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Maria Falk Mikkelsen & Mikkel Giver Kjer

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Autonomy is Taken, Not Given. The Role of Public Leader Networking in Shaping Perceived Managerial Autonomy

Maria Falk Mikkelsen[a] and Mikkel Giver Kjer[b]

[a]University of Southern Denmark & VIVE - The Danish Center for Social Science Research; [b]The Danish Center for Social Science Research

ABSTRACT

This paper analyzes how public leaders influence their managerial autonomy through managerial networking, proposing that autonomy is not only a prerequisite for leadership but also a result of it. Through a mixed-methods approach, we analyze a unique longitudinal dataset comprising both quantitative and qualitative data on public school leaders in Denmark collected between 2011 and 2018, a period marked by a significant reform aimed at enhancing managerial autonomy. Contrary to the political aims of the reform, our findings reveal an overall decline in perceived managerial autonomy over time. However, as hypothesized, school leaders who actively engage in hierarchical networking are able to sustain their autonomy. Leaders who successfully preserve their autonomy do so by asserting their leadership and authority in interactions with external actors. These results contribute to the broader discourse on public leadership, illustrating how leaders can navigate complex governance structures to secure the decision-making flexibility necessary for effective leadership.

KEYWORDS

administrative reform; longitudinal study; managerial autonomy; mixed method; networking

Introduction

Managerial autonomy is widely regarded as a key prerequisite for effective public leadership (Andersen et al., 2021). Public leaders navigate complex environments with multiple, often conflicting demands (Chun & Rainey, 2005), requiring them to manage upwards to political principals, downwards to employees, and outwards to external stakeholders (Grøn et al., 2024; O'Toole et al., 2005; Van Der Voet et al., 2023) Without sufficient decision-making flexibility, public leaders will struggle to respond effectively to the shifting demands of this diverse array of actors.

CONTACT Maria Falk Mikkelsen mfm@vive.dk VIVE – The Danish Center for Social Science Research, University of SouthernDenmark

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While managerial autonomy can enable or constrain leadership behaviors and outcomes (e.g., Andersen & Moynihan, 2016; Bjørnholt et al., 2022; Blom-Hansen et al., 2024; Grøn et al., 2024; Nielsen, 2014), we argue that autonomy is not merely a structural condition for leadership—it is also shaped by leaders themselves. Since Hambrick and Finkelstein's seminal work, scholars have posited that managerial discretion or autonomy is shaped by environmental, organizational, and individual factors. However, research on the individual antecedents of managerial autonomy remains scarce (Boye, 2021; Grøn et al., 2024; Wangrow et al., 2015), and the few existing studies have focused on static differences in perceived managerial autonomy across genders, different levels of experience, and personality traits (Key, 2002; Palus & Yackee, 2016; Portillo, 2012; Van de Walle, 2019).

This paper fills a critical gap in the literature by examining how individual leaders shape and negotiate their autonomy over time. Specifically, it explores the role of managerial networking in influencing perceived autonomy by addressing the research question: *How does public leaders' managerial networking impact their perceived autonomy?*

Public organizations operate within a complex multi-actor, multi-level system, in which managerial autonomy is shaped by actors both inside and outside the politico-administrative hierarchy (Christensen & Lægreid, 2015; Egeberg & Trondal, 2009; Rommel & Verhoest, 2014; Wonka & Rittberger, 2010; Yesilkagit, 2011; Yesilkagit & van Thiel, 2008). These complex structures create veto points and barriers, making efforts to enhance managerial autonomy—whether through reforms or other mechanisms—challenging (Blom-Hansen et al., 2024).

However, they also present opportunities. The involvement of multiple stakeholders with differing, and often conflicting, interests, each wielding varying degrees of influence, enhances the strategic options available to leaders. Unlike in a simple principal-agent relationship, this complexity allows leaders to negotiate or *forge* greater autonomy by leveraging relationships with these various actors (Carpenter, 2001). We argue that public leaders can strategically use their networks to navigate these structures and actively forge or carve out managerial autonomy for their own agenda. Leaders who engage in hierarchical networking—building strong connections within the politico-administrative hierarchy—are better positioned to shield their organizations from autonomy constraints and seize opportunities for increased decision-making flexibility.

We test our hypotheses using a unique dataset that includes both quantitative and qualitative longitudinal data on Danish public school leaders collected between 2011/2013 and 2017/2018. This period featured a major reform explicitly aimed at increasing school leaders' autonomy, creating a unique context to study how leaders negotiate autonomy. Our dataset

comprises longitudinal qualitative interviews with six school leaders, longitudinal survey data from over 500 school leaders, and longitudinal administrative data from all Danish public schools.

Our findings reveal that, despite the government's intention to enhance managerial autonomy through the reform, school leaders' perceptions of autonomy declined significantly over time. While central government regulations were lifted, they were replaced by new municipal-level regulations, effectively counteracting the intended effects of the reform. However, school leaders who actively engaged in hierarchical networking with municipal authorities were able to maintain their autonomy, underscoring the importance of strategic networking behaviors. Notably, we found no positive effects of nonhierarchical networking. The qualitative findings further illustrate that leaders who preserved their autonomy did so by consistently asserting their leadership by being "bold" and actively "challenging" authority in their interactions with the municipality. Leaders who proactively negotiated their autonomy fared better, while those who adopted more passive roles saw a decline in their autonomy.

The paper makes three key contributions to the literature on public leadership. First, it advances the limited literature on individual antecedents of managerial autonomy by demonstrating that leaders' own actions—-specifically, their networking behaviors—play a crucial role in shaping their autonomy. While prior research acknowledges static individual differences in perceived managerial autonomy due to factors such as personality or experience (Hambrick & Finkelstein, 1987; Key, 2002; Palus & Yackee, 2016; Portillo, 2012; Van de Walle, 2019), this paper argue and shows that managerial autonomy is a dynamic phenomenon fluctuating at least in part based on leaders' strategic efforts to negotiate and redefine their decision-making space over time.

Amid ongoing debates about what defines "public" leadership (Orazi et al., 2013; Tummers & Knies, 2016; Vogel & Werkmeister, 2021; Van Wart, 2013), our findings suggest that the primary distinction between private and public leadership may not lie in absolute levels of autonomy, but rather in the ongoing redefinition of autonomy within public leadership. Public leaders are not passive recipients of predetermined autonomy levels; they are active agents who continuously reshape their autonomy through strategic interactions with key actors in their networks.

Second, the paper responds to the growing demand for more multimethod research in the field of public administration and leadership (Perry, 2012; Raimondo & Newcomer, 2017). By drawing on a unique dataset that includes both quantitative and qualitative longitudinal data on public managers, the paper provides an in-depth analysis of how public leaders, over time, use networking to shape and influence their own levels of autonomy.

Third, we provide empirical evidence relevant to the practice of public leadership. Our findings demonstrate that public leaders who engage in strategic, hierarchical networking are better positioned to maintain and potentially enhance their autonomy, even when faced with external pressures and regulatory changes. School leaders, who maintained their autonomy, did so by actively negotiating, and when necessary, challenging the positions of others—such as municipal authorities in our case—to safeguard their decision-making power.

Theoretical foundations

Research shows that managerial autonomy plays a central role for how public leadership unfolds, influencing both leadership styles and their outcomes (Andersen et al., 2021). In the private sector, studies show that greater managerial discretion amplifies the impact of CEOs (Crossland & Hambrick, 2007, 2011; Hambrick & Quigley, 2014). In the public sector, changes in managerial autonomy are linked to variations in leaders' decisions and behaviors (Andersen & Moynihan, 2016; Blom-Hansen et al., 2024; Cárdenas & Ramírez de la Cruz, 2017; Grøn et al., 2024) as well as the effectiveness of performance management systems (Bjørnholt et al., & 2022; Nielsen, 2014). While autonomy is frequently conceptualized as a structural or contextual condition for leadership, this paper offers an alternative view. We conceptualize managerial autonomy as a dynamic asset—one that public leaders can actively negotiate, shape, and expand.

Managerial autonomy

A substantial body of research has examined organizational autonomy (see e.g., Arregle et al., 2023; Verhoest et al., 2004), highlighting its multi-dimensional nature and the various ways it has been conceptualized (Blom-Hansen et al., 2024; Boye, 2021; Verhoest et al., 2004). Within this literature, managerial autonomy is typically treated as one subdimension among others such as financial or structural autonomy (Verhoest et al., 2004). However, in contrast to the extensive attention given to organizational-level autonomy, studies that examine individual managerial autonomy remain scarce (Grøn et al., 2024).

This study adopts van der Voet and Van de Walle (2018) definition of managerial autonomy as "*the relative freedom that managers experience in decision-making processes related to the inputs and processes of the organization, for example, with regard to planning, organizing, budgeting, and staffing*" (2018, 10). Boye classifies this definition as narrower and less abstract, capturing both "autonomy to"—the extent to which public

leaders have the capacity to act and make choices—and "autonomy from"—independence and being free from interferences in the decision-making process (2021). Our focus aligns with Hambrick and Finkelstein (1987) concept of "latitude of action," which refers to the discretion managers have in pursuing and implementing organizational objectives Importantly, we distinguish this from "latitude of objectives," which concerns the discretion managers have to pursue other goals (e.g., personal goals) potentially at the cost of organizational goals (Shen & Cho, 2005; Williamson, 1963).

The paper furthermore differentiates between *formal* and *de facto* autonomy (Bjørnholt et al., & 2022; Boye, 2021; Verhoest et al., 2021). Legal (formal) autonomy described in organizational charters/constitutions/regulations does not necessarily equal actual experienced (de facto) autonomy (Maggetti, 2007). Governments can legislate formal autonomy through reform, but whether such reforms affect de facto autonomy remains uncertain.

Similarly, studies—including this one—demonstrate that even when public leaders are granted equal legal autonomy under similar organizational conditions, they can still experience vastly different levels of de facto autonomy (Key, 2002; Palus & Yackee, 2016; Portillo, 2012; Van de Walle, 2019). This variation suggests that managerial autonomy is not solely determined by legal/formal or organizational factors.

Drawing on Hambrick and Finkelstein's framework for managerial discretion of private sector managers, (1987), antecedents of managerial autonomy can be divided into three types of factors: individual (e.g., personal characteristics), organizational (e.g., size, structure, and age), and environmental (e.g., regulation and law). Given this paper's focus on the managerial autonomy of individual managers, our primary emphasis is on individual-level factors while controlling for organizational and environmental factors.

Despite the theoretical importance of individual-level determinants, empirical research on this aspect remains limited. Boye's (2021) review of managerial discretion research in the public sector identifies only five studies on individual-level antecedents, while a comparable review in the private sector finds just two (Wangrow et al., 2015). This limited research shows static differences in perceived managerial autonomy across genders, different levels of experience, and personality traits. Consequently, questions about whether and how public leaders can actively negotiate and reshape their autonomy over time remain largely unanswered. Building on scholarship in managerial autonomy and public leadership, we argue that the complex and often competing demands faced by public leaders create distinct opportunities for leaders to influence and expand their own autonomy.

Navigating dynamic environments: The role of public leadership

Viewing autonomy as a straightforward, dyadic relationship between one principal and one agent oversimplifies its complexity in public leadership contexts (Christensen & Lægreid, 2007). Public organizations exist in a multilevel, multi-actor environment where various players—national and local authorities, administrative and political principals and subordinates, but also actors outside the politico-administrative hierarchy such as unions, interest groups, clients, and the media—influence autonomy (Egeberg & Trondal, 2009; Rommel & Verhoest, 2014; Wonka & Rittberger, 2010; Yesilkagit, 2011; Yesilkagit & van Thiel, 2008). Consequently, no single actor has full control over autonomy; rather, it is constrained by the mandates and powers of other actors. The multilevel structure in which public organizations are embedded thus creates potential veto points that can impede the process of enhancing managerial autonomy. Even without conflicting preferences among actors, *"the complexity of joint action"* (Pressman & Wildavsky, 1973) may inhibit efforts to enhance managerial autonomy.

The above arguments offer a somewhat pessimistic view of influencing managerial autonomy through reform or other means, which may explain why reforms often fail to significantly increase autonomy (Bezes & Jeannot, 2018; Bjørnholt et al., 2021; Blom-Hansen et al., 2024; Maggetti & Verhoest, 2014; Moynihan, 2006). Public leaders, particularly those at the frontlines who answer to multiple principals (Boye, 2021), face limitations on their "autonomy from" external interference. However, the same complex structures that limit "autonomy from" also present opportunities that a simple principal-agent relationship does not. The presence of multiple actors with differing, and often competing, interests—each wielding varying degrees of power depending on the issue—widens the strategic options available to public leaders, thus creating more opportunities for exercising "autonomy to" act.

In these dynamic environments, public leaders must manage relationships in multiple directions: upwards, toward political authorities and senior organizational levels; downwards, toward employees and subordinate units; and outward, toward external stakeholders like interest groups, users, and the public (Grøn et al., 2024; O'Toole et al., 2005; Van Der Voet et al., 2023). This multidirectional management is far from passive or reactive—it demands proactive coordination, negotiation, and strategic alignment of interests to achieve organizational goals (Getha-Taylor et al., 2011). Given that public leaders are already deeply embedded in relationships with these diverse actors, they are uniquely positioned to leverage these connections.

While Getha-Taylor et al. (2011) do not directly address managerial autonomy, their description of one of the three core functions of public leadership closely aligns with our argument:

> Public managers must balance the demands of many masters, including a variety of internal and external stakeholders and partners. As compared to their private and nonprofit partners, public leaders' concerns for responsiveness and accountability are complicated by this reality. Therefore, in the context of new governance, an important role of public leaders is to bridge the multiple relationships operating to accomplish public purposes, while stewarding or conserving important accountability concerns Getha-Taylor et al. (2011, i89).

We argue that this bridging function inherently involves carving out or negotiating managerial autonomy. To better understand how this process unfolds, we turn to the literature on managerial networking, which provide a useful insight into the mechanisms through which public leaders can strategically shape their autonomy.

The role of managerial networking

While existing research on strategic networking and autonomy is limited, there is suggestive evidence that networks can be used to shape autonomy at the organizational level. For example, Carpenter (2001) demonstrates that organizations can increase their autonomy by using networks to build favorable coalitions. Similarly, Rommel and Verhoest (2014) find that coordination within networks enhances the autonomy of Belgian regulatory agencies. These studies suggest that organization can bolster their autonomy by effectively "working the network," utilizing relationships and alliances to achieve greater decision-making freedom. Both studies, however, focus on organizations rather than public leaders, leaving the implications for public leadership unexplored. Moreover, large-scale longitudinal studies examining the impact of networking on public sector managerial autonomy over time and in a dynamic fashion are missing.

Research has consistently shown that managerial networking improves organizational performance (Gibson et al., 2014; Hassan et al., 2018; e.g., Hicklin et al., 2007; Meier & O'Toole, 2003; Song et al., 2021). For example, Meier and O'Toole (2003, 2005, 2007) find that public sector leaders can enhance organizational performance by protecting the organization from external shocks—such as changes in policy and fluctuations in funding—and by seizing new opportunities, like fostering organizational support and discovering new funding sources.

By the same logic, we expect that public leaders who engage more intensively in networking activities are better positioned to protect their autonomy from erosion (e.g., through reform or political interference) and

to expand it by cultivating allies, legitimizing their leadership role, and aligning external expectations with their own goals. In short, we propose that managerial networking is a key mechanism through which public managers can actively shape their own autonomy.

Managerial autonomy is shaped not only by actors within the politico-administrative system but also by a broader set of external stakeholders (Egeberg & Trondal, 2009; Rommel & Verhoest, 2014; Wonka & Rittberger, 2010; Yesilkagit, 2011; Yesilkagit & van Thiel, 2008). In such multi-actor settings, public managers must navigate a web of relationships to effectively claim, protect, or expand their autonomy. Managerial networking provides a critical mechanism for doing so.

We distinguish between two broad types of networking: hierarchical and nonhierarchical. Hierarchical networking refers to interactions with actors within the politico-administrative hierarchy, such as senior executives, municipal leaders, or central government officials. These relationships can directly influence the delegation and interpretation of autonomy within institutional frameworks. Nonhierarchical networking involves connections outside the formal bureaucratic structure—such as with peer managers, professional associations, unions, and community groups—who can provide resources, legitimacy, or pressure that indirectly, but also sometimes directly, affect managerial autonomy.

Meier, O'Toole, and their collaborators emphasize that public sector performance is enhanced when managers engage strategically across both types of networks (O'Toole et al., 2005). Building on this insight, we argue that both hierarchical and nonhierarchical networking affect managerial autonomy.

H_1: *Managers with high levels of hierarchical networking will have higher perceived autonomy compared to managers with low levels of networking.*

H_2: *Managers with high levels of nonhierarchical networking will have higher perceived autonomy compared to managers with low levels of networking.*

The setting

The paper analyzes the effect of public leaders' managerial networking on managerial autonomy within the setting of Danish public elementary/middle schools (grades 0 to 6). The Danish public school system offers an ideal setting for investigating this research question, as a large-scale reform—the Danish Public School Reform of 2014—were introduced with the explicit political aim of increasing the managerial autonomy of school leaders (Bjørnholt et al., 2022; Houlberg et al., 2016). This reform provided opportunities for public leaders to renegotiate their managerial autonomy, offering a unique chance to study how they navigated and capitalized on these changes.

The uniform structure of Danish public schools enhances the study's ability to isolate the effects of managerial networking. Schools operate under the same government regulations, provide identical services, and have the same level of formal autonomy, as they are all municipally owned. This homogeneity allows the study to control for environmental determinants of managerial autonomy and focus on whether differences in networking affect managerial autonomy.

The Public School Reform represents the most significant transformation of Denmark's public school system in the past 35 years, aiming to improve academic achievement and student well-being (Winter et al. 2022). Among its various initiatives, the reform sought to expand school leaders' latitude of action—the discretion to make managerial decisions—while simultaneously reducing their latitude of objectives—the freedom to set their own performance goals. The reform introduced stronger performance management measures, with higher authorities setting objectives and holding school leaders accountable for achieving them. At the same time, it sought to increase managerial autonomy by streamlining and eliminating certain government regulations on school management.

As Danish public schools are owned and operated by municipalities, the reform formally expanded municipal autonomy. However, the reform came with a clear mandate to further delegate decision-making powers to school leaders. Municipalities were expected to simplify or abolish process rules, granting school leaders more discretion in determining how to meet performance targets. Because municipalities had a large influence on whether delegate decision-making powers were delegated to school leaders, relationships with municipal authorities are expected to play a crucial role in shaping school leaders' autonomy in the reform years.

Research design

The paper uses a mixed method design with longitudinal quantitative and qualitative data. Specifically, we use a sequential design with an explanatory logic (Creswell & Creswell, 2017; Mele & Belardinelli, 2019). Quantitative data are used to test our hypotheses, while qualitative data provide a deeper understanding of how and why school leaders' perceptions of autonomy change over time, and the role of networking in this process. The focus of the qualitative analysis is thus to refine our statistical findings (Honig, 2019).

This research design is chosen for three key reasons. First, the complexity of the relationship between managerial autonomy and networking cannot be fully captured by either quantitative or qualitative data alone. While quantitative analysis reveals general patterns, it lacks the depth to show how school leaders navigate autonomy through networking. Qualitative

data addresses this gap. Second, using both methods strengthen validity. When qualitative and quantitative findings align, the credibility of the results increases. Triangulation also supports a more comprehensive understanding (Teddlie & Tashakkori, 2009). Third, combining statistical evidence with lived experiences enhances the practical relevance of the findings, yielding insights that are both theoretically sound and directly applicable to educational leadership.

Qualitative data

From 2011 to 2018, we conducted five rounds of qualitative interviews with school leaders at six public schools (in 2011, 2015, 2016, 2017 and 2018). Interviews lasted approximately 1.5 h and was guided by an interview framework with semi-open-ended questions. The topics covered a broad range of topics such as school management, leadership responsibilities, organizational changes, relationships with the municipality and local stakeholders, and changes in goals, ambitions, and autonomy. In the later years (2015–2018), interviews also explored aspects of the ongoing reform (see Table A3 in the appendix for the interview guide).

The selected schools varied based on size, student socioeconomic background, student performance, and the characteristics of their leaders, such as gender, experience, and education (see Table 1). Only one school experienced a leadership change between the first interview in 2011 and the last in 2018.

Table 1. Overview of school and principal characteristics, qualitative interviews.

	Principal 1	Principal 2	Principal 3	Principal 4	Principal 5	Principal 6
Schools size/ number of students	Large (above 600)	Medium (between 300 and 599)	Small (below 300)	Medium (between 300 and 599)	Medium (between 300 and 599)	Large (above 600)
Student socioeconomic background*	Weak	Average	Average	Average	Weak	Strong
Organizational performance*	High	High	High	Low	Low	Average
Gender	Woman	Man	Man	Man	Woman	Woman
Education	Master's degree in leadership and management	Other education	Diploma in management	Diploma in management	Diploma in management	Master's degree in leadership and management
Managerial experience	More than 15 years	More than 15 years	Less than 10 years	Less than 10 years	10–15 years	More than 15 years
Principal transition	No	No	No	Yes	No	No
Years at the school (in 2011)	More than 5 years	More than 10 years	More than five years	A couple of years	A couple of years	A couple of years

Note.
*Based on an average from 2014–2017.

All interviews were transcribed, and to ensure confidentiality, personal information such as names and locations were anonymized. Data were analyzed using Nvivo, with a deductive coding system based on predefined themes. The central codes for our research questions included:

1. Leaders' Experience of Autonomy: Statements reflecting leaders' perceptions of their latitude of action such as "I have the freedom to make my own decisions.
2. Autonomy in Relation to Other Actors: Comments regarding the influence of hierarchical and nonhierarchical actors e.g., "The municipality limits the flexibility I have in certain situations.
3. Use of Networks: Insights into how leaders leverage relationships with peers and other stakeholders, such as "Networking with other leaders helps me gain different perspectives."

We adopted a more deductive approach to ensure comparability and consistency in our analysis. Our key objective was to track the evolution of school leaders' autonomy over time and determine whether they actively used networking to enhance it. The deductive framework allowed us to systematically compare statements across different schools and time periods, focusing on recurring themes such as decision-making autonomy, municipal interference, and external influences.

Moreover, the deductive approach facilitated the integration of qualitative and quantitative data, aligning with our sequential design and explanatory logic (Creswell & Creswell, 2017; Mele & Belardinelli, 2019). By using predefined categories, we could deepen our understanding of the quantitative results, cross-referencing them with qualitative insights to create a more nuanced analysis.

While an inductive coding approach could have uncovered unexpected patterns by allowing themes to emerge organically from the data, it might have introduced variability that would have undermined the structured comparisons we needed. The pre-established themes in our deductive approach enabled us to focus on key areas, ensuring that the qualitative data directly informed and refined our statistical findings. However, a limitation of this deductive approach is that it may restrict the discovery of novel themes or subtleties that could surface through inductive coding. We will revisit this limitation in the discussion.

To complement our analysis, we coded municipal school quality reports [Kvalitetsrapporter] from 2014, 2016, and 2018. These reports outline local educational goals and track progress over time. Using a standardized coding manual, all goals—whether broad or specific—were categorized as

process—or performance-related. To enhance reliability, each report was double-coded, and ambiguous cases were resolved through coder discussion.

Quantitative data

For the quantitative data collection, an electronic survey was sent to the school leaders at all the public schools on four occasions between 2013[1] and 2017. The survey data were merged with administrative panel data on student performance as well as on important school and student socio-economic controls for all public primary schools from 2013 to 2017. While school leaders at 83% of the schools answered at least one of the five waves of the survey, only schools with both a pre-reform (2013) and post-reform (2015, 2016 and/or 2017) survey response were included in the final analysis. The final sample used for the analysis consists of 40% of Danish public primary schools (514). The included schools do not differ from the schools excluded from the analyses with regard to student performance and socioeconomic background of students (SES). However, the included schools are significantly larger. Thus, results may not be generalizable to small schools.

Measuring managerial autonomy

As all school leaders operate under the same legal framework and thus possess the same level of formal autonomy, our focus is solely on their de facto, or experienced, autonomy. By definition, de facto autonomy is a perceptual construct that reflects how leaders perceive and experience their autonomy. To capture this, we measure school leaders' perceptions of their own autonomy. This approach is consistent with several previous studies (e.g., Boon & Wynen, 2017; van Thiel & Yesilkagit, 2011). Specifically, we assess managerial autonomy using a scale based on three items from the school leader survey, each rated on a 5-point Likert scale. The items assess the extent to which school leaders perceive they have influence over:

1. Hiring of teachers;
2. Setting curricular goals for students; and
3. Determining how teaching is organized.

These items were selected based on their use in prior research on managerial autonomy (Bjørnholt et al., 2022; Nielsen, 2014). Factor analysis identified a single factor with an eigenvalue greater than 1 (Kaiser, 1960; Nunnally, 1978). The scale's internal consistency, as indicated by an alpha score of 0.60, falls slightly below the commonly accepted threshold. To address this, we constructed a two-item scale using the most strongly correlated items (setting curricular goals and organizing teaching), resulting in an improved alpha of

0.68, which is near the recommended level of 0.70 (Nunnally, 1978, 245–46). For both scales, we use factor scores in the analysis.[2]

Measuring managerial networking

To capture networking behavior by public leaders, we built on Meier and O'Toole's measure of managerial networking (2003). Networking was assessed through survey items that asked school leaders how often they met with key external actors (measured on a scale from "daily" to "never"). The factor analysis revealed two distinct factors with eigenvalues above 1:

1. Hierarchical Networking: Consisting of three items measuring how often leaders met with the municipal school administration, the municipal social affairs administration, and the municipal educational-psychological advisory service [PPR].
2. Nonhierarchical Networking: Consisting of three items measuring how often leaders met with other school leaders, the local teachers' union leader, and the school board.

Both scales demonstrated high reliability, with alpha values of 0.88 and 0.93, respectively. To better illustrate the impact of managerial networking in the analysis, we categorized both networking scale into three equally-sized groups: low, medium, and high networking.[3]

We acknowledge the limitations of this measure of networking. As Meier and O'Toole note, their measure of managerial networking is *"simplified and ignores all aspects of networking aside from frequency of contact, such as skill, reputation, and a number of strategic considerations."* (2003, 692). Despite these limitations, frequency of contact remains an effective proxy for assessing whether leaders engage with relevant actors—a necessary first step in any networking process. Simply put, leaders who do not meet with others cannot network. Reinforcing the measure's credibility, Meier and O'Toole conclude in a study specifically investigating its limitations that it "*nonetheless taps important components of managerial action in valid and reliable ways*." (2005, 536).

That said, the measure does not differentiate between contacts initiated by the leader (e.g., to increase autonomy) and those initiated by higher authorities (e.g., for oversight). Nor does it capture the substantive content of these interactions. Such limitations are inherent to large-scale longitudinal studies, which necessitate simplified measures to ensure feasibility. Studies with comparable longitudinal measures of networking are rare, underscoring the significance of this work.

However, as we argue throughout this paper, the reduction in complexity inherent to large-scale quantitative research means such studies should not stand alone. To address this, we complement our quantitative analysis

with a longitudinal qualitative study, allowing for a more in-depth exploration of how school leaders network with relevant actors. This mixed-methods approach provides a richer understanding of the complexities underlying leadership networking behaviors.

Statistical model

We analyze our panel data using a school fixed effects model. This model accounts for all cross-sectional differences, including those related to school performance, and automatically controls for any unobserved variables that remain constant over time (Wooldridge, 2011). The model uses 2013 as the base year and compares it to 2017 to secure maximum effect of the reform.[4] It estimates whether the trend in autonomy from 2013 to 2017 depends on changes in school leaders' networking activities, while controlling for observable (included controls) and unobservable fixed differences between schools, like historical and organizational context and municipal variations in managerial autonomy.

While our measures of managerial autonomy and networking rely on self-reported data from the same school leader survey—potentially raising concerns about social desirability and/or common source bias—these issues are to a large extent mitigated by our longitudinal design. By analyzing changes over time, we control for all time-invariant biases at both the school and leader levels, including personality traits, abilities, and general response tendencies such as social desirability (Favero & Bullock, 2015; Jakobsen & Jensen, 2015).

To further address potential bias, we test our model excluding schools that underwent leadership transitions. This step eliminates the risk of comparing pre- and post-reform responses from different leaders within the same school. While we do not anticipate that leadership transitions systematically bias our results, we acknowledge that they may affect the reliability of our findings.

Controls

The model holds all time-invariant variables constant thus reducing the need for control variables. Nonetheless, we include a number of controls to capture changes at the organizational level that may affect managerial autonomy such as changes in student composition (percentage of immigrants and parental education), organizational performance (student test scores), organizational changes (number of middle managers and school size), municipal changes (number of inhabitant and school budget) and managerial factors (experience, education and gender of manager[5]) over time at the investigated schools. Table 2 show descriptive statistics for the control variables and the measures of networking and autonomy.

Table 2. Descriptive statistics, survey and administrative data.

Variable	*N*	Mean	Std. Dev.	Min	Max
Managerial autonomy 1 (factor score)	1,028	−0.108	0.943	−3.567	1.766
Managerial autonomy 2 (factor score)	1,028	−0.138	0.939	−2.607	1.807
Hierarchical networking	1,028	1.982	0.809	1	3
Nonhierarchical networking	1,028	1.784	0.721	1	3
School size (students in 100)[1]	1,026	4.401	2.270	0.190	11.150
Number of middle managers	1,028	2.532	1.091	1	8
Organizational performance[1,2]	1,028	58.805	9.990	24.143	87.714
Immigrant students (proportion)[1]	1,028	0.097	0.159	0.000	1.000
Parents education (proportion): High school or less[1]	1,028	0.133	0.110	0.000	1.000
Parents education (proportion): Bachelor degree[1]	1,028	0.402	0.142	0.000	1.000
Parents education (proportion): Master degree[1]	1,028	0.465	0.172	0.000	1.000
Municipal size (number of inhabitants in 1,000)[1]	178	60.690	68.308	1.795	580.184
School budget for municipality (in 1,000 Danish kr.)[1]	178	170.415	32.700	134.963	314.149
Female manager	1,028	0.390	0.488	0	1
Manager experience (years as school manager)	1,028	10.903	7.394	1	37
Manager has master degree in management	1,028	0.044	0.205	0	1

[1]Given that the effect of the organizational control variables on managerial autonomy is likely not instantaneous, we measure the controls with a two-year lag.
[2]School performance is measured as the school's average on the National Test in math in the sixth grade. The National Test is a nationwide, externally graded, standardized aptitude test with a score from 0 to 100 (best possible score) that almost all Danish children take.

Findings

Findings from the quantitative data

Table 3 presents the findings from the quantitative analysis. Models 1 and 2 illustrate the average change in managerial autonomy between 2013 and 2017 for our two measures of autonomy, without incorporating independent variables. Both measures show a clear and significant negative trend, indicating that, contrary to the government's intention to enhance managerial autonomy through reform, school leaders reported an overall decline in autonomy during this period.

Models 3 to 6 show the effects of hierarchical and nonhierarchical managerial networking for the development in managerial autonomy. Hierarchical networking is significant in all models. Even with the reduced sample size in Models 5 and 6 (which exclude schools with leadership transitions, leaving 205 schools), the results remain robust, providing strong support for Hypothesis 1: the more school leaders network within the hierarchy, the higher the managerial autonomy.

In contrast, we find a significant negative effect of nonhierarchical networking in model 3 and 4 though these results are less consistent when the sample is limited to schools without leadership transitions. Nonhierarchical networking remains significant only in Model 5. As models 5 and 6 draw on answers from the same school leaders over time, the reliability of these results is higher. Thus, the negative effect of nonhierarchical networking is less certain. In sum, we find no support for hypothesis 2.

Table 3. The effect of hierarchical and non- hierarchical networking on autonomy. School fixed effects models.

	(1) Autonomy 1	(2) Autonomy 2	(3) Autonomy 1	(4) Autonomy 2	(5) Autonomy 1 No transition	(6) Autonomy 2 No transition
Low hierarchical networking			(ref.)	(ref.)	(ref.)	(ref.)
Medium hierarchical networking			0.409***	0.452***	0.500***	0.588***
			(0.112)	(0.116)	(0.143)	(0.147)
High hierarchical networking			0.706***	0.691***	0.708***	0.732***
			(0.134)	(0.133)	(0.193)	(0.194)
Low nonhierarchical networking			(ref.)	(ref.)	(ref.)	(ref.)
Medium nonhierarchical networking			−0.258***	−0.233**	−0.249*	−0.191
			(0.089)	(0.093)	(0.138)	(0.149)
High nonhierarchical networking			−0.280**	−0.228*	−0.415**	−0.323
			(0.129)	(0.134)	(0.188)	(0.217)
2013	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)
2017	−0.261***	−0.293***	−0.366*	−0.478**	−0.233	−0.375
	(0.053)	(0.052)	(0.189)	(0.188)	(0.293)	(0.298)
N (Observations)	1028	1028	1026	1026	410	410
N (Schools)	514	514	514	514	205	205
Adj. R2	0.182	0.181	0.245	0.231	0.396	0.410

Note. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.
Municipal cluster robust standard error in parenthesis. Controls not shown. Full models are in Table A1 in the Appendix.

Further analysis reveals that while hierarchical networking enhances managerial autonomy, even leaders with the highest levels of networking did not experience an overall increase in autonomy over time due to the negative effects of the reform. By including an interaction term between hierarchical networking and year, we tested whether the reform's impact on managerial autonomy differed across the three networking groups. Results show no significant positive change in autonomy over time, even for leaders with high levels of hierarchical networking. Figure 1 illustrates the calculated point estimates and confidence intervals for the overall change in managerial autonomy (scale 1) across low, medium, and high hierarchical networking groups for the largest estimates of the interaction effect (model 6).[6]

While the point estimate is positive for high levels of hierarchical networking, the confidence interval reveal that the estimate is not different from zero. Thus, while leaders with high hierarchical networking succeed in buffering their organization from the decline in managerial autonomy over time, the government's ambition of higher managerial autonomy were not realized—not even for the school leaders with the highest levels of networking. Leaders with the lowest hierarchical networking in contrast experienced a significant decrease in managerial autonomy over time.

Most control variables in Models 3–6 are statistically insignificant (see Table A1 in the appendix), indicating that factors such as organizational size and performance do not significantly influence school leaders' perceived autonomy. However, municipality size does have a significant and

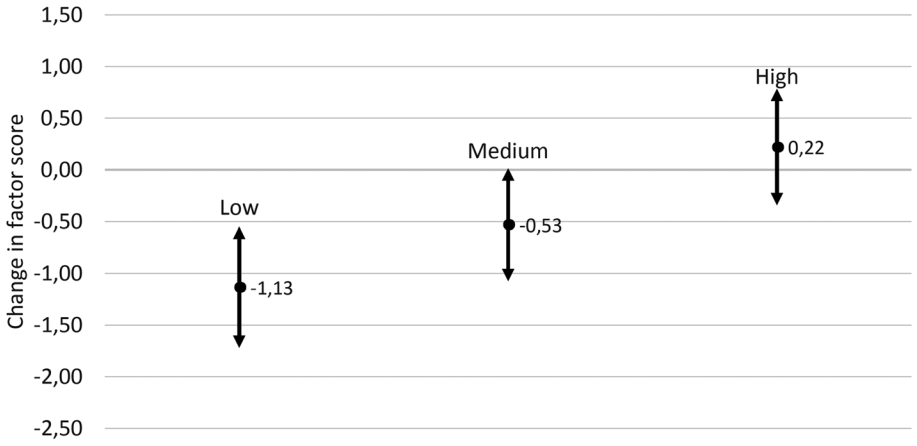


Figure 1. Change in managerial autonomy (scale 1) from 2013 to 2017 by group. *Note.* Point estimates with 95% confidence intervals calculated from including an interaction term between hierarchical networking and year to model 6. Results are similar across models 3–6.

Table 4. Change in perceived autonomy 2011–2018. Qualitative interviews.

Principals	Principal 1	Principal 2	Principal 3	Principal 4	Principal 5	Principal 6
Perception of autonomy from 2011–2018[1]	Unchanged	Slightly increased	Decreased	Decreased	Unchanged	Unchanged

[1]Comparing interviews from 2011 with interviews in 2015–2018.

robust negative effect: the larger the municipality, the lower the perceived managerial autonomy. Thus, we find some evidence that organizational size matters. However, our results suggest that it is the size of the organization at the superjacent level, not the agent organization that matters. We also find limited evidence that managerial experience influences perceived autonomy, in line with prior research (Palus & Yackee, 2016). However, as managerial experience is redundant in models 5 and 6, the robustness of this finding cannot be fully assessed.

Findings from the qualitative data

The qualitative data aligns with the quantitative findings, indicating that the development of managerial autonomy varied across school leaders. Table 4 presents a comparison of statements from six interviewed school leaders regarding their perceived autonomy before (2011) and after the reform (2015–2018). Overall, the qualitative data reflect mixed experiences: while some leaders reported a slight increase in autonomy, others experienced a decline or no significant change.

These findings reinforce the quantitative results, suggesting that the reform did not lead to a general increase in managerial autonomy. They also provide a more nuanced perspective on how autonomy evolved, highlighting the influence of municipalities and networking in this process. Despite their differing experiences, all school leaders agreed that local administration became more involved in the daily management of schools after the reform.

Municipal regulation

In 2011, none of the interviewed leaders reported that government or municipal regulation significantly restricted their autonomy. To substantiate these autonomy perceptions empirically, School Leader 4 described the school as having "extensive autonomy," while School Leader 2 believed they had "considerable autonomy." While all leaders acknowledged that municipal involvement was, to some extent, influenced by school performance, they did not view it as a major constraint on their leadership.

By contrast, in interviews conducted after the reform (2015–2018), all school leaders commented on the noticeable increase in municipal oversight and regulation. Leaders 3 and 4, in particular, expressed concerns about this shift:

> I think it has become more and more difficult to say: 'Now we follow our own agenda'. What I plan is pushed aside by things we have to do. So, I am very careful about saying [to the employees]: 'This is our strategy'. Due to all the other things we need to do. So, my own agenda is pushed aside, because I can control that; but all demands from outside [the local administration] are compulsory (Leader 4, 2016).

> I believe the regulation from the local government has increased (Leader 3, 2016).

All six school leaders acknowledged this growing regulation, a trend further supported by municipal reports indicating a significant increase in process goals set by municipalities (see Table A2 in the appendix). By 2018, the number of process goals had more than doubled compared to 2014, underscoring the expanding municipal oversight and the potential reduction in school leaders' latitude of action. Simultaneously, performance goals also more than doubled, likely reflecting the reform's emphasis on performance management and intended aim of reducing school leaders' latitude of objectives.

Despite the consensus on increased regulation, only School Leaders 3 and 4 reported a loss of autonomy. Leader 4, in particular, expressed frustration mixed with resignation:

> I think I have given somewhat up. I have accepted the smaller room [for my leadership], and I spend my time on municipal ideas, not my own. I primarily function as an administrator now. (Leader 4, 2018)

This statement suggests that Leader 4, while frustrated by the loss of autonomy, has resigned to it, withdrawing from active engagement with the municipal administration and focusing instead on internal school management.

In contrast, Leader 2 reported an increase in autonomy—not as a direct result of the reform itself, but through actively challenging municipal perspectives:

> I don't think the scope of management, the possibilities, that was promised with the reform, have been realized. So, I have to do what I can, and I will not keep my mouth shut; so, I have challenged my local administration in the implementation of the reform, and I have been right every time. (Leader 2, 2018)

Leader 2 felt that that the reform had failed to deliver on its promises regarding managerial autonomy. Viewing it as her responsibility to "challenge" the municipality, she actively pushed for greater autonomy ("I have to do what I can"). School Leader 5 expressed a similar proactive stance, emphasizing the importance of "boldness" in interacting with the municipal administration:

> I feel like you have the opportunity to influence, if you are bold enough. I mean, the local administration has created a very detailed framework for implementing the reform, but I have said "I think we should do it in a different way", and they have sometimes responded with "this is how you do in our municipality". My response has been "I am not employed as a manager [but as a leader], so I will make a plan together with the staff, but I will do it within the framework" (Leader 5, 2018)

Leader 5 emphasized that boldness creates opportunities for influence. Even when facing resistance—such as municipal officials insisting, "This is how we do it in our municipality"—she remained firm in asserting her autonomy within the given framework. By developing her own plans in collaboration with staff, she reinforces her role as a leader rather than merely an administrator. She also underscored the importance of understanding legal boundaries:

> I have gone in and read the legislation and curriculum…I have been able to push through with my interpretation of laws and regulations. When I believe something benefits the children in the long run, I go all the way. And in this municipality, I had to be a bit brave *(Leader 5, 2018)*

For Leader 5, legal knowledge was a crucial tool in the negotiations. By presenting alternative interpretations of laws and formulating independent plans within the legal framework, she successfully advocated for—and was granted—the autonomy to implement her vision.

Both Leaders 2 and 5 emphasize that while they challenge municipal perspectives and assert their leadership, they also maintain positive, non-adversarial relationships. Asserting authority does not necessarily lead

to conflict. As Leader 5 put it, "I am not just a manager, but a leader," reinforcing the importance of asserting her authority to protect her autonomy while reminding municipal officials that such autonomy is essential for effective leadership. For Leader 2, this approach resulted in an increase in autonomy, while for Leader 5, it helped preserve it.

In sum, the qualitative data suggest that school leaders actively negotiate their autonomy. For Leaders 2 and 5, a combination of boldness, legal knowledge, and strategic engagement within municipal constraints allowed them to assert their leadership and either preserve (Leader 5) or even expand (Leader 2) their managerial autonomy. In contrast, other leaders—particularly Leader 4—chose to withdraw from municipal interactions to focus on internal management but ultimately experienced a decline in managerial autonomy.

Discussion and conclusion

This paper analyzes how the managerial autonomy of public school leaders in Denmark is shaped by their networking behaviors during the implementation of a major school reform explicitly aimed at enhancing managerial autonomy. Drawing on longitudinal survey data and qualitative interviews, we find that the reform largely failed to achieve its intended objective. Rather than increasing managerial autonomy, perceived managerial autonomy declined significantly from 2013 to 2017.

While other concurrent changes in the public school system could theoretically explain this trend, such an explanation would require evidence of centralization—which conflicts with the broader emphasis on performance management and enhanced leader autonomy that has defined Danish public school reforms over the past 15 years (Houlberg et al., 2016). A more plausible explanation emerges from our qualitative interviews and the coded municipal school reports: many municipalities responded to the reform not by delegating managerial autonomy to school leaders as intended, but by introducing additional regulations, rules, and process goals. These municipal responses restricted rather than expanded autonomy of school leaders.

Crucially, however, we find that school leaders are not passive recipients of such challenges to managerial autonomy. Consistent with our hypotheses, both the quantitative and qualitative data show that school leaders actively shape their own autonomy through strategic networking—particularly within hierarchical structures. We identify three key insights:

First, the quantitative data shows that school leaders who maintained frequent interactions with municipal officials were able to protect their autonomy, while those with lower levels of networking experienced a decline. While frequency of contact is a basic metric, it effectively captures

whether leaders meet with relevant actors, a necessary first step for networking.

The qualitative data further enrich our understanding of how leaders use their network to negotiate autonomy. The interviews show that these leaders actively asserted their leadership, challenged decisions they perceived as wrong or limiting, and navigated complex institutional frameworks by leveraging their understanding of legal and procedural rules. They used these relationships to negotiate alternative solutions that remained within the set formal boundaries, but retained their latitude of action.

One leader (Leader 2) reported increased autonomy post-reform. However, the quantitative data do not support a general trend toward greater managerial autonomy—even among those with high levels of networking. Instead, we find that networking buffered against the downward trend in autonomy, helping leaders retain their autonomy rather than gain more. Conversely, leaders who disengaged from networking with municipal actors experienced a pronounced erosion of autonomy. Leader 4, in particular, appeared notably "defeated" in later interview rounds, having to some extent given up on striving for autonomy. Notably, Leaders 3 and 4, who reported a reduction in autonomy, were among the least experienced, suggesting that leadership experience may also play a role in how effectively school leaders navigate the "negotiation game" of autonomy. This interpretation finds some support in the quantitative data.

Second, while we find positive effects of hierarchical networking, networking outside the politico-administrative hierarchy appears to have little or even negative effects. This finding may reflect the pivotal role municipalities played in our reform context. Municipal formal authority was expanded with the reform, granting them considerable influence over the development of school leader autonomy. Despite research suggesting that actors outside formal hierarchies can influence autonomy (Egeberg & Trondal, 2009; Rommel & Verhoest, 2014; Wonka & Rittberger, 2010; Yesilkagit, 2011; Yesilkagit & van Thiel, 2008), our findings indicate that such influences are context-dependent. In our case, nonhierarchical ties offered little protection against the downward trend in autonomy caused by the reform. In other public sector settings, however, such relationships may have greater impact.

Third, and consistent with existing research (Bezes & Jeannot, 2018; Bjørnholt et al., 2021; Blom-Hansen et al., 2024; Maggetti & Verhoest, 2014; Moynihan, 2006), we find that enhancing managerial autonomy through administrative reform is inherently difficult due to the multi-level governance structure of public organizations. In our case, municipal-level actions effectively counteracted the central government's reform intentions, illustrating the limited capacity of top-down initiatives to shape managerial

autonomy in practice. These findings reinforce the value of distinguishing between formal autonomy—codified in laws, policies, or institutional frameworks—and de facto autonomy, which emerges through dynamic interactions among a range of actors across governance levels.

Furthermore, in line with previous research (Bjørnholt et al., 2022; Brodkin 2011; Nielsen, 2014), our findings demonstrate that it is inherently difficult to expand managerial autonomy—understood as latitude of action—while simultaneously implementing performance management initiatives—which reduce latitude of objectives. This inherent tension can lead to "half-hearted managerialism" (Hood 1991) in which public leaders face the dual burden of reduced discretion over goal-setting and limited freedom in how to achieve the set goals—a dynamic particularly evident in the experiences of Leaders 3 and 4 in our study. Prior studies have shown that such constraints are linked to weaker organizational performance (Bjørnholt et al., 2022; Nielsen, 2014). Our findings suggest that public leaders with low levels of managerial networking are more likely to experience such compromised control over both ends and means, which ultimately weakening their ability to act strategically and responsively.

In sum, our findings contribute to the broader discourse on public leadership by challenging the notion that managerial autonomy is a static attribute granted by external forces or predetermined by fixed personal characteristics such as gender or personality. Instead, our study demonstrates that autonomy is actively shaped and continuously negotiated through leadership behaviors, specifically managerial networking. We find that while governments may have constrained capacity to impose or expand autonomy from above, individual public leaders retain a degree of agency to shape their own autonomy through strategic behavior, negotiation, and engagement with their networks. Our findings align with contemporary public leadership literature emphasizing the importance of relational engagement (Getha-Taylor et al., 2011, i89). Achieving and sustaining autonomy can thus be viewed as a core component of public leadership, requiring leaders to redefine and renegotiate their authority amid shifting institutional landscapes, competing demands, and evolving stakeholder expectations.

Practical implications

Our results also hold significant practical implications for public leaders seeking to maintain or enhance their autonomy. Strategic networking emerges as a vital tool for cultivating influence and negotiating the terms of decision-making authority. Our results suggest that autonomy is a contested and dynamic space that demands continuous effort and strategic engagement.

Leaders who succeeded in preserving their autonomy skillfully balanced assertiveness with collaboration. They positioned themselves as proactive agents rather than passive implementers. For instance, when Leader 5 asserted, "I am a leader, not just an administrator," she reinforced her decision-making authority while simultaneously appealing to the municipality's desire for strong leadership. This example illustrates how boldness, paired with relational tact, can effectively protect a leader's autonomy. Our qualitative data further underscore the importance of presenting alternative plans or interpretations within the confines of the existing legal framework. Presenting credible plans within the boundaries of existing frameworks proved to be a powerful strategy for retaining autonomy.

For practitioners, these findings underscore the value of investing in strong relationships within the politico-administrative hierarchy. Such networks provide access to critical information and serve as platforms for shaping the decisions and processes that influence managerial autonomy. At a broader level, the study also offers a cautionary note for policymakers. Reforms intended to increase managerial autonomy cannot succeed without considering the behavior of other involved actors, such as municipalities. If such actors impose new constraints or fail to internalize the reform's intent, formal changes risk being diluted or even reversed in practice.

Limitations

The use of longitudinal data and a mixed-method design significantly strengthens the validity of this paper's conclusions by providing both a large-n longitudinal perspective and a deeper qualitative understanding of the dynamics at play. However, a few limitations should be acknowledged.

First, the paper analyzes facto managerial autonomy measured through self-reported perceptions of autonomy. Although perceptual measures are well-suited to capturing how autonomy is experienced, they are susceptible to biases such as social desirability and subjective interpretation. Additionally, both managerial autonomy and networking data were drawn from the same survey of school leaders, raising the potential for common source bias. We mitigate this risk through the use of longitudinal data, which reduces susceptibility to such biases compared to cross-sectional studies (Favero & Bullock, 2015; Jakobsen & Jensen, 2015). To further validate our results, we also re-ran our models, excluding schools that experienced leadership transitions, to ensure that observed effects were not driven by personnel changes.

Second, the study is contextually bound to the Danish public school system, which may limit its generalizability. Danish school leaders typically operate with less autonomy than counterparts in more decentralized systems like the US (Meier et al., 2015). Despite the sample

opportunities to increase managerial autonomy from this low baseline, our findings show that a reform aimed at enhancing autonomy fell short. While specific dynamics may vary across sectors or countries, the broader finding—that strategic networking is a critical tool for navigating managerial autonomy—likely holds in other governance contexts. Future research should investigate how institutional settings shape this relationship and whether similar patterns emerge across different public sectors and policy domains.

Third, in our qualitative analysis we used a deductive approach to enable systematic comparison across cases and time. While effective for structured analysis, this method may overlook emerging themes. Future research could benefit from a more integrative approach that combines deductive structure with inductive flexibility to better capture the complexity of public leadership and autonomy negotiation.

Notes

1. Since the Public School Reform had not yet been implemented in 2013, the surveys at that time did not specifically address the reform but instead focused on broader themes related to school management, such as autonomy and networking. The same questions concerning autonomy and networking were repeated across the three subsequent waves of the survey.
2. Sum scales produce similar results.
3. Drawing on the full sample of schools (3,761 observations within 2011 schools) we use the factor scores to create three groups of equal size. Using the factor scores without grouping produce similar results.
4. Missing values in 2013 were replaced with values from the same school from the same survey in 2011. Missing values in 2017 were replaced with 2016 or 2015 values from the same school.
5. When schools with principal transition are excluded from the models, manager experience and gender become redundant and are thus excluded from the models.
6. Results are similar for models 3 to 6.

Ethics

Informed consent was obtained from all participants involved in the study. All procedures involving human participants adhered to the ethical standards of the 1964 Declaration of Helsinki and its subsequent amendments, or to comparable ethical guidelines.

The paper utilized ChatGPT, a language model developed by OpenAI, to assist with language editing and improving clarity. The AI was not used to generate original content, conduct analysis, or interpret results.

Author contributions

All intellectual contributions, including research design, data analysis, and conclusions, are solely those of the authors.

Disclsoure statement

The authors declare that they have no conflict of interest.

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Notes on contributors

Maria Falk Mikkelsen is an associate professor at the Department of Political Science and Public Management at the University of Southern Denmark and a Senior Researcher at VIVE – The Danish Center for Social Science Research. Her research focuses on public leadership and public management reforms, with particular emphasis on managerial autonomy, performance management, and the role of frontline leaders in implementing policy and driving organizational change.

Mikkel Giver Kjer is a chief research analyst at VIVE – The Danish Center for Social Science Research. His research centers on schooling and education, with a particular focus on school leadership, change management, performance management, and the behavior of frontline staff in both the school and early childhood education sectors.

Data availability statement

The analysis relies on survey data and data from several Danish administrative registers, which were linked using social security numbers and school identifiers. In accordance with the European Union's General Data Protection Regulation (GDPR) and Danish regulations effective from May 2018, the data are securely stored on servers at Statistics Denmark and cannot be transferred to external computers for security reasons. Access to these data is restricted and requires formal approval from Statistics Denmark. Interested researchers must submit a written application detailing the research project, including its purpose, societal relevance, and the specific data sets, variables, and population to be used. Applications are open to researchers affiliated with Danish institutions authorized by Statistics Denmark, as well as to international researchers collaborating with those institutions.

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