in organizations (Hornung & Rousseau, 2007). Autonomy has been argued to be multifaceted and to consist of three interrelated aspects, namely decision-making autonomy, work methods autonomy, and work scheduling autonomy (Morgeson & Humphrey, 2006). Decision-making autonomy is defined as having the freedom to make decisions at work, while work methods autonomy is described as the freedom to control which methods to utilize to perform work (Morgeson & Humphrey, 2006). Furthermore, work scheduling autonomy involves the discretion to schedule and control the timing of work (Morgeson & Humphrey, 2006, 2008). Due to the complex and volatile nature of digital transformations, all dimensions of autonomy may be needed in order to conduct such a process successfully. However, leaders might have varying attitudes towards letting employees decide on the method and timing for their work or when and how to involve employees in decision-making processes.

Oftentimes, autonomy is seen as the result of delegating task responsibility to subordinates (Cleavenger & Munyon, 2013; Riisgaard et al., 2016). When employees perceive a high degree of autonomy, they depend less on their leader's direction and increase emphasis on their individual contributions to work

outcomes (Cleavenger & Munyon, 2013). Due to the high speed and the complexity of digital transformations, leaders often do not have the capacities or knowledge to respond fast enough, which is why the delegation of tasks and responsibility from the leader to the subordinate, and the diffusion of decision-making deep into the organization are core elements in a digital transformation (Schwarzmüller et al., 2018). In doing so, the rapid decisions resulting from decentralized processes can keep up with the speed of the digital world (Schwarzmüller et al., 2018). Therefore, employee autonomy is considered to be one of the most important factors supporting a digital transformation (Hemerling et al., 2018; Westerman, Soule & Eswaran, 2019).

Digital transformations can be seen as a fundamental change process (Goerzig & Bauernhansl, 2018). In change processes, a central element is how leaders manage uncertainties introduced by radical change (Judge, Thoresen, Pucik & Welbourne, 1999). Organizational members are more likely to engage in change-supportive behaviors, when they have "positive evaluations of the change, based on beliefs about the positive consequences for themselves or the organization" (Straatmann, Kohnke, Hattrup & Mueller, 2016, p. 269). Thus, the attitude towards change is often decided by the factor of uncertainty that usually follows (Stoffers & Mordant-Dols, 2015). Perceived uncertainty is often examined as a major predictor of stress (Greco & Roger, 2003). Earlier findings have shown that personal characteristics impact how individuals react to stressful situations in their workplace (Fugate, Kinicki & Scheck, 2002; Oreg; 2003). This, in turn, will influence a leader's reaction to organizational change processes (Vakola, Armenakis & Oreg, 2013). Applying this to leading a digital transformation, we believe that leaders' differing personal characteristics could result in contrasting enactments of granting autonomy to subordinates. In order to research the impact of such personal characteristics in a digital transformation, we will explore the relationship between a leader's personal need for structure and employee autonomy.

Personal need for structure is a desire to structure knowledge, where individuals with a high PNS seek more structure than those with a low PNS (Vess, Routledge, Landau & Arndt, 2009). In organizations where individuals have to face complex settings filled with information, they may continuously try to reduce their cognitive information load (Neuberg & Newsom, 1993). This reduction

happens through the attempt to "structure the world into a simplified, more manageable form" (Neuberg & Newsom, 1993, p.113). Therefore, it was argued that "people meaningfully differ in the extent to which they are dispositionally motivated to cognitively structure their worlds in simple, unambiguous ways" (Neuberg & Newsom, 1993, p.114). PNS reflects the extent "to which people prefer to view the world in clear, unambiguous, and orderly terms" (Routledge et al., 2010, p.244) and it has been shown that individuals with a low PNS gain psychological security by becoming more cognitively and attitudinally flexible (Routledge et al., 2010, p.244). On the other hand, individuals with a high PNS will become more cognitively and attitudinally rigid over time (Routledge et al., 2010, p.244). Thus, PNS influences how leaders understand, experience and interact with other people and their environment (Neuberg & Newsom, 1993). Further, individuals with a high degree of PNS are shown to be more risk avoidant and dislike complexities (Meertens & Lion, 2008; Neuberg & Newsome, 1993). Since leaders in a digital transformation need to seek for new opportunities and create an experimental atmosphere, which usually involves risk-taking and uncertainty (Newman, 2018; Promsri, 2019), leaders with a high PNS might feel uncomfortable in the rapidly changing environments of a digital transformation. Since risk-taking has been found to be a "tolerance for uncertainty and ambiguity exposed in the workplace" (Isaksen, 2017, p.140) and uncertainty entails a lack of structure (Meertens & Lion, 2008), we argue that leaders who have a high PNS might be more risk avoidant, especially in the context of digital transformations, which are characterized by uncertainty, risk-taking and experimentation (Buvat et al., 2017; Eisenhardt, Furr & Bingham, 2010). Followingly, since delegating responsibility is seen as a form of risk-taking behavior (Brower, Schoorman & Tan, 2000), we assume that leaders with a high PNS may not be willing to take the risk of delegating tasks to subordinates.

Since leaders should act as change agents (Northouse, 2001) and because little is known about how leaders' characteristics influence their decision to delegate (Haselhuhn et al., 2017), it becomes necessary to explore leaders' cognitive tendencies towards the behavior supporting subordinate autonomy in a digital transformation. When addressing this notion through the RAA framework, it is suggested that every individual holds certain beliefs about the consequences of the outcome of a specific behavior (Fishbein & Ajzen, 2010). This means that a

leader's PNS might subconsciously either promote or inhibit the behavior necessary to support a digital transformation. The beliefs forming expectancies to outcomes are, through the RAA, labeled as behavioral beliefs and determine the positive or negative evaluation of personally performing a behavior (Fishbein & Ajzen, 2010). Therefore, if the performance of the behavior is perceived to result in more positive than negative outcomes, the person will form a favorable attitude towards the behavior (Fishbein & Ajzen, 2010). Thus, behavioral beliefs will affect the attitude of organizational members, such as leaders, towards performing a specific action, which in turn will impact their intention to perform the behavior in question. When variations in their PNS can incline leaders to favor certain contexts over others, leaders' PNS may influence their behavioral beliefs, and consequently form a negative or positive attitude towards a specific behavior. As individuals are more likely to act in accordance with their intention based on how positive or negative their attitude is (Fishbein & Ajzen, 2010), leaders who have less tolerance for uncertainty could undoubtedly be an inhibiting factor for the digital change process. This means that leaders with a high PNS, who may be cognitively dispositioned towards perceiving employee autonomy as an element that increases risk and complexity, could unknowingly become more cognitively rigid and form an unfavorable attitude towards performing change-supporting behaviors. The environment of digital transformations might thus trigger the cognitive predisposition of leaders with a high PNS to monitor the progress of their subordinates' work and the methods they use to conduct said work. In consequence, a high PNS might be detrimental for fostering required factors, such as delegating tasks and granting autonomy to the subordinates and can thus be hindering for successful digital transformations.

On the other hand, leaders with a low PNS, that are more open to new challenges and feel comfortable in uncertain environments, would employ a cognitive framework that unconsciously creates a more positive attitude towards granting employee autonomy. Therefore, these leaders might be more prone to engage in behaviors necessary for a successful digital transformation. Followingly, differences in leaders' PNS could have far-reaching consequences for the digital transformation initiatives and emphasize the findings of Osmundsen, Iden and Bygstad (2018), stating that the outcome of digital

transformations is highly dependent on human capital.

Based on the presented literature, we assume that:

H1: *A leader's personal need for structure is negatively related to the subordinate's perceived autonomy in the process of a digital transformation.*

The Moderating Role of a Leader's Trust in Subordinates

Trust can be seen as "a psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behavior of another" (Rousseau, Sitkin, Burt & Camerer, 1998, p.395). Since fostering trust is critical when organizational members are expected to mobilize extra efforts (Jung & Avolio, 2000), trust has been shown to be vital for successful organizational change (Sørensen & Hasle, 2009). Due to the acceleration of change processes in contemporary organizations, trust has become more and more significant (Sørensen & Hasle, 2009). The concept of trust is especially relevant in processes where risk and interdependencies are high (Bligh & Kohles, 2013; McLain & Hackman, 1999; Six, 2008), such as digital transformations. Interestingly, a majority of studies seeking to examine the consequences of trust on employee behavior have exclusively focused on the trust the subordinate has in the leader (Brower, Lester, Korsgaard & Dineen, 2009). Although several models of subordinates' trust in leadership have been developed (e.g., Burke, Sims, Lazzara & Salas, 2007; Whitener, Brodt, Korsgaard & Werner, 1998), little empirical research has investigated the role of the leader's trust in the subordinate (Fulmer & Gelfand, 2012). Hence, little is known about the potential behavioral outcomes of subordinates when they are trusted by the leader (Brower et al., 2009; Chiu & Chiang, 2019). Since a digital transformation requires decentralized, bottom-up decision-making due to its complexity and speed, employee judgment needs to be trusted (Hemerling et al., 2018), and leaders' trust in subordinates seems to be essential in these processes.

In digital transformations, where the new role of the leader includes outlining goals for the organization but letting employees decide how to reach them (Schwarzmüller et al., 2018), empowering employees and delegating responsibility to subordinates becomes critical. Trust in subordinates has been shown to be a prerequisite for the willingness to delegate tasks and responsibilities (Spreitzer & Mishra, 1999). Therefore, leaders need to "trust their subordinates enough to delegate responsibility and to provide them with the experience of autonomy" (Ladegard & Gjerde, 2014, p.636). Since risk and trust are closely related to each other, it has been shown that making oneself vulnerable when trusting someone is taking a risk (Mayer, Davis & Schoorman, 1995). However, trust is "not taking risks per se, but rather it is a willingness to take risks" (Mayer

et al., 1995, p.712). Since delegating to a follower is seen as a form of risk-taking behavior that indicates leader vulnerability (Brower et al., 2000), the leaders may accept vulnerability to the subordinate and indicate trust by delegating responsibilities (Hanna, Elms, Gill, Stanley & Powell, 2019). By accepting vulnerability when trusting employees, we believe that a leader's trust in subordinates will create a form of security in the leader to delegate tasks and responsibilities, which may influence his or her personal need for structure.

However, since most organizations are risk-averse and build their structure, policies, and culture to ensure efficiency and limit risks (Brower, Lester & Korsgaard, 2017), leaders often try to protect the organization from undesirable results by carefully monitoring and limiting the decisional latitude of subordinates who are not trusted (Brower et al., 2009). This might decrease employees' perception of autonomy. For instance, having low trust in their subordinates, leaders with a high degree of PNS might schedule regular check-in meetings as a method to assure that employees who are working remotely are actually working. This might have a great negative impact on developing relationships and enabling employees to make independent decisions (Brower et al., 2017).

Applying the Reasoned Action Approach (Fishbein & Ajzen, 2010), we argue that normative beliefs affect how leaders cognitively structure situations through the perceptions of what is deemed suitable or unsuitable behavior in leader-subordinate relationships. Since normative beliefs result in perceived social pressure or so-called subjective norms (Ham, Jeger & Frajman Ivković, 2015), the pressures resulting from the bottom-line mentality of some organizations may impact the leader to act in ways that unintentionally signal a lack of trust (Brower et al., 2017, p.2). The subjective norms that result from such cognitive processes may demonstrate the leader's beliefs about the expectations of referent individuals or groups, such as their subordinates, and the motivation to comply with these referents (Ajzen, 2012; Ham et al., 2015). Thus, having low or high trust in their subordinates might influence leaders' expectations of their subordinates and their intention to empower employees to engage in, for instance, decision-making and let them decide which methods to use in their work. Consequently, a leader with a high degree of PNS and low trust in subordinates might tend to concentrate on achieving short-term performance targets instead of engaging their subordinates in the transformation process, hence constricting subordinates' autonomy. As social

interaction plays a central role in organizational life, social influence from leaders can have a substantial effect on employees' reactions to change (Lam & Schaubroeck, 2000, cited in Straatmann et al., 2016). Since it has been shown that subjective norms are one of the strongest predictors of intentions to engage in change-supportive behaviors (Jimmieson, Peach & White, 2008, p.255), we believe that the leader's trust in subordinates might impact their normative beliefs, and consequently their subjective norms, in such a way that leaders with a high PNS might gain security and certainty by having high trust in their subordinates. We believe that this process will affect the leader's intention to grant autonomy in digital change. Thus, a high degree of trust in subordinates could bridge potential gaps created by the leader's personal need for structure. This, in turn, may increase the support leaders show for subordinates' judgments and the willingness to grant autonomy to subordinates. Therefore, we assume that a leader's trust in subordinates will moderate the relationship between the leader's PNS and employee autonomy.

Drawing on the literature above, we propose the following hypothesis:

H2**:** *A leader's trust in the subordinate will moderate the relationship between a leader's personal need for structure and the subordinate's perceived autonomy in the process of a digital transformation.*

The Moderating Role of a Leader's Digital Self-Efficacy

The term self-efficacy was first introduced by Bandura and is defined as "beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations" (Bandura, 1995, p. 2). Thus, a high level of self-efficacy is the belief that one can execute a particular behavior successfully (Ormrod, 2012). These beliefs can influence individuals' goal setting as well as the intensified efforts on a task and the perseverance when facing failures (Bandura, 1984). Ormrod (2012) states that self-efficacy can be developed through, for instance, previous successes and failures or feedback from others. Research suggests that a high degree of general self-efficacy may yield positive outcomes such as raising aspirations, maintaining motivation, and contributing to achievements (Ormrod, 2012), which may be vital in the uncertainty organizational changes bring. Moreover, self-efficacy is positively related to satisfaction, commitment, as well as the adaptation to organizational change (Schyns, 2004).

On the other hand, self-efficacy can have negative consequences as well. Bandura (1997) suggests that some people may overestimate their own abilities. Thus, individuals with a high degree of self-efficacy might be less likely to fear failure and more likely to take irresponsible risks (Kontos, 2004; Salanova, Lorente & Martínez, 2012). It is important to notice that such beliefs in one's own ability are domain-specific, depending on the special features of a situation (Bandura, 1977). Consequently, self-efficacy has been studied in various contexts.

As digitalization and technological advancements are getting more and more essential and influential in the working environment and are seen as crucial to an organization's strategic position, most companies nowadays employ some form of digital technology. When organizations approach a digital transformation initiative, leaders need to generate a general understanding of the organizational changes as well as an understanding of the specific technology (Furr, Gaarlandt & Shipilov, 2019). Consequently, the requirements for being capable of adapting and working with digital technology are vital to most firms.

Computer, internet and digital self-efficacy. Research has found several self-efficacy constructs that are linked to technology, namely computer self-efficacy, internet self-efficacy, and digital self-efficacy. In the following, we will

shortly present these concepts and explain which of these concepts might be most relevant for our work investigating digital transformation processes.

Computer self-efficacy. Computer self-efficacy can be defined as "users' beliefs regarding their ability to perform specific tasks using a software package" (Shakarami, Khajehei & Hajhashemi, 2013, p.81). Thus, computer self-efficacy is the belief in one's capability to use a computer and impacts an individual's expectations of the outcomes of using a computer as well as their emotional reactions to it (Shakarami et al., 2013, p.81).

Internet self-efficacy. Internet self-efficacy, on the other hand, can be distinguished from computer self-efficacy as "the belief that one can successfully perform a distinct set of behaviors required to establish, maintain and utilize effectively the Internet over and above basic personal computer skills" (Eastin & LaRose, 2000). Those with low Internet self-efficacy should be less likely to perform Internet-related behaviors, such as adopting and using the Internet, than those with high degrees of Internet self-efficacy (Eastin & LaRose, 2000). Thus, Internet self-efficacy concentrates on the beliefs a person has about what he or she can achieve online (Eastin & LaRose, 2000).

Digital self-efficacy. Digital self-efficacy (DSE) describes a concept of digital competence, confidence in the ability to master new digital technologies, and the belief in one's ability to effectively utilize new digital tools implemented in the organization (Wong et al., 2020). Since digital transformation processes are complex and require competencies and confidence in various digital areas, a leader needs to be capable of handling more than the Internet or a computer itself. Leaders need to be able to master digital technology and overarching digital processes in their work environments. Therefore, the construct of a leader's DSE seems to be more relevant and better suited for this study, as DSE describes "employees' belief in their abilities to master digital technology in carrying out their work" (Wong et al., 2020).

Digital self-efficacy in a digital transformation. Change processes, such as digital transformations, can involve backlashes, for instance, when new technologies do not function as anticipated or when new processes first result in lower productivity (Schyns, 2004). Individuals with high self-efficacy and thereby higher persistence are less likely to give up when difficulties occur in organizational transformation processes (Schyns, 2004).

In addition, it has been demonstrated that a leader's self-efficacy influences his or her preparedness for occupational change, which is defined "as the wish to take over a task with higher task demands […] than those that existed in the previous task" (Schyns, 2004, p.250). Thus, in change processes, supervisors showing preparedness for occupational change "can serve as role models and can encourage their subordinates by assuring them that they will be able to cope with the changes" (Schyns, 2004, p.249). We assume that this might also be true in the case of digital self-efficacy and the process of a digital transformation, increasing the employees' perception of their autonomy.

Further, employees with high self-efficacy are more likely to seek higher task demands and invest in their own careers, which might also be true for leaders (Schyns, 2004). It might, therefore, be possible that leaders with a high degree of DSE are better capable of delegating tasks in order to achieve better organizational results, leading to a higher perceived autonomy among the employees. Moreover, since leadership self-efficacy is one of the necessary factors contributing to leadership effectiveness (McCormick, 2001), we assume that especially DSE might play a major role in the process of a digital transformation.

Utilizing the Reasoned Action Approach, the intention-behavior relation is influenced by control beliefs (Fishbein & Ajzen, 2010). Thus, managerial intentions are stronger when the leader perceives control (Fishbein & Ajzen, 2010). Given that self-efficacy is conceptually the same as Fishbein and Ajzen's (2010) perceived behavioral control, research shows that self-efficacy can increase the likelihood of favorable behavior when the intentions are positive (Ajzen, 2012). Since being confident about one's ability to change is an essential determinant of actual behavior, perceptions of control can influence employees and help them to cope and adjust during organizational change (Jimmieson et al., 2008). Additionally, higher change self-efficacy leads to a greater acceptance of change (Wanberg & Banas, 2000). Since a digital transformation is a fundamental change process (Goerzig & Bauernhansl, 2018), we believe that a high digital self-efficacy may influence leaders' control beliefs in such a way that it creates greater acceptance and support of a digital transformation. More precisely, we assume that if a leader is confident in his or her own ability to master new digital technologies, thus having a high DSE, the leader will perceive more control,

which might affect his or her personal need for structure. Thus, a high DSE could potentially bridge the negative consequences induced by a leader's high PNS. This, in turn, might influence the leader's behavior in a digital transformation and impact the subordinate's perception of autonomy.

Based on the presented research, we will investigate the possible moderating effect of a leader's digital self-efficacy on the relationship between a leader's personal need for structure and the employee's perceived autonomy. This leads to the following hypothesis:

H3: *A leader's digital self-efficacy will moderate the relationship between a leader's personal need for structure and the subordinate's perceived autonomy in the process of a digital transformation.*

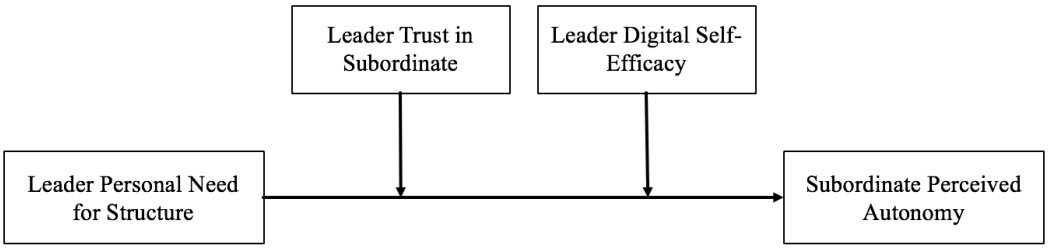

Figure 1. The conceptual model.

Methodology

Procedure

In order to test our hypotheses, we needed responses from leaders who were in processes of digital change initiatives, as well as their respective subordinates, to assess the potential relation between leaders' personal need for structure and employee perceived autonomy. The leaders needed to have at least one subordinate in order to participate. Due to our given context, the group of participants who were able to take part in this study was limited.

The respondents of our sample were mainly recruited through our professional network and via LinkedIn, which is an online networking site for business professionals. Thus, a non-probability sampling method was used (Singh, 2015). We approached leaders and asked them to invite their subordinates to take part in the study. Thereupon, the leader provided us with the email addresses of the subordinates who were willing to participate in the survey.

The survey data was captured at one specific point in time. The data collection period lasted from 11.12.2019 until 31.01.2020. Thus, we used a cross-sectional study design (Bryman & Bell, 2007). The data was collected through two English web-based surveys, one for the leaders and one for the subordinates. The questionnaires were generated in the online survey tool Qualtrics. Electronic mail and web-based surveys have been found to be inexpensive and to secure rapid responses (Schmidt, 1997). As we collected data in several countries, web-based questionnaires give the opportunity of being geographically unrestricted (Schmidt, 1997). In addition, such surveys can be completed at the respondent's chosen pace (Cook, Heath & Thompson, 2000).

Followingly, the surveys were distributed via email to the leader-subordinate dyads. Every survey contained a consent form, where the subjects were informed about their rights and the purpose of this study. Before starting the survey, participants had to give their consent for participating voluntarily. The procedure of anonymizing respondents' information in our data analysis was also described and communicated to all potential respondents. In addition, confidentiality and data protection were ensured to increase the response rate. Moreover, after distributing emails, responses were regularly monitored, as follow-up procedures are seen as highly effective in electronic surveys (Kittleson, 1997).

Sample

Participants were leaders and employees from 30 different organizations in the private sector. The organizations operated mainly in the financial and logistics sector. The leaders in our study worked in three different countries, namely Norway, Germany, and The Netherlands. The respective subordinates worked in Sweden, Denmark, Norway, Germany, and The Netherlands. Some leaders had subordinates in more than one country, which explains the difference in countries.

Our research design gave us two sets of responses, one for leaders and one for subordinates, which were combined into pairs of leader-subordinate ratings. A total of 60 surveys were sent to leaders, and 148 surveys were sent to subordinates. Of those, we received 49 leader responses and 116 subordinate responses. This gave us a response rate of 82% for leaders and 78% for subordinates. Eight leaders needed to be excluded, as they indicated that they were not working with digital transformations. This also required the exclusion of the ten respective subordinates. In addition, one leader and three subordinates were excluded from the sample due to voluntary withdrawal and incomplete survey answers. Thus, the final sample size consisted of a total of 40 leaders and 103 employees, resulting in 103 unique dyads.

For the leaders, 45 to 54 years was the most represented age band (37.50%), followed by 35 to 44 years (30%). Due to the narrow scope of our research, leaders of all ages were considered. Thus, the age of leaders was widely spread (*SD* = 0.94). 57.50% of our leader sample was male and 42.50% female. The highest education of most leaders (60%) was a master's degree. Only two leaders had higher education at MBA or Ph.D. level, respectively. The majority of the leader respondents (72.50%) had more than 11 years of full-time work experience, and most leaders (57.50%) had up to five subordinates. Moreover, 55% of the leaders were part of top management. All leaders were in the process of a digital change initiative. The vast majority of our sample, namely 95%, had been in a change process before, and almost half of the leaders (45%) also led the team in charge of the change process.

The largest represented age band of the subordinates (47.60%) was the one ranging from 25 to 34 years. Since all subordinate age groups were relevant to our research as well, the age of subordinates accordingly showed a wide spread (*SD* = 0.95). The subordinate sample consisted of 54.40% female, 44.70% male, and 1%

nonbinary respondents. Half of the subordinates (50.50%) had a master's degree, and approximately a fourth (26.20%) had a bachelor's degree as the highest education. While only 14.60 % of subordinates had been reporting to their current leader for more than eight years, the majority (61.20%) had been working under their current leader for up to two years. Furthermore, more than two thirds (68%) of the subordinates had previously been subjected to a change process.

Measures – Leader Survey

All measures and scales were adopted from prior research in order to ensure that they had been previously tested. We employed 5-point Likert scales to capture participants' responses in order to research individual positions towards specific topics. Likert scales obtain data more readily to interpret and are used to measure general constructs (Flynn, Sakakibara, Schroeder, Bates & Flynn, 1990). When combining and inter-linking the responses from a Likert scale, the participants' attitude towards a topic is revealed (Joshi, Kale, Chandel & Pal, 2015). Since our sample consisted of leaders and subordinates in the private sector, we considered time to be a sensitive matter. As it takes time to interpret and judge the different points and items from a scale (Joshi et al., 2015), a 5-point scale was chosen over a 7-point scale to reduce potential strain on respondents.

Personal need for structure. Personal need for structure was measured by the revised and widely used scale by Neuberg and Newsom (1993). The 11 items (e.g., "I don't like situations that are uncertain") were rated on a 5-point Likert scale that ranged from 1 ("strongly disagree") to 5 ("strongly agree"). The Cronbach's alpha reliability for PNS was α=.791.

Trust in subordinates. A leader's trust in subordinates was measured by an adjusted version of Mayer and Davis' (1999) trust measure. In addition, this scale has previously been used by Seppälä, Lipponen, Pirttilä-Backman, and Lipsanen (2011) to measure a supervisor's trust in subordinates. Since one item from the four-item scale seemed inappropriate for our study, as the statement did not appear meaningful in the case of leaders ("I would be willing to let top management have complete control over my future in this company") (Seppälä et al., 2011), this item was not included. The three items (e.g., "I really wish I had a good way to keep an eye on my subordinate") were rated on a 5-point Likert scale that ranged from 1 ("strongly disagree") to 5 ("strongly agree"). Since the

reliability for the three items was not sufficient (α=.219), we excluded one item during the data analysis in order to increase the reliability. Thus, the Cronbach's alpha reliability for trust in subordinates was α=.507. Although the Cronbach's alpha indicated a reliability below the suggested threshold value of 0.7 (Taber, 2018), we decided to retain this scale in our study. Since psychological tests are seen as difficult as many constructs are diverse and the items are interpreted differently by respondents, a Cronbach's alpha value below 0.7 can be seen as sufficient for psychological constructs (Kline, 2000). The low Cronbach's alpha reliability could, in addition, be explained by the low number of items used in this scale (Kline, 2000).

Digital self-efficacy. Digital self-efficacy was measured by a six-item scale that was developed by Wong et al. (2020). The items (e.g., "I have confidence in my ability to master new digital technologies implemented at work") were rated on a 5-point Likert scale that ranged from 1 ("strongly disagree") to 5 ("strongly agree"). The Cronbach's alpha reliability for DSE was α=.936.

Control variables. Several control variables for potential sociodemographic differences were included in order to rule them out as alternative explanations of the results. Thus, we included gender, age, years of full-time work experience, number of subordinates, and highest education as control variables. The participants could indicate their gender by choosing between the options "male", "female", or "nonbinary". Age was measured through six different age groups (e.g., "under 25", "25-34"), that the participants could select. Years of full-time work experience, as well as the number of subordinates, were measured through four different options, indicating time frames (e.g., "0-3 years") or subordinate numbers (e.g., "11-20", "more than 20"), respectively. Highest education was measured through six selectable options (e.g., "High school", "Bachelor", "Master"). In addition, the survey asked if the leader was part of the top management, which could be indicated by a Yes/No option. Since our research investigated a digital transformation context, questions regarding the exposure to a change and transformation process were collected as well, which again were measured by a Yes/No option. The leaders could additionally choose between three statements that best represented their involvement in the previous change process (e.g., "I led the team that led the

change process"). Lastly, data regarding the country of employment was collected using ten different country options (e.g., "Norway", "Germany") as well as one option stating "other country".

Measures – Subordinate Survey

Autonomy. Autonomy was measured by a nine-item autonomy scale from Morgeson & Humphrey (2006). This scale consists of three items regarding work scheduling autonomy (e.g., "The job allows me to make my own decisions about how to schedule my work"), decision-making autonomy (e.g., "The job allows me to make a lot of decisions on my own") and work methods autonomy (e.g., "The job allows me to make decisions about what methods I use to complete my work"), respectively. The items were rated on a 5-point Likert scale that ranged from 1 ("strongly disagree") to 5 ("strongly agree"). The Cronbach's alpha reliability for autonomy was α=.921.

Control variables. Several control variables for potential sociodemographic differences were also included in the subordinate version of the survey. We included age, gender, years of full-time work experience, and highest education. These variables were measured identically to the leader survey. In order to indicate how many years the employees had been working for their current leader, four options representing timeframes (e.g., "3-5 years", "6-8 years") could be selected. In addition, the survey asked if the subordinate had been exposed to a work-related change process before, which was measured by a Yes/No option. Lastly, data regarding the country of employment was collected using ten different country options (e.g., "Norway", "Germany") as well as one option stating "other country".

Ethical Considerations

In order to ensure that all ethical considerations and guidelines were met for our research, the project was approved by the Norwegian Centre for Research Data (NSD) in advance of the data collection process. All collected data were stored according to the NSD's guidelines. No sensitive data were collected. At data collection completion, indirectly identifiable information was anonymized in the data set. Anonymity was ensured by giving each leader-subordinate dyad a unique number. Thus, no data could be traced back to personal information. The

survey stated that participation in this study was voluntary.

Data Analysis

Prior to our analysis, a data screening where we searched for missing or incomplete data was conducted, and all flawed data points were excluded. In addition, we assessed potential outliers. Outliers are defined as "an observation that appears to be inconsistent with other observations in the data set or experiment" (Bartolucci, Singh & Bae, 2015, p.98). One potential outlier was found on the autonomy scale (subordinate nr. 12). However, for the other scales, no inconsistencies were found. After a total assessment of the potential outlier, the responses were considered to be relevant and included in the final data set.

The IBM SPSS statistics 26 software was used to analyze the data. A multilevel analysis was conducted to test our hypotheses. Multilevel modeling is usually used for analyzing data that have a hierarchical or nested structure (Hox & Maas, 2005; Preacher, Zhang & Zyphur, 2016). In multilevel research, level 1 variables are measured at the lowest or individual level of analysis, while level 2 variables are measured at a second, higher contextual level (Preacher et al., 2016). The majority of multilevel analyses have concentrated on models, which measure the independent variable as a level 2 variable and the dependent variable as a level 1 variable (Rockwood, 2017). Thus, since the variables personal need for structure as well as the two moderators trust in subordinates and digital self-efficacy were measured on the leader level (level 2) and employee perceived autonomy on the individual level (level 1), a multilevel analysis was suitable for this research. A moderator affects the relation between an independent variable and a dependent variable (Baron & Kenny, 1986).

Before testing the hypotheses, the independent variables and the moderators used in the analysis were centered. Centering describes the process of "transforming a variable by subtracting the mean" (Hox & Maas, 2005, p.785). Several analyses were conducted in order to test our hypotheses. We first started with a large number of predictors and control variables. However, to conduct research with sufficient statistical power, large sample sizes are usually needed in multilevel models (Snijders, 2005). Due to our rather small sample size (N=40), which is seen as a sample of 50 or less at level 2 (Maas & Hox, 2005), we decided to remove non-essential variables and simplify the analysis in order to increase

statistical power. Additionally, it has been shown that using multiple moderators in the same model increases the chance that the moderators themselves interact (Dawson, 2014), which may lead to inaccurate predictions. Thus, we conducted two separate analyses for the moderators trust in subordinates, where the interaction term PNS x Trust was added and for DSE, where the respective interaction term PNS x DSE was added.

In order to test our hypotheses, the multilevel analysis was conducted in SPSS with the final model containing gender and age as control variables. To examine the meaning of our results, we used the table "estimates of fixed effects" and evaluated the significance value. To do so, we first considered the p-value. The p-value is a measure of statistical evidence and can be defined as "the probability of seeing the observed difference, or greater, just by chance if the null hypothesis is true" (Whitley & Ball, 2002, pp. 1-2). The p-value can lie between 0 and 1, where values close to 0 show that "the observed difference is unlikely to be due to chance" (Whitley & Ball, 2002, p. 2). Therefore, the p-values were investigated to find out if the results were statistically significant. For this, a pre-defined level of significance, the alpha value (Peres-Neto, 1999), was used. The alpha value is defined as "the probability of committing the so-called Type I error, which is the sampling frequency at which the null hypothesis will be rejected when it is true" (Peres-Neto, 1999, p.303). This allowed us to distinguish between unusual random and significant differences (Peres-Neto, 1999). Due to our small sample size and research design, we set our alpha value to 0.1 level and below (e.g., α=0.1 and α=0.05). All values that showed a p-value below 0.1 or 0.05 were therefore considered as significant on the respective significance level.

In addition, a simple slope test for the interaction effect of PNS x DSE was conducted to evaluate whether the relationship between the independent variable and the dependent variable was significant at a particular value of the moderator (Dawson, 2014).

Results

Descriptive Statistics

Table 1 displays the descriptive statistics, such as the means (*M*) and standard deviations (*SD*), as well as Pearson's correlations and internal consistencies for the variables included in this study. Trust in subordinates as well as DSE were significantly and negatively correlated with PNS (r = -0.27, p < 0.01; r = -0.23, p < 0.05). In addition, DSE was significantly correlated with trust in subordinates (r = 0.31, p < 0.01).

Table 1

Means, standard deviations, intercorrelations and internal consistencies (Cronbach's α on the diagonal) between the study variables

		M	*SD*	1	2	3	4	5	6	7	8
1	Age (Leader)	3.38	0.93	–							
2	Age (Subordinate)	2.71	0.95	.36**	–						
3	Gender (Leader)	0.47	0.50	−0.07	−0.02	–					
4	Gender (Subordinate)	0.56	0.52	−0.06	−0.14	.30**	–				
5	Autonomy	3.96	0.68	−0.07	0.06	−0.12	−0.08	(.92)			
6	PNS	2.94	0.64	−.38**	−0.12	−0.16	−0.04	−0.14	(.79)		
7	Trust in Subordinates	3.87	0.71	0.02	−0.02	.42**	−0.04	0.17	−.27**	(.51)	
8	DSE	4.39	0.49	−0.06	−0.09	.39**	0.19	0.07	−.23*	.31**	(.94)

Note. Statistics from 103 leader-subordinate dyads; * p <0.05; ** p < 0.01 level

Hypotheses Testing

All our hypotheses were tested with multilevel analyses. Hypothesis 1, which states that a leader's personal need for structure is negatively related to an employee's perceived autonomy, was analyzed in Step 1. The results of the multilevel analysis are presented in Table 2. We found a significant negative relation between leaders' PNS and employees' perceived autonomy (-0.25, p < 0.05). Thus, *H1* was supported.

Table 2

Results for the multilevel analysis testing Hypothesis 1

Parameter	Estimate	SE	t	Sig.	95% CI	
					Lower	Upper
Intercept	4.72*	0.71	6.66	0.00	3.31	6.12
Gender, male (Leader)	0.22	0.14	1.58	0.12	−0.06	0.49
Gender, female (Leader)	0[a]	0.00				
Gender, male (Subordinate)	−0.51	0.67	−0.76	0.45	−1.83	0.82
Gender, female (Subordinate)	−0.59	0.66	−0.89	0.37	−1.90	0.72
Gender, nonbinary (Subordinate)	0[a]	0.00				
Age (Leader)	−0.16†	0.08	−1.98	0.05	−0.32	0.00
Age (Subordinate)	0.08	0.07	1.04	0.30	−0.07	0.22
PNS	−0.25*	0.11	−2.26	0.03	−0.47	−0.03

Note. Statistics from 103 leader-subordinate dyads; dependent variable: Autonomy

[a] This parameter is set to zero because it is redundant

† $p < 0.1$; * $p < 0.05$

Hypothesis 2, which states that the leader's trust in the subordinate will moderate the relationship between the leader's personal need for structure and the degree of employees' perceived autonomy, was analyzed in Step 2. For this, the interaction term of PNS x trust in subordinates was added to the model. The results in Table 3 reveal no support for trust in subordinates being a moderator in the relation between a leader's PNS and employee perceived autonomy (-0.09, $p >$ 0.05). Thus, *H2* was not supported, meaning that trust in subordinates does not moderate the relation between a leader's PNS and the employee's perceived autonomy. However, we found a significant direct effect of leaders' trust in subordinates on employee perceived autonomy (0.24, $p < 0.05$).

Table 3

Results for the multilevel analysis testing Hypothesis 2

					95% CI	
Parameter	Estimate	SE	t	Sig.	Lower	Upper
Intercept	4.56*	0.70	6.56	0.00	3.18	5.94
Gender, male (Leader)	0.37*	0.16	2.38	0.02	0.06	0.69
Gender, female (Leader)	0[a]	0.00				
Gender, male (Subordinate)	−0.50	0.65	−0.77	0.44	−1.80	0.79
Gender, female (Subordinate)	−0.51	0.65	−0.80	0.43	−1.79	0.77
Gender, nonbinary (Subordinate)	0[a]	0.00				
Age (Leader)	−0.16†	0.08	−2.00	0.05	−0.32	0.00
Age (Subordinate)	0.09	0.07	1.18	0.24	−0.06	0.23
PNS	−0.18	0.12	−1.60	0.11	−0.41	0.04
Trust in Subordinates	0.24*	0.11	2.17	0.03	0.02	0.45
Interaction PNS x Trust	−0.09	0.22	−0.41	0.69	−0.52	0.34

Note. Statistics from 103 leader-subordinate dyads; dependent variable: Autonomy

[a] This parameter is set to zero because it is redundant

†p < 0.1; * p < 0.05

Hypothesis 3, which states that a leader's digital self-efficacy will moderate the relationship between a leader's personal need for structure and the employee's perceived autonomy in the process of a digital transformation, was analyzed in a last step. For *H3*, the interaction term PNS x DSE was added to the model. Table 4 presents the results of the multilevel analysis conducted to test the hypothesis. The results show a significant interaction effect of PNS x DSE on 0.10 significance level (0.42, $p < 0.10$), revealing that DSE works as a moderator in the relation between a leader's PNS and employee perceived autonomy. Thus, *H3* was supported.

Table 4

Results for the multilevel analysis testing Hypothesis 3

Parameter	Estimate	SE	t	Sig.	95% CI	
					Lower	Upper
Intercept	4.51*	0.70	6.41	0.00	3.11	5.90
Gender, male (Leader)	0.26†	0.14	1.85	0.07	−0.02	0.54
Gender, female (Leader)	0[a]	0.00				
Gender, male (Subordinate)	−0.46	0.65	−0.70	0.49	−1.76	0.84
Gender, female (Subordinate)	−0.55	0.65	−0.86	0.39	−1.84	0.73
Gender, nonbinary (Subordinate)	0[a]	0.00				
Age (Leader)	−0.10	0.08	−1.23	0.22	−0.27	0.06
Age (Subordinate)	0.07	0.07	0.99	0.32	−0.07	0.22
PNS	−0.24*	0.11	−2.15	0.03	−0.46	−0.02
DSE	0.17	0.15	1.18	0.24	−0.12	0.46
Interaction PNS x DSE	0.42†	0.25	1.70	0.09	−0.07	0.91

Note. Statistics from 103 leader-subordinate dyads; dependent variable: Autonomy

[a] This parameter is set to zero because it is redundant

† $p < 0.1$; * $p < 0.05$

The slope test revealed a significant negative relationship between a leader's PNS and employee autonomy when leaders had a low DSE (-0.445, $p < 0.05$). The relationship between a leader's PNS and employee autonomy was negative, but not significant when DSE was high (-0.034, $p > 0.1$). Figure 2 provides a graphical representation of the PNS x DSE interaction effect. When leaders have a high DSE, the leaders' degree of a personal need for structure appears to have little to no effect in regard to employees' perceived autonomy. However, when the leader scores low on digital self-efficacy, the individual preference for a personal need for structure becomes more critical. As can be seen in the graph, when leaders have a low DSE and a high personal need for structure, then this appears to have a negative effect on employee perceived autonomy.

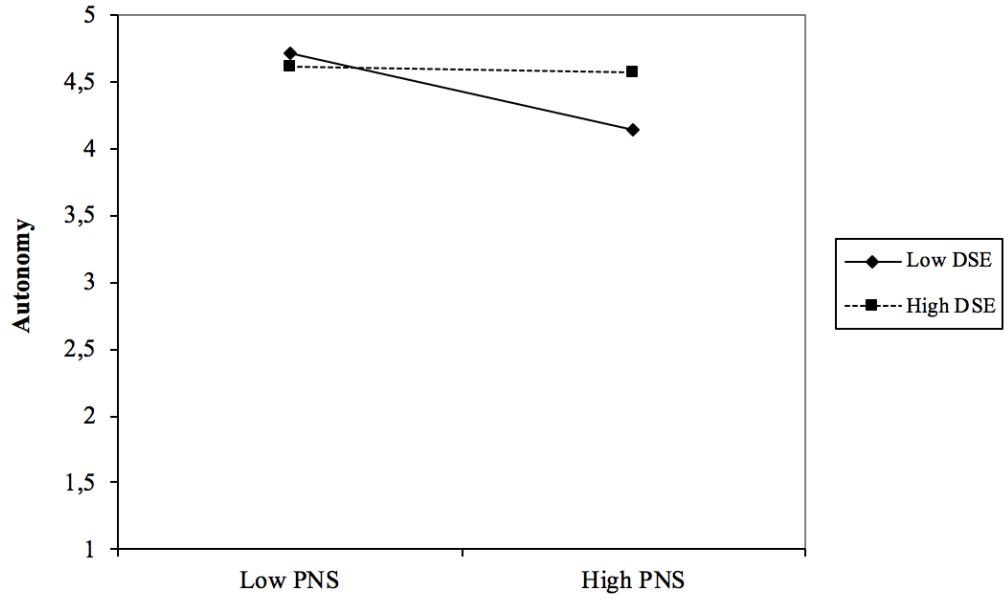

Figure 2. A leader's personal need for structure and employee autonomy: The moderating role of DSE.

Discussion

Digital transformations become more and more critical to organizations in order to address the changing customer demands, grow their business, and prepare it for the future. Since autonomy has been shown to be an important factor for successful digital transformations, we addressed leaders' personal need for structure and its impact on the degree to which their subordinates experience autonomy. Followingly, combining data of leaders (level 2) and their respective subordinates (level 1) into leader-subordinate dyads, we used multilevel modeling in our research. In addition, possible moderating variables were tested. Our study offers several new findings.

Regarding our hypotheses, for *H1*, we expected that a leader's personal need for structure would be negatively related to an employee's perceived autonomy in the process of a digital transformation. Our results confirmed this hypothesis. Further, *H2* stated that a leader's trust in the subordinate would moderate the relationship between the leader's personal need for structure and the degree of employees' perceived autonomy. *H2* was not supported. However, we found a positive direct relationship between a leader's trust in subordinates and employee perceived autonomy. For *H3*, we expected that a leader's digital self-efficacy would moderate the relationship between a leader's personal need for structure and the employee's perceived autonomy in the process of a digital transformation. Although the effect was rather weak, our results supported *H3*. These findings together lead to a couple of important theoretical as well as practical implications.

Theoretical Implications

Although there has been a rapid increase in digital transformation initiatives in numerous industries, little research has so far been dedicated to the relationship between leaders' PNS and employee perceived autonomy in such processes. Our study indicates several noteworthy implications of this relationship.

Our results showed that a leader's PNS was negatively related to employee perceived autonomy. This points to an interesting dynamic between leaders' reaction to ambiguity and the structures necessary for employee autonomy in digital transformations. Routledge and colleagues (2010) propose that individuals

with a low PNS find psychological security through cognitive flexibility, while individuals with a high PNS become more cognitively and attitudinally rigid over time. Since digital transformations bring about high levels of complexity (Schwarzmüller et al., 2018), a leader with a high PNS may react more rigidly towards such transformations than leaders with a low PNS, which could explain our findings. Followingly, since leaders with a high PNS prefer simplicity and certainty and often act in a risk avoidant manner (Meertens & Lion, 2008; Neuberg & Newsome, 1993), the structures a leader will thrive in, and the structures necessary for employees to conduct their work in a digital transformation successfully might be contradicting.

Aligning our findings with the RAA framework can help to gain a more comprehensive understanding of our model. Applying this theory to the shown linkages, our findings indicate that leaders' PNS could indeed affect their behavioral beliefs, influencing the attitude towards granting autonomy. Thus, a low degree of PNS in a leader seems to impact their evaluations of the specific behavior positively, forming a positive attitude towards granting autonomy to employees. On the other side, however, a high degree of PNS in a leader seems to impact these beliefs negatively. Since behavioral beliefs influence the individual's readiness towards performing an action (Fishbein & Ajzen, 2010), our findings support the argument that leaders with a high PNS may indeed form unfavorable intentions towards performing the behavior necessary for employees to perceive autonomy in digital transformations. Consequently, through the subconscious restriction of employee autonomy, leaders with a high PNS can behave conflictingly in digital change and potentially hinder successful outcomes of digital transformations.

All things considered, for leaders to recognize new opportunities, delegate responsibility, and create an affinity to experimentation among their workforce in a digital transformation initiative, risk-taking seems to be vital (e.g., Kane, Palmer, Phillips, Kiron & Buckley, 2015; Newman, 2018; Promsri, 2019). Since PNS influences risk-taking behaviors (Meertens & Lion, 2008), the degree of PNS in a leader can impact the outcome of digital change. Thus, our results share similarities with recent work on digital leadership that has expressed the relevance of risk-taking behavior for digital transformation success.

Altogether, our study expands the research on PNS and contributes to the

field by showing that PNS plays a critical role in digital transformations since a leader with high PNS can hinder employees to feel that they have the autonomy to go about the changes caused by such initiatives.

Furthermore, we highlighted the importance of a leader's digital self-efficacy in our model. As discussed, leaders' PNS can influence the leaders' attitude towards granting autonomy to subordinates in digital change. Our results, in fact, demonstrated that the negative relationship between a leader's PNS and employee perceived autonomy was moderated by a leader's DSE. Thus, our findings indicated that employees reported lower perceived autonomy when their leaders reported a high level of PNS but a low level of DSE. However, employees of leaders with a high PNS, as well as a high DSE, reported greater perceived autonomy. Consequently, the severity of a leader's PNS in relation to employees' perceived autonomy might be decreased when leaders feel perceived behavioral control and, therefore, more confident in their tasks and work environment. As discussed, an individual carries out intentions when he or she perceives sufficient volitional control over a specific behavior (Fishbein & Ajzen, 2010). Given Fishbein and Ajzen's (2010) suggestion that actual control could be reflected through the perception of control, our findings show that a high DSE could work as an element to strengthen leaders' control beliefs, ultimately leading to higher perceived behavioral control. Thus, risk avoidant behaviors induced by PNS may be countered by the feeling of control caused by DSE. This, in turn, can impact leaders' intentions and behavior in granting autonomy to their subordinates.

As a digital transformation is not only a change process but a change process enabled through technology, understanding the consequences of technology and how they may affect the organization seem to be necessary. Thus, our findings are in line with previous research that highlights the importance of a leader's digital knowledge and literacy (e.g., Davenport & Westerman, 2018; Kane, 2018; Promsri, 2019). Scholars show that in order to conduct a digital transformation successfully, leaders need to comprehend the changing environment caused and enabled by digital technologies (Kane, 2018). Further, leaders need to understand what these technologies can do and their impact on the organization in order to be able to utilize digital tools correctly themselves (Davenport & Westerman, 2018; Kane, 2018; Promsri, 2019). Since digital knowledge is a very broad concept, we showed that DSE might be an appropriate

measurement in digital transformation research. Since DSE is a rather new construct, which has not been researched extensively yet, our study expands the body of research on and contributes to the understanding of DSE by demonstrating its moderating role in our model.

Moreover, our study adds insights into the field of a leader's trust in subordinates. Since the concept of trust in the workplace has been researched extensively in regard to a subordinate's trust in the leader, we reversed the concept. We expected leaders' trust in subordinates to impact leaders' normative beliefs, thus creating subjective norms related to how subordinates may perform in certain situations. We anticipated that these norms would impact the leader's intentions towards granting autonomy to employees. Our hypothesis that a leader's trust in the subordinate would function as a moderator between a leader's PNS and employee perceived autonomy was not supported. Thus, whether the leader had high or low trust in the subordinate seemed not to influence said relation. In contrast to DSE, trust in subordinates might not influence the leader's feeling of structure or control. Thus, leaders' trust in subordinates might not be able to bridge potential shortcomings induced by their PNS. Even though the investigated relation was not dependent on trust, we found a positive direct effect of a leader's trust in subordinates on employee perceived autonomy in a digital transformation process. Thus, regardless of whether the leader had a high or low PNS, subordinates reported higher levels of perceived autonomy when their leader reported higher levels of trust in them. These findings are in line with Seppälä and colleagues (2011), who found that supervisor trust has a significant positive direct effect on subordinates' autonomy. Our results are also consistent with Ladegard & Gjerde (2014), who state that leaders need to trust their employees in order to delegate tasks and grant autonomy. These findings support the assumption that leaders' normative beliefs, which are influenced by their trust in subordinates, may affect leaders' perceptions of their employees. Since leaders might perceive giving autonomy as acceptable behavior when trusting their employees, the leader may be inclined to grant autonomy to employees. Supporting this notion, our findings showed that if leaders trust their subordinates, this trust will positively affect the subordinates' perceived autonomy. Thus, our study expands the current body of research by highlighting the importance of the role of the leader's trust in subordinates in a digital transformation context.

Although RAA is a well-established theoretical framework that has been researched in various contexts before, it has, to our knowledge, not previously been utilized to understand the outcomes of a leader's PNS in digital transformations. By considering PNS as an influencing factor for behavioral beliefs, trust in subordinates for normative beliefs, and DSE for control beliefs, which together may form favorable or unfavorable intentions towards granting autonomy in digital change, our research contributes to the RAA literature and expands its contextual application. Our study does so by suggesting that the different beliefs might, in fact, be relevant predictors of behavioral intentions in the investigated context. The presented assumptions offer a deeper understanding of how leaders form intentions and how the following behaviors can be impacted. However, in order to evaluate the significance of the respective constructs, we advise to measure RAA belief and intention variables in future studies instead of using them as a theoretical framework.

Furthermore, our results might not only be applicable to digital transformations per se but might also be of meaning to industries preoccupied with creativity and innovation. Since innovations are surrounded by uncertain and demanding environments and creativity demands climates that encourage risk-taking processes and experimentation to generate new ideas (Gilson & Shalley, 2004; West & Sacramento, 2012), leaders with a high PNS might be detrimental in these environments. Future research would need to investigate this relationship further.

In sum, our findings shed light on some of the mechanisms that are involved in a successful digital transformation process. Given Cortellazzo and colleagues' (2019) suggestion of investigating leadership on an individual as well as organizational level, we address implications of the individual perspective of leadership and its impact on employee outcomes. Thus, our results can be valuable to models explaining digital change initiatives as well as research on change leadership.

Practical Implications

Our results indicate important practical implications as well. Since all organizations search for high-potential individuals who can create value for their businesses (Teodorescu, Furnham & MacRae, 2017), organizations require

favorable behaviors from their leaders, especially in change processes. Since a leader's high PNS has been shown to be negatively related to employee perceived autonomy, our findings support the notion that leaders' PNS may, in fact, play a critical role in digital transformation efforts. Therefore, it could be necessary for organizations to assess individual characteristics to be more aware of differences in leaders' PNS. This might help firms to appoint the appropriate leader for a project in order to ensure value in their digital transformation effort.

Furthermore, organizations can aid and assist leaders in learning how to delegate responsibility, which may be especially relevant for leaders with a high PNS. Organizations could conduct delegation training to engage leaders in exchanging thoughts about practices of delegating at work (Lyons, 2016). Self-assessment activities are suggested as an efficient tool for such training, where leaders can complete surveys that indicate their delegation approach (Lyons, 2016). The results of these surveys open for discussions and show possible room for improvement (Lyons, 2016). Thus, such practices could increase leaders' self-awareness about their own approach to delegation and granting autonomy and likely counteract adverse fallouts due to their individual characteristics.

These practices are also connected to how leaders can trust their employees because, in order to delegate effectively, trust or distrust must be recognized and coped with (Lyons, 2016). Since our findings indicate that a leader's trust in subordinates has a direct effect on employees' autonomy, organizations should find measures that help to increase leaders' trust in their subordinates. Thus, it could be beneficial for businesses to focus on supporting leaders to trust their subordinates enough to delegate responsibilities and tasks. In order to develop leaders who are capable of leading a digital transformation, we suggest leadership coaching as a leadership development initiative, since it has been found that coaching influences and increases leaders' trust in subordinates (Ladegard & Gjerde, 2014). However, to conduct effective and efficient coaching, organizations need to ensure that their coaches are competent enough to provide coaching on leadership level (Ladegard & Gjerde, 2014).

Furthermore, our findings indicate that a leader's high DSE could bridge potential gaps between negative consequences of a leader's high PNS and change-supportive behaviors, such as providing autonomy, in a digital transformation initiative. Since previous research found that general self-efficacy can be

increased through training (Unsworth & Mason, 2012), we suggest that organizations should focus on leadership training that increases the leaders' digital knowledge as a step to build and broaden their DSE. Moreover, the enhancement of leadership self-efficacy has been shown to be important when improving leadership quality (McCormick, 2001). Given the moderating effect of DSE in our model, we suggest furthering the focus to digital self-efficacy in order to improve leadership quality due to the importance of understanding technology to conduct digital transformations successfully. Therefore, we propose that organizations might benefit from leadership development programs that focus on training in digital and technological literacy in order to increase leaders' belief that they can master digital technologies. It should be mentioned that since general self-efficacy can be associated with irresponsible risk-taking (Kontos, 2004), organizations should be wary of potential negative consequences of leaders' high DSE.

Summarizing our practical implications, organizations should evaluate their current leadership development programs and revalidate their measures in order to support leaders to meet the requirements demanded by digital transformations.

Limitations of the Study

Although this study provides a better understanding of leader characteristics and their impact on employee autonomy in a digital transformation context, the limitations of our research need to be acknowledged. Our sample size was relatively small, containing only 103 leader-subordinate dyads. A larger sample could have resulted in more reliable, valid, and generalizable results, being less prone to measurement errors (Kotrlik & Higgins, 2001). Moreover, we received all employee email addresses from the respective leaders. Since we asked the leaders to invite as many of their subordinates as possible to take part in our study, this selection process of the participating subordinates could have created a potential bias as some leaders may be inclined to ask certain individuals over others. In addition, there might be a discrepancy between the number of employees who agreed to take the survey and the number of mail addresses we received from the respective leader. Further, since it was left to the employees and leaders to select themselves to participate in the survey, a self-selection bias could have occurred (Bethlehem, 2010). Thus, employees or leaders who are more

confident taking the survey or who expect positive feedback when participating might, therefore, be more likely to take part than employees fearing negative feedback. As we mostly used our network for the data collection process, neither the selection of the subordinates nor of the leaders was completely randomized. Therefore, since we did not use probability sampling, our sampling method could limit our findings in terms of their representativeness and generalizability (Singh, 2015). Utilizing a cross-sectional design, we only collected data at a single point in time. Thus, we cannot determine how the relations may evolve throughout a digital transformation. In addition, interviews or observations could have been beneficial in order to get some in-depth knowledge about the investigated relationships, as some variables might be difficult to define in an online survey.

Second, although we gathered data from various companies as well as different countries, which may increase the generalizability of the findings (Zhang & Bartol, 2010), our study does not acknowledge potential cultural differences. Moreover, although our sample comprises multiple organizational settings, we did not control for potential organization-specific confounding variables (Zhang & Bartol, 2010). Thus, organizational factors such as the size of the enterprise, organizational culture, or other organizational factors were disregarded. This should be considered a limitation as it may affect the generalizability of our findings. Moreover, since we distributed the survey to various countries, an English survey version was used. However, since participants had to respond in a language other than their mother tongue, this could have led to potential misunderstandings and misinterpretations of the items, impacting the accuracy of our results.

Third, the reliability coefficient of the trust in subordinates scale was rather low and did not reach the common threshold of .70. Even though a scale that previously was tested for its psychometric properties was used for this construct, it has been shown that the alpha values can vary from sample to sample (Tavakol & Dennick, 2011). Given that Cronbach's alpha is sensitive to the number of items in a scale (Hair, Hult, Ringle & Sarstedt, 2016), the low Cronbach's alpha value of the used trust in subordinate scale could be explained by its small number of items. Alternatively, the reliability of the scale could have been affected by the rather small leader sample size or our sampling method (Bartone, 2007; Gliem & Gliem, 2003; Singh, 2015). The low reliability of the

trust in subordinates scale questions the validity of the results obtained in regard to *H2* and limits the interpretation and application of these findings. Alternatively, another process, such as PLS-SEM, could have been used as it measures reliability differently (Hair et al., 2016). However, we decided not to use this technique, as its primary strength has been shown to be in exploratory research (Goodhue, Thompson & Lewis, 2013; Hair et al., 2016). Due to these limitations, the used trust in subordinates scale might not be optimal. However, there is a limited amount of reliable and appropriate measurements for this construct due to the scarcity of research in leaders' trust in their subordinates.

Implications for Future Research

As digital transformation initiatives challenge traditional leadership models, more research might be necessary to investigate how the leader role develops, especially when acknowledging that leaders' PNS impacts employee autonomy. Future research could, therefore, expand the study of a leader's personal need for structure in digital transformation initiatives. This will allow the exploration of other possible moderators between PNS and employee outcomes, and ultimately provide research aiding companies to overcome potential shortcomings of leaders with a high PNS.

For instance, investigating interdependencies between the needs of a leader and the needs of the employees in digital transformations would be beneficial. It would be valuable to find organizational approaches that create structures that allow for both leaders with high PNS and low PNS to thrive. Thus, it is possible that different structural approaches towards executing digital change might moderate the conclusions drawn from this study. One example of this point may be found in organizational strategy. It is important for organizations to have a clearly defined strategy as a central concept for integrating and implementing all digital transformation efforts due to its complexity and possibility to shape the organization (Matt, Hess & Benlian, 2015). Furthermore, it has been shown that digitally maturing companies are more likely to have a clear digital strategy (Kane et al., 2015). We believe that a clear set of plans for a digital strategy might be able to fasten decision-making processes and reduce ambiguity in digital change initiatives. These approaches might affect the relation between the leaders' tolerance for ambiguity, PNS, and employee outcomes in a digital transformation.

Thus, exploring leaders with high or low PNS in organizations with clear versus vague digital transformation strategies might be interesting.

Future research may also investigate the relation between PNS and creativity in a digital transformation context since creativity and innovation get highly emphasized by organizations in today's competitive economic market (Mumford, Hunter, Eubanks, Bedell & Murphy, 2007). As human creativity is needed in order to address new technological challenges, explore opportunities, or adopt technologies, it is seen as a vital skill in order to face uncertainties that digital initiatives may entail (Bruno & Canina, 2019). Slijkhuis, Rietzschel, and Van Yperen (2013) found that a person's PNS can impact their creative performance and that individuals low in PNS showed a higher creative performance than those high in PNS. The reason for this may be that creativity demands some tolerance for ambiguity (Chirumbolo, Mannetti, Pierro, Areni & Kruglanski, 2005). Earlier studies have shown that a leader's creativity has a positive association with the employee's creativity (Pan, Lou & Zhou, 2013). Since leadership plays a critical role in the success of creative initiatives (Mumford et al., 2007), future studies are advised to investigate the role of leaders' PNS and its effect on their own as well as their employees' creativity in a digital transformation context. In addition, Rietzschel, De Dreu, and Nijstad (2007) found that the fear of making wrong decisions can play a vital role between PNS and creativity. Utilizing Personal Fear of Invalidity (PFI) as a moderator, they found that individuals with a high PNS, who are not afraid of making wrong decisions, can positively manage their PNS by employing a structured approach to creative ideas. This will help them to behave and perform more creatively than having high scores on PFI (Rietzschel et al., 2007; Slijkhuis, 2012). Thus, exploring PFI as a moderating variable between a leader's PNS and employee outcomes in a digital context could contribute to the understanding of the process.

Furthermore, a study by Finzi and colleagues (2017) found that a tolerance of ambiguity is aligned with personality, but not necessarily a fixed characteristic. Thus, researchers found that many executives developed their comfort with ambiguity over time in order to use it as a strategic tool (Finzi et al., 2017). Consequently, under the assumption that leaders might be able to learn how to deal with ambiguity, this may reduce the relevance of leaders' PNS in a digital

transformation context. Therefore, future research could investigate enabling training and leadership development measures to support this notion. For instance, longitudinal studies measuring the effects of leaders' PNS before and after training could be conducted.

In order to better understand the underlying cognitive processes described by the Reasoned Action Approach, we would advise future research to measure the different beliefs and the intentions that precede behavior in digital change initiatives to be better able to assess the different effect sizes. Thus, one would be able to evaluate which belief (i.e., behavioral, normative, or control belief) to be the most critical or whether all beliefs influence leaders' intentions equally in digital processes.

Furthermore, studies could look at other aspects of DSE. Since DSE is a rather new construct, few studies have been conducted in this field. Therefore, further exploring the significance of DSE in digital change processes would be vital. Future studies could, for instance, investigate how employees' DSE may impact digital change processes.

Since the literature on a leader's trust in subordinates is rather scarce, it would also be fruitful to further examine this field in a digital context. Further, it may be useful to expand the scale for trust in subordinates with more items. Using only three items to measure such a complex construct might not be sufficient. Therefore, more research on this topic and its measurements is advised.

Conclusion

Although traditional leadership models are challenged by digital transformation initiatives, few studies have examined the relation between leader characteristics and employee outcomes in these processes. Our study investigated the relationship between leaders' personal need for structure and employee perceived autonomy in a digital transformation process, examining leaders' trust in subordinates and leaders' digital self-efficacy as possible moderators. By utilizing the Reasoned Action Approach as a theoretical framework, we provided unique insights into the relationship between leaders' characteristics and their intentions towards granting autonomy to subordinates in digital change. Our findings revealed that a leader's PNS was negatively related to employees'

perceived autonomy. Moreover, it was shown that this relationship was moderated by a leader's DSE. A high DSE can ease the impact of a leader's high PNS on employee autonomy. Thus, leaders with a high PNS, as well as a high DSE, are still likely to grant autonomy to their subordinates. Contrary to our expectations, leaders' trust in their subordinates was not found to be a significant moderator in the relationship between the leader's PNS and employee perceived autonomy. An unpredicted finding suggested, however, that leaders' trust in subordinates has a direct positive effect on employee perceived autonomy. Despite some limitations, this study offers new theoretical perspectives and provides practical implications. To more fully understand the role of leader characteristics in digital transformations, future research may extend the body of research on PNS, DSE, and leaders' trust in subordinates in these processes. Our study contributes to a deeper understanding of leader characteristics and their impact on employee autonomy in digital change and expands the literature on digital transformations.

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Attachments

Attachment A. *Leader Survey.*

Information about research project.

In regard to our master thesis in Leadership and Organizational Psychology, we are investigating the topic of leadership in the process of digital transformation. The study is based on online surveys and will take less than 10 minutes to complete. When choosing answers you can pick from five alternatives varying from “strongly disagree” to “strongly agree”. If you encounter difficulties answering a question it is important that you answer what seems closest to what you think is right.

Your participation is voluntary and you can withdraw at any time for any reason. Your e-mail address will be recorded, but answers will be processed using numeric pseudonyms. No results will be shared between leader and employee. The results will only be used for academic purposes and will be treated confidentially on encrypted hard-drives. The study is approved by the “Norsk senter forskningsdata“ (NSD), the Norwegian data protection services. After project completion on 01.07.2020, all potentially identifiable variables, including e-mail address, will be deleted.

Handelshøyskolen BI is responsible for the project and the data will be accessible by two project members and our thesis supervisor, Sut I Wong, sut.i.wong@bi.no. The responsible data protection officer for this project is Vibeke Nesbakken, personvernombud@bi.no. Additionally, we remind you of your rights regarding data portability and your rights to complain to Datatilsynet.

If you have any questions or need any more information about this study, please do not hesitate to contact us via email:

Mona.M.Kegel@student.bi.no
peter.valderhaug@student.bi.no

Best regards,
Mona Kegel and Peter Valderhaug
MSc-students at BI Business School

If you **do not want** us to use this data, please click below to **exit the survey immediately.**

- I have changed my mind and want to withdraw

Control variables

The following questions will help us gather demographic information on a general basis. Please answer as accurately as possible.

- Please indicate your age?
  - Under 25
  - 25-34
  - 35-44
  - 45-54
  - 55-64
  - 65 and over
- Please indicate your gender
  - Female
  - Male
  - Nonbinary
- How many years of full-time work experience do you have?
  - 0-3
  - 4-7
  - 8-11
  - 11+
- How many subordinates are reporting to you?
  - 0-5
  - 6-10
  - 11-20
  - More than 20
- If you are part of the top management
  - Yes
  - No
- Highest education
  - No education
  - High School

  - Bachelor
  - Master
  - PhD
  - MBA
- Have you previously been exposed to a work-related change process?
  - Yes
  - No
- If yes, what was the extent of your involvement in the change process?
  - I attended meetings.
  - I led a team that was affected by the change process.
  - I led the team that led the change process.
- Do you currently lead a project regarding a digital transformation?
  - Yes
  - No
- Will you lead a project regarding a digital transformation in the future?
  - Yes
  - No
- Which country do you work in?
  - Norway
  - Germany
  - Sweden
  - Denmark
  - England (UK)
  - USA
  - France
  - Switzerland
  - Netherlands
  - Belgium
  - Other country

Please read each statement carefully and decide if you ever feel this way about your job. If you have never had any experiences like this, choose “neutral”. If you have encountered such situations or emotions, choose the option from “strongly disagree” to “strongly agree”, that is closest to your personal experience. There

are no "right" or "wrong" answers to these questions.

Personal need for structure scale

5-point Likert Scale (Strongly Disagree – Disagree – Neutral –Agree – Strongly Agree)

1. It upsets me to go into a situation without knowing what I can expect from it.
2. I'm not bothered by things that interrupt my daily routine.
3. I enjoy having a clear and structured mode of life.
4. I like to have a place for everything and everything in its place.
5. I find that a well-ordered life with regular hours makes my life tedious.
6. I don't like situations that are uncertain.
7. I hate to change my plans at the last minute.
8. I hate to be with people who are unpredictable.
9. I find that a consistent routine enables me to enjoy life more.
10. I enjoy the exhilaration of being in unpredictable situations.
11. I become uncomfortable when the rules in a situation are not clear.

Leader trust in subordinate

5-point Likert Scale (Strongly Disagree – Disagree – Neutral –Agree – Strongly Agree)

1. I really wish I had a good way to keep an eye on my subordinate.
2. I would be comfortable giving my subordinate a task or problem that was critical to me, even if I could not monitor his or her actions.
3. If I had my way, I wouldn’t let my subordinate have any influence over issues that are important to me.

Digital self-efficacy

5-point Likert Scale (Strongly Disagree – Disagree – Neutral –Agree – Strongly Agree)

1. I have confidence in my ability to master new digital technologies implemented at work

2. I believe in my ability to effectively utilize new digital tools implemented in my organization
3. I am certain I can be digitally competent
4. I am confident that I can learn to use most any new digital technology introduced at work
5. I believe that I can succeed in mastering most any new work technology to which I set my mind
6. No matter what new digital technologies may be introduced at work, I am certain I will be able to master them.

Attachment B. *Subordinate Survey.*

Information about research project.

In regard to our master thesis in Leadership and Organizational Psychology, we are investigating the topic of leadership in the process of digital transformation. The study is based on online surveys and will take less than 10 minutes to complete. When choosing answers you can pick from five alternatives varying from "strongly disagree" to "strongly agree". If you encounter difficulties answering a question it is important that you answer what seems closest to what you think is right.

Your participation is voluntary and you can withdraw at any time for any reason. Your e-mail address will be recorded, but answers will be processed using numeric pseudonyms. No results will be shared between leader and employee. The results will only be used for academic purposes and will be treated confidentially on encrypted hard-drives. The study is approved by the "Norsk senter forskningsdata" (NSD), the Norwegian data protection services. After project completion on 01.07.2020, all potentially identifiable variables, including e-mail address, will be deleted.

Handelshøyskolen BI is responsible for the project and the data will be accessible by two project members and our thesis supervisor, Sut I Wong, sut.i.wong@bi.no. The responsible data protection officer for this project is Vibeke Nesbakken, personvernombud@bi.no. Additionally, we remind you of your rights regarding data portability and your rights to complain to Datatilsynet.

If you have any questions or need any more information about this study, please do not hesitate to contact us via email:

Mona.M.Kegel@student.bi.no
peter.valderhaug@student.bi.no

Best regards,
Mona Kegel and Peter Valderhaug
MSc-students at BI Business School

If you **do not want** us to use this data, please click below to **exit the survey immediately.**

- I have changed my mind and want to withdraw

Control variables

The following questions will help us gather demographic information on a general basis. Please answer as accurately as possible.

- Please indicate your age?
  - Under 25
  - 25-34
  - 35-44
  - 45-54
  - 55-64
  - 65 and over
- Please indicate your gender
  - Female
  - Male
  - Nonbinary
- How many years of full-time work experience do you have?
  - 0-3
  - 4-7
  - 8-11
  - 11+
- Highest education
  - No education
  - High School
  - Bachelor
  - Master
  - PhD
  - MBA
- How many years have you been working for your current leader?
  - 0-2
  - 3-5
  - 6-8

    - Over 8 years
- Have you previously been exposed to a work-related change process?
    - Yes
    - No
- Which country do you work in?
    - Norway
    - Germany
    - Sweden
    - Denmark
    - England (UK)
    - USA
    - France
    - Switzerland
    - Netherlands
    - Belgium
    - Other country

Please read each statement carefully and decide if you ever feel this way about your job. If you have never had any experiences like this, choose “neutral”. If you have encountered such situations or emotions, choose the option from “strongly disagree” to “strongly agree”, that is closest to your personal experience. There are no "right" or "wrong" answers to these questions.

Autonomy

5-point Likert Scale (Strongly Disagree – Disagree – Neutral –Agree – Strongly Agree)

1. The job allows me to make my own decisions about how to schedule my work.
2. The job allows me to decide on the order in which things are done on the job.
3. The job allows me to plan how I do my work.
4. The job gives me a chance to use my personal initiative or judgment in carrying out the work.

5. The job allows me to make a lot of decisions on my own.
6. The job provides me with significant autonomy in making decisions.
7. The job allows me to make decisions about what methods I use to complete my work.
8. The job gives me a considerable opportunity for independence and freedom in how I do the work.
9. The job allows me to decide on my own how to go about doing my work.

Attachment C. *Norwegian Centre for Research Data evaluation.*

NSD NORSK SENTER FOR FORSKNINGSDATA

NSD sin vurdering

Prosjekttittel

Ledelse i digital transformasjon

Referansenummer

824222

Registrert

06.11.2019 av Peter Valderhaug - Peter.Valderhaug@student.bi.no

Behandlingsansvarlig institusjon

Handelshøyskolen BI / BI Oslo / Institutt for ledelse og organisasjon

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Sut I Wong, sut.i.wong@bi.no, tlf: 4746410723

Type prosjekt

Studentprosjekt, masterstudium

Kontaktinformasjon, student

Peter Reinert Valderhaug, peter.valderhaug@student.bi.no, tlf: 97972026

Prosjektperiode

18.11.2019 - 01.07.2020

Status

03.12.2019 - Vurdert

Vurdering (2)

03.12.2019 - Vurdert

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 03.12.19, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

MELD ENDRINGER
Dersom behandlingen av personopplysninger endrer seg, kan det være nødvendig å melde dette til NSD

ved å oppdatere meldeskjemaet. På våre nettsider informerer vi om hvilke endringer som må meldes. Vent på svar før endringer gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 01.07.2020

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER
NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke behandles til nye, uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen om behandlingen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

Qualtrics er databehandler i prosjektet. NSD legger til grunn at behandlingen oppfyller kravene til bruk av databehandler, jf. art 28 og 29.

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og/eller rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!

Kontaktperson hos NSD: Elizabeth Blomstervik

Tlf. Personverntjenester: 55 58 21 17 (tast 1)

28.11.2019 - Vurdert anonym

Det er vår vurdering at det ikke skal behandles direkte eller indirekte opplysninger som kan identifisere enkeltpersoner i dette prosjektet, så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet den 28.11.19 med vedlegg, samt i meldingsdialogen mellom innmelder og NSD. Prosjektet trenger derfor ikke en vurdering fra NSD.

HVA MÅ DU GJØRE DERSOM DU LIKEVEL SKAL BEHANDLE PERSONOPPLYSNINGER?
Dersom prosjektopplegget endres og det likevel blir aktuelt å behandle personopplysninger må du melde dette til NSD ved å oppdatere meldeskjemaet. Vent på svar før du setter i gang med behandlingen av personopplysninger.

VI AVSLUTTER OPPFØLGING AV PROSJEKTET
Siden prosjektet ikke behandler personopplysninger avslutter vi all videre oppfølging.

Lykke til med prosjektet!

Kontaktperson hos NSD: Elizabeth Blomstervik

Tlf. Personverntjenester: 55 58 21 17 (tast 1)