


Unpacking the microfoundations of educational innovation and change: a multi-level study of ambidexterity, commitment, and trust using Coleman's bathtub model

Marcus Pietsch^a, Hilal Buyukgoze^b, Sedat Gümüş^c , Ömür Çoban^d and Nedim Özdemir^e

^aSchool of Education and School of Management & Technology, Leuphana University, Lüneburg, Germany; ^bSchool of Education, Bartın University, Bartın, Türkiye; ^cDepartment of Educational Policy and Leadership, The Education University of Hong Kong, Hong Kong, China; ^dSchool of Education, Karamanoglu Mehmetbey University, Karaman, Türkiye; ^eSchool of Education, Ege Üniversitesi, Izmir, Türkiye

ABSTRACT

Using data from 3,075 teachers and 246 school leaders, this study examines the microfoundations of ambidexterity in public schools. Drawing on Coleman's bathtub model and the concept of contextual ambidexterity, we apply multilevel structural equation modelling to show that leader trust enhances organizational ambidexterity, fully mediated by teacher commitment and individual ambidexterity. By connecting individual- and organizational-level mechanisms, the study advances public management theory and addresses a methodological gap in studies of public sector organizations. The findings offer new insights into how trust-based leadership fosters adaptive capacity in public organizations, informing leadership development and innovation strategies across the public sector.

ARTICLE HISTORY Received 15 December 2024; Accepted 23 October 2025

KEYWORDS Ambidexterity; commitment; microfoundations; schools; multilevel analysis; trust

Introduction

While organizational management research has extensively examined ambidexterity in business contexts, studies on how micro-level social factors shape ambidexterity in public organizations remain limited, particularly in education (Bryson, Crosby, and Bloomberg 2014; Fernandez and Rainey 2006; Hamblin et al. 2024). This may be partly due to the fact that public education has so far played only a marginal role within public administration

Marcus Pietsch  marcus.pietsch@leuphana.de

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research (Raffel 2007). Schools, however, as highly structured and centralized institutions (Tyack and Tobin 1994), provide a unique context to explore the microfoundations of ambidexterity in the public sector, where both exploration and exploitation must be balanced in complex and changing environments (Gupta, Smith, and Shalley 2006; Levinthal and March 1993). Addressing this gap is vital for understanding how leadership and individual mechanisms foster organizational ambidexterity in the public sector.

Organizational ambidexterity is a multilevel phenomenon emerging from collective interactions that connect ideas and knowledge across organizational levels (Tarba et al. 2020). A microfoundational perspective assumes that macro-level effects are mediated through micro-level actors and mechanisms (Felin, Foss, and Ployhart 2015; Linder and Foss 2018). Yet, despite extensive research in management, public administration studies have only recently begun to examine leadership, culture, and structure as drivers of ambidexterity – and few employ multilevel quantitative designs (Foss and Pedersen 2019; Pertusa-Ortega et al. 2021). Moreover, studies invoking Coleman's (1990) bathtub model rarely use it systematically to explain these mechanisms (Distel 2019).

Research on organizational ambidexterity in education has grown, but remains limited in scope and theoretical integration. While recent studies have linked leadership to teacher-level outcomes such as creativity, innovation, and the balance between exploration and exploitation (Da'as 2023, 2025; Özdemir et al. 2024; Pietsch, Tulowitzki, and Cramer 2022, 2023; Pietsch et al. 2025; Ugwuanyi, Bellibaş, and Pietsch 2025), none of these studies have modelled the microfoundations of ambidexterity.

To address this limitation, the present study applies Coleman's (1990) micro – macro framework to explain how leader trust (macro-level) influences school ambidexterity through teacher commitment and teacher ambidexterity (micro-level). Leader trust, conceptualized as a contextual school-level condition shaping collective norms and behaviours, provides a theoretical and analytical foundation linking individual and organizational levels (Spreitzer and Mishra 1999). Drawing on Gibson and Birkinshaw's (2004) view of trust as a central condition for ambidexterity, we modelled the mediating roles of teacher commitment and teacher ambidexterity in a multilevel dataset of 3,075 teachers across 261 schools in Türkiye.

Conceptual framework

We developed our conceptual mediation model, drawing on Coleman's (1990) bathtub model (see Figure 1). In this framework, collective outcomes emerge as organizational antecedents that shape individual conditions, which in turn influence individual actions that aggregate into macro-level outcomes (Felin and Foss 2020). While Coleman's (1986)

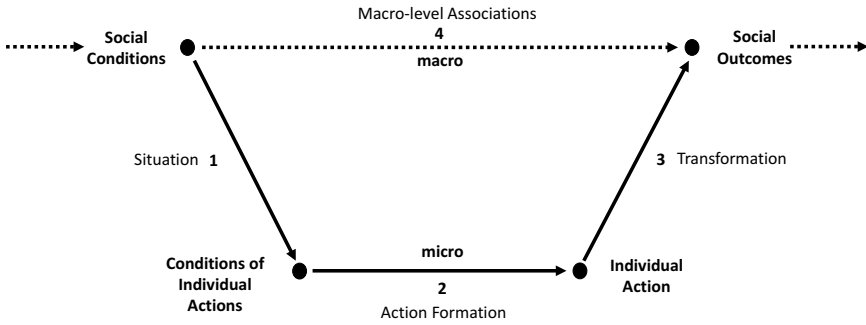


Figure 1. The general model of microfoundational explanation.

model offers a powerful mechanism-based approach to capture these multilevel processes, it has been criticized for its assumptions of linear causality and its limited capacity to account for temporal dynamics, feedback loops, and the emergence of social structures and realities (Hedström and Ylikoski 2010; Whittington 2025). Particularly in organizational contexts, where interactions are often reciprocal and evolving (Kozlowski and Klein 2000), this static representation may oversimplify complex dynamics (Cowen et al. 2022). Nevertheless, for the purposes of analysing microfoundations, Coleman’s model offers a useful analytical framework to systematically trace how macro-level factors – such as leader trust – shape individual attitudes and behaviours that subsequently aggregate into organizational outcomes like ambidexterity (Distel 2019; Felin, Foss, and Ployhart 2015; Mueller, Renzl, and Will 2020). In our concept, leader trust in teachers (social conditions) affects teacher organizational commitment (conditions of action), which fosters teacher ambidexterity (individual action), ultimately leading to school ambidexterity (collective outcome).

Despite these acknowledged limitations, we deliberately adopted Coleman’s (1990) bathtub model because it allows us to analytically trace the multilevel causal chain linking macro-level trust to micro-level commitment and individual ambidexterity, and, in turn, to school-level outcomes. In contrast to other multilevel frameworks that emphasize static structures or purely bottom-up emergence, Coleman’s mechanism-based logic provides conceptual clarity for identifying the specific pathways through which public leaders’ trust can influence teachers’ attitudes and actions. By integrating this model with recent advances in microfoundations research (Felin and Foss 2020; Gullmark and Clausen 2023), our study applies the bathtub model in a non-deterministic, interactional manner, thereby capturing reciprocal influences between levels while maintaining analytic parsimony.

Microfoundations of organisational ambidexterity

This study is based on the concept of the microfoundations of organizational ambidexterity (Tarba et al. 2020). As stated by Linder and Foss (2018), the microfoundations argument makes a strong claim for multilevel mediation, stating that the effects of macro-entities (e.g. organizations) are always mediated through micro-actors, micro-level mechanisms and both lateral and cross-level interactions. Gullmark and Clausen (2023) emphasize that microfoundations in public administration research ‘are about locating (theoretically and empirically) the proximate causes of a phenomenon (or explanations of an outcome) at a level of analysis lower than that of the phenomenon itself’ (Felin, Foss, and Ployhart 2015, 586). This discussion commences with Coleman’s (1990) bathtub model, in which collective phenomena emerge when organizational antecedents shape individual conditions, thereby initiating actions at the individual level that ultimately result in social or collective outcomes (Felin and Foss 2020; Felin, Foss, and Ployhart 2015).

From this perspective, an organization’s dynamic capabilities are constituted by the actions of individuals within the organization (Eisenhardt, Furr, and Bingham 2010). Dynamic capabilities are defined as the capacity of an organization to integrate, build and reconfigure internal and external competencies to address rapidly changing environments characterized by deep uncertainty (Birkinshaw, Zimmermann, and Raisch 2016; Bogers et al. 2019). This discussion is becoming increasingly significant in the field of public administration research (Gullmark 2021; Gullmark, Salvato, and Clausen 2025), where organizational routines are increasingly recognized as microfoundations of the dynamic capabilities of public organizations (Piening 2013). In this context, Wirtz, Langer, and Schmidt (2021) argue that dynamic capabilities in public organizations are essential for introducing new services, developing new processes and adapting the organization’s business model, thus facilitating broader organizational transformation.

With regard to organizational ambidexterity, the dynamic capability perspective suggests that the ability of individuals to navigate the contradictory yet complimentary demands of exploitation and exploration is a crucial prerequisite for the emergence of ambidexterity at the organizational level (Gibson and Birkinshaw 2004; Raisch et al. 2009). It is assumed that all individuals within an organization must act ambidextrously (Gibson and Birkinshaw 2004), but senior managers play a special role (Zimmermann, Raisch, and Cardinal 2018). Consequently, as highlighted by O’Reilly and Tushman (2008), dynamic capabilities are fundamental to organizational ambidexterity, arising primarily from the deliberate actions of senior managers and leaders to facilitate learning, integration, reconfiguration and transformation – each aimed at enhancing an organization’s

capacity to sense and seize emerging opportunities and fostering exploration and exploitation.

This is essential because, from a structural perspective, senior managers and leaders are individual agents embedded within the organizational level, influencing, and coordinating the actions of individuals, teams and sub-units, thereby shaping the organization as a whole (Dionne et al. 2014; Yammarino and Dansereau 2008). In this multilevel context, leaders play a pivotal role in enabling organizational ambidexterity by aligning structures, goals, and behaviours across organizational levels (Müller et al. 2020). As Foss and Lindenberg (2013) argue, they contribute to organizational success by guiding individuals to pursue organizational objectives through the alignment of individual and organizational goals, supported by governing structures that maintain effective routines. Managing ambidexterity thus becomes a distinct leadership challenge that requires leaders to continuously balance and coordinate the interplay between organizational structures and individual motivations across organizational levels. Müller et al. (2020) thus emphasize a multilevel perspective. Furthermore, this interplay suggests that leaders not only develop strategies at the macro level but also translate these into actionable practices at the micro level, ensure their implementation by individuals and teams, and ultimately secure their contribution to broader organizational outcomes.

Consistent with the tenets of microfoundation theory, we posit that the causal factors underpinning the higher-level organizational macro phenomenon of organizational ambidexterity are constituted at lower, micro within-levels (Felin, Foss, and Ployhart 2015) and that higher-level social conditions shape individual actions (Tarba et al. 2020). For instance, Tempelaar and Rosenkranz (2019) demonstrated that individuals with proclivity for exploitation are generally less inclined to contribute intuitively to an organization's ambidexterity. However, they might engage in such activities when situated in work contexts that offer clear guidelines and assign them exploratory tasks.

This discussion is also reflected in public administration and leadership research (Galwa and Vogel 2023; Molines and Perrier 2024; Vogel and Masal 2015). As Vogel and Masal (2015) argued, for instance, public leadership studies typically vary along two key dimensions: 1) a philosophical one (objective vs. subjective) and 2) an analytical one (micro-level vs. multilevel). In particular, the analytical dimension is often illustrated using Coleman's (1990) 'bathtub' model. While some studies focus on individual behaviour within administrative contexts, others examine broader systemic dynamics; multilevel approaches integrate both. These perspectives are not mutually exclusive but form a continuum that allows for considerable conceptual and methodological variation. According to Gullmark and Clausen (2023), the

microfoundations perspective in public administration research seeks to understand how antecedents of public sector innovation can be organized and related both within and across various levels of analysis, as well as to explain why they interact.

In light of this discussion, it is evident that, from a microfoundational perspective, organizational ambidexterity is consistently viewed as a multilevel phenomenon that ‘offers unique insights about how ambidexterity as an organizational-level dynamic capability can be systematically built’ (Tarba et al. 2020, 2). To date, however, there has been a paucity of empirical research into the extent to which these assumptions hold true. One significant challenge in this context is that the topic of aggregation is fundamentally important for microfoundations research, encompassing a range of methodological and theoretical approaches – including simple aggregation, variance decomposition, and the study of the emergence of bottom-up effects – each varying considerably in complexity (Barney and Felin 2013).

Furthermore, there is a dearth of studies that coherently combine micro- and macro-perspectives (Tarba et al. 2020). While Coleman’s bathtub model provides a valuable foundation for the empirical analysis of such relations, its application has thus far been extremely limited, particularly regarding the comprehensive investigation of the microfoundations of organizational dynamic capabilities (Felin, Foss, and Ployhart 2015). In our study, this limitation becomes an advantage, as the model’s simplicity helps to systematically structure the otherwise complex interplay of macro and micro mechanisms within schools – without implying a one-directional or deterministic relationship. Our design explicitly tests reciprocal and mediated effects, extending Coleman’s logic to capture the microfoundations of public ambidexterity. There is currently a dearth of large-scale multilevel studies in microfoundations research (Distel 2019; Felin, Foss, and Ployhart 2015; Foss and Pedersen 2019), which, at a minimum, is due to the fact that ‘collecting data at multiple levels of analysis is one of the major stumbling blocks for the dissemination of microfoundational explanations’ (Foss and Pedersen 2019, 1616).

This also applies to research on the microfoundations of ambidexterity, as demonstrated in the systematic review conducted by Pertusa-Ortega et al. (2021). While most studies to date employ a quantitative design, the utilization of appropriate methodologies, such as multilevel analyses, is seldom observed. Even when the relevant data were collected, most studies were usually only conducted at one level of analysis. Consequently, although scholars have conceptualized organizational ambidexterity as a multilevel phenomenon more recently (Martin, Keller, and Fortwengel 2019; Mom, Van Den Bosch, and Volberda 2009; O’Reilly and Tushman 2013), a significant gap remains in understanding its microfoundations, particularly

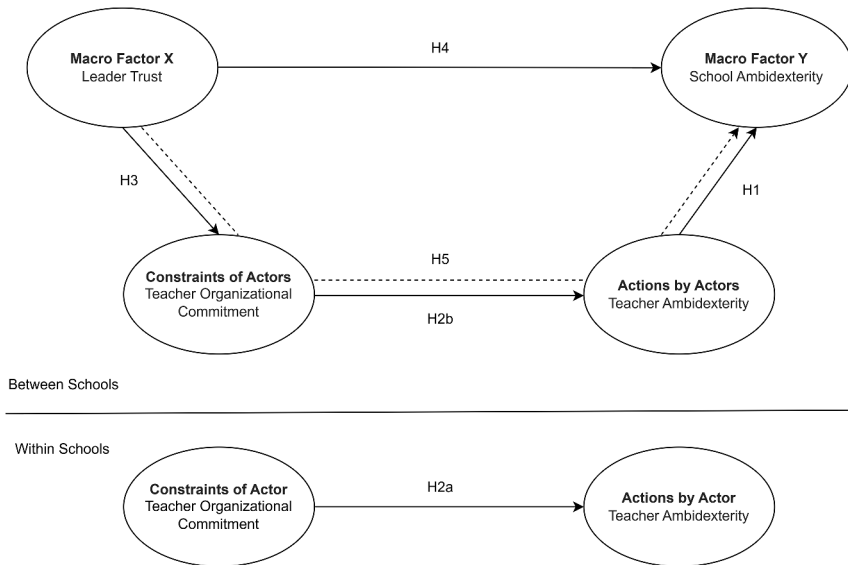


Figure 2. Conceptual model and hypotheses.

the individual and collective actions that are essential for managing the inherent tension between exploration and exploitation activities (Tarba et al. 2020). Figure 2 presents the conceptual model and hypotheses of our study.

Literature review and hypotheses

School ambidexterity (SA) as a macrofactor

This study defines organizational ambidexterity in schools as a school's ability to empower its members to exploit existing capabilities and operate effectively within constraints while exploring innovative approaches to improving performance (Bingham and Burch 2019). It incorporates the concepts of exploration and exploitation and represents a dynamic capability that requires schools to integrate both current and new resources and knowledge to facilitate change and ensure continuous improvement (O'Reilly and Tushman 2008).

Exploitation focuses on improving resource efficiency and maintaining established practices, often through incremental changes, while exploration requires significant or radical innovation in products, practices, and technologies (Gupta, Smith, and Shalley 2006). While exploitation aims to improve productivity and stability through more efficient execution, exploration is oriented towards experimentation, seeking innovative approaches and embracing variability (Lavie, Stettner, and Tushman 2010;

O'Reilly and Tushman 2008). At the organizational level, exploitation involves 'refining and extending existing competencies, technologies, and paradigms' while exploration emphasizes 'experimentation with new alternatives' (March 1991, 85).

As highlighted by Gupta, Smith, and Shalley (2006), both exploitation and exploration involve some form of learning, which ultimately drives organizational change. In this regard, exploitation is associated with mechanistic structures, tightly coupled systems, and stability, whereas exploration is linked to organic structures, loosely coupled systems, and chaos (He and Wong 2004). Consequently, the nature and scope of learning vary between the two, leading to tension that must be actively managed (Dedering and Pietsch 2025; Gupta, Smith, and Shalley 2006). The concept of 'ambidexterity' means the active management of these two conflicting organizational modes (Birkinshaw and Gupta 2013).

According to O'Reilly and Tushman (2013), organizational ambidexterity can be achieved through sequential, structural, or contextual approaches. In this regard, both sequential and structural ambidexterity necessitate some kind of organizational (re-)structuring, which may entail the formation of specialized work units or the flexible adaptation of existing units and strategies over time (Raisch and Zimmermann 2017). In contrast, the contextual approach to ambidexterity is achieved by fostering a work environment that encourages individuals to allocate their time effectively between exploration and exploitation activities (Havermans et al. 2015). According to Raisch and Zimmermann (2017), the contextual approach to ambidexterity places less emphasis on formal rules and formalized organizational processes, instead focusing on the informal context that influences the actions of individuals within the organization.

Contextual ambidexterity, thus, focuses on integrating exploration and exploitation within a single organization, department or work unit while allowing individuals to selectively engage in and switch between both activities (Gibson and Birkinshaw 2004). Senior managers' context-building abilities (Birkinshaw, Zimmermann, and Raisch 2016) and role modelling (Gibson and Birkinshaw 2004), exemplifying desired actions and behaviours, are imperative (Raisch and Zimmermann 2017). Consequently, the contextual path to ambidexterity is accomplished by fostering a supportive work environment in which individuals are encouraged to balance and alternate their time and individual resources between exploratory and exploitative tasks (Havermans et al. 2015). As outlined by Gieske, Duijn, and van Buuren (2019), contextual ambidexterity in public organizations means fostering an organizational context that enables individual-level ambidextrous behaviour through a combination of processes, systems, and shared beliefs, allowing individuals to simultaneously engage in exploration and exploitation and allocate their time accordingly. In essence, this approach emphasizes the

individuals within the organization rather than the organization as a whole, creating a "context characterized by a combination of stretch, discipline, support and trust" (Gibson and Birkinshaw 2004, 209).

Ambidexterity in the public sector, however, differs fundamentally from its private-sector origins due to distinct contextual factors, such as heightened political scrutiny, stronger demands for accountability, and a focus on creating public value rather than profit maximization (Gieske, Duijn, and van Buuren 2019). These elements shape how exploration and exploitation are balanced, often requiring more nuanced and transparent approaches than those typical of private firms (Favoreu, Maurel, and Queyroi 2024). For instance, recent studies (e.g. Cannaerts, Segers, and Warsen 2019) have shown that public organizations often combine structural and contextual ambidexterity to simultaneously address innovation demands and regulatory requirements. In public education, organizational ambidexterity is linked to organizational performance, such as student achievement, and to broader societal outcomes, such as educational equity (Pietsch et al. 2025).

What is striking, however, is that schools, as public organizations, tend to favour exploitation over exploration (Pietsch, Tulowitzki, and Cramer 2022). This imbalance appears characteristic of public sector organizations, which frequently prioritize exploitation-oriented activities rooted in the principles of optimization and efficiency (Cannaerts, Segers, and Warsen 2019; Gieske, Duijn, and van Buuren 2019). This tendency is reinforced by bureaucratic structures and increasingly constrained financial and budgetary environments (Favoreu, Maurel, and Queyroi 2024). As public institutions, schools are designed to deliver standardized services efficiently, governed by the principles of neutrality and equity (Lubienski and Lubienski 2013). Consequently, schools are embedded in highly standardized organizational structures – such as subject-based curricula, age-based grouping, and fixed schedules – that often absorb or constrain innovation (Tyack and Tobin 1994). Moreover, their responsibility to serve multiple stakeholders while transmitting civic and cultural knowledge further limits their adaptive capacity (Tye 2000), as they must continuously balance innovation with the preservation of institutional stability and continuity (Pietsch, Tulowitzki, and Cramer 2023).

Teacher ambidexterity (TA) as actions by actors

Ambidexterity at the individual level is not seen as an innate psychological trait (Bledow et al. 2009); rather, it refers to a behavioural capacity or an ability to engage in tasks in different spectrums (Kaupilla and Tempelaar 2016) and deal with the related paradoxical demands (Papachroni and Heracleous 2020). Whether these tasks occur simultaneously or sequentially, individuals need to be capable of adaptively switching between these polarities in response to changing environments. In this sense, individual

ambidexterity requires ‘divergent thinking, focused attention, and cognitive flexibility’ (Good and Michel 2013, 437).

Individual exploration is about searching for novelty and experimenting with new alternatives and skills (Levinthal and March 1993; Mom, Van Den Bosch, and Volberda 2009; O’Reilly and Tushman 2008). Individuals skilled in explorative tasks and activities can more readily extend themselves towards new ideas, knowledge and concepts. In education, accordingly, exploration-oriented teachers might adopt and implement new and innovative teaching and/or assessment methods, frequently produce fresh ideas about school processes, and exhibit creativity on their job when given the opportunity. Relatedly, divergent thinking can be closely associated with the cognitive aspect of exploration (Good and Michel 2013).

On the other hand, individual exploitation involves routines, refinement, choice, present knowledge, short-term goals, and efficiency (March 1991; Mom, Van Den Bosch, and Volberda 2009). That said, exploitative activities contribute to building reliability in experience (Levinthal and March 1993) and promote a sense of certainty and efficiency using present knowledge rather than seeking out new information (Gupta, Smith, and Shalley 2006). Applied to the education sector, exploitation-oriented teachers are more competent in maintaining school routines and implementing the same teaching methods across diverse classroom settings (Dedering and Pietsch 2025).

In essence, ambidexterity can be a challenge for individuals since it often requires dealing with tensions and/or conflicting demands (Pertusa-Ortega et al. 2021). While some scholars suggest that attempts to succeed in both exploration and exploitation have to be in a simultaneous fashion (Gupta, Smith, and Shalley 2006), others propose the possibility of a sequential approach, where employees engage in exploration and exploitation activities at different times (Andriopoulos and Lewis 2010; Keller and Weibler 2015). In any case, ambidexterity requires cognitive flexibility in overcoming control-shift mental sets, either in the short or long term (Good and Michel 2013).

Though limited in number (Dedering and Pietsch 2025), empirical evidence shows that individual ambidexterity plays a crucial role in promoting organizational ambidexterity (e.g. Gibson and Birkinshaw 2004; Mom, Van Den Bosch, and Volberda 2009). Applied to schooling environments, emerging research (e.g. Da’as 2023; Dedering and Pietsch 2025) suggests that teachers’ appropriately toggling between the modes of exploration and exploitation contribute SA in fostering creativity, collective innovativeness, and dealing with change, especially in unprecedented contexts and times. On this theoretical and empirical basis, we hypothesize the following:

H1: *Teacher ambidexterity predicts the emergence of school ambidexterity.*

Teacher organizational commitment (TOC) as a constraint of actors

As noted by Zhang et al. (2025) and Smith, Binns, and Tushman (2010), the effective management of an ambidextrous organization depends on the leader's ability to foster employee commitment. Teachers' organizational commitment is a complex concept with multiple definitions and dimensions. According to Berkovich and Bogler (2021), commitment generally refers to the bond between an individual and an organization, especially in challenging situations. Hallinger and Lu (2014) focus on affective attitudes towards organizational goals, while Meyer et al. (2002) suggest that commitment is composed of three dimensions: continuance, normative, and affective. In this study, we utilized teacher commitment according to Mowday et al.'s (1979) three critical elements: a strong belief in institutional goals, a willingness to exert significant effort for the organization and a desire to remain with the organization. Within the context of education, commitment means a teacher's dedication to their profession, school and course objectives, and their willingness to go above and beyond to achieve institutional goals (Firestone and Pennell 1993; McInerney et al. 2015; Meyer and Allen 1997; Ng and Feldman 2011; Setyaningsih and Sunaryo 2021).

In this study, we included TOC in the bathtub model as a constraint on actors at the micro level. In this model, constraints are represented by the depth of the water, which affects the speed of an actor's behaviour. TOC, as a micro-level variable, triggers macro-level variables through the integration mechanism (Abell, Felin, and Foss 2008; Distel 2019; Felin and Foss 2006). Previous research indicates that organizational commitment has a significant impact on organizational performance, particularly on exploitation (Jandeska and Kraimer 2005; Meyer et al. 2002) and exploration (Nakata and Sivakumar 1996; Shane 1993). Carmeli and Halevi (2009) suggested that collective perceptions of TOC and collaboration based on collectivism may trigger both exploitation and exploration simultaneously. Heavey, Simsek, and Fox (2015) underline the importance of proactive commitment for ambidexterity, with weak organizational commitment decreasing innovation and strong organizational commitment increasing innovation.

In general, in organizations where trust is strong, employees demonstrate a greater commitment to organizational goals (Chams-Anturi et al. 2020). Furthermore, their commitment to the organization is enhanced as they engage in mutual trust (Gibson and Birkinshaw 2004; Simsek 2009). In this case, organizational ambidexterity is a more effective approach; however, it should be noted that this situation may differ in the public sector (Kobarg et al. 2017). Based on this theoretical and empirical foundation, we hypothesize the following:

H2a: *Teacher organisational commitment is positively related to teacher ambidexterity at the individual level.*

H2b: *School-wide collective faculty perceptions of teacher organisational commitment are positively related to perceptions of teacher ambidexterity.*

Leader trust (LT) as a macrofactor x

Trust is a crucial factor for both individual and organizational ambidexterity (Chams-Anturi, Moreno-Luzon, and Escorcia-Caballero 2020; Dederling and Pietsch 2025; Gibson and Birkinshaw 2004), influencing outcomes across multiple levels and disciplines (Burke et al. 2007; Molina-Morales, Martínez-Fernández, and Torló 2011). Its complexity stems from varying definitions, dynamics between trustors and trustees, and contextual factors (Dirks and Ferrin 2002; Fuglsang and Jagd 2015; Möllering 2019).

In this study, we follow Mayer, Davis, and Schoorman (1995), defining trust as a psychological state of willingness to accept vulnerability based on positive expectations of others' actions. Consistent with Spreitzer and Mishra (1999), we conceptualize leaders' trust in teachers not as dyadic interpersonal trust, but as donated trust directed towards the teaching staff as a collective entity – a macro-level phenomenon shaping organizational outcomes through autonomy and delegation.

Trust fosters favourable work environments, enhancing satisfaction, commitment, and performance (Asencio 2016; Dederling and Pietsch 2025; Zeffane and Bani Melhem 2017), and has been linked to school climate, leadership, and academic outcomes (Bukko, Liu, and Johnson 2021; Tschannen-Moran and Gareis 2015). However, research explicitly focusing on leaders' trust in teachers remains scarce (Dederling and Pietsch 2025; Hoy, Gage, and Tarter 2006), particularly in the Turkish context (Bilgin-Aksu, Aksu, and Polat 2015; Canlı and Demirtaş 2018).

Beyond its organizational functions, trust represents a key public value (Bouckaert 2012; Liu 2022), supporting professional autonomy, innovation, and trust-based governance in public sector institutions (Christensen and Lægheid 2007; Tummers and Bekkers 2013). Schools, as public institutions, bridge government policies and citizen expectations, reflecting broader citizen – state trust dynamics. Recent research highlights trust-based governance in post-bureaucratic settings, where formal controls are supplemented by interpersonal trust, professional norms, and mutual accountability (Christensen and Lægheid 2007). Teachers are thus expected to exercise greater autonomy and adaptability, fostering innovative, context-sensitive practices without strict oversight (Bach and Bordogna 2016). Consequently,

leaders' trust in teachers not only drives organizational learning and collaboration but also reinforces public trust and contributes to public value creation (Moore 1995). In this sense, LT enables both stable coordination (exploitation) and risk-taking behaviour (exploration), thus fostering contextual ambidexterity (Fainshmidt and Frazier 2017; Gibson and Birkinshaw 2004; Wohlgemuth et al. 2019).

With regard to leaders' trust in their employees, Spreitzer and Mishra (1999, 159) ultimately argue that this kind of trust directly affects employees' commitment, 'because [they] are concerned with the interests of the organization'. In essence, LT promotes ambidexterity by inspiring organizational members to engage with and commit to organizational goals (Chams-Anturi, Moreno-Luzon, and Romano 2022; Wohlgemuth et al. 2019) while fostering mutual reliance on colleagues' commitments (Gibson and Birkinshaw 2004; Simsek 2009). This interplay facilitates individual ambidexterity, which ultimately aggregates into the macro-level phenomenon of organizational ambidexterity (Good and Michel 2013; Mom, Van Den Bosch, and Volberda 2009; Tarba et al. 2020). Accordingly, we hypothesize the following:

H3: *Leader trust positively relates to organisational commitment.*

H4: *Leader trust positively relates to school ambidexterity.*

H5: *Organisational commitment and individual ambidexterity jointly mediate this relationship.*

Methods

In the current study, we employed a cross-sectional survey design to examine the role of teacher commitment on TA at the individual level, and the mediating roles of teacher commitment and ambidexterity in the relationship between LT and SA at the school level. We controlled for years of experience and gender (teacher level) as well as education level, school size, and SES (school level). To enhance validity and reduce potential common method bias – an issue often overlooked in public administration research (Jakobsen and Jensen 2015; Meier and O'Toole 2012) – we applied procedural remedies recommended by Podsakoff et al. (2024): using different data sources, separating measurements, ensuring anonymity, and minimizing common scale properties. The following section outlines the data collection, variables, instruments, and data analysis procedures.

Procedure and sample

We employed a two-stage stratified cluster sampling procedure to select public schools from 12 NUTS regions across Türkiye. First, schools were grouped by geographic location and educational stage, and 246 were randomly selected. Second, both principals and at least 10 teachers per school participated, yielding a total of 3,075 teachers and 246 principals, reflecting the national distribution across school types and regions. Data collection was approved by the Ege University Ethics Committee and the Ministry of National Education and conducted on-site after participants were informed about the study, anonymity, and data protection. Missing data were minimal (< 5%) and handled using Full Information Maximum Likelihood (FIML).

The teacher sample (65% female) averaged 6.1 years of experience at their current school and 8.9 years of prior teaching experience, with a mean workload of 32.8 hours per week. Teachers represented all educational stages—9.7% early childhood, 35.1% primary, 32.3% lower secondary, and 23% upper secondary – and worked in urban (41%), large city (35%), and smaller or rural settings (24%). Most principals were male (80%) with a mean of 4.2 years of experience at their current school and 9.8 years of prior teaching experience. Their average workload was 47.6 hours per week. School sizes ranged from 31 to 2,840 students ($M = 797$), and the mean percentage of socioeconomically disadvantaged students was 3.3%.

Survey instruments

Data were collected using demographic forms tailored for both teachers and school principals, as well as four data collection instruments to measure the main study variables.

Demographic form

Participant teachers were asked to provide information, including their gender, years of experience at the current school, prior experience as a teacher, average weekly workload, and school size and level. School principals were requested to report their gender, years of experience as a school principal and (if applicable) as a teacher, average weekly workload, teaching duties, school SES and the programmes (general education vs. vocational/technical education) taught at their school.

Macrofactor Y: school ambidexterity

SA was measured using items developed by Dederich and Pietsch (2025) and based on the concept of March (1991). Following Lubatkin et al.'s (2006)

discussion, we understand ambidexterity as a combination of exploitation and exploration – that is, as the sum or, more precisely, the one-dimensional factor of both dimensions. Consequently, teachers were asked to state how much their schools focus on new things – exploration – and how much on more tried-and-true things – exploitation. The instrument consisted of six four-point Likert-type scale items (with response options ranging from 1 = strongly disagree to 4 = strongly agree) loaded on the two subscales. Three items reflected an exploitative orientation, while the remaining three indicated the school's explorative orientation. A sample item for exploration was, 'Our school generates new ideas through unconventional thinking', and for exploitation, 'Our school continuously improves its quality'. The internal consistency in the current study was $\alpha = 0.95$ ($\omega = 0.95$). The average variance extracted (AVE) was 0.763, indicating strong convergent validity.

Actions by actor: teacher ambidexterity

TA was measured using six items developed by Mom, Van Den Bosch, and Volberda (2009). The teachers were requested to report the extent to which they engaged in exploitation and exploration activities during the last 12 months on the individual level. We conceptualized ambidexterity as the combined effect (sum or unidimensional factor) of exploitation and exploration. This conceptualization implies a compensatory relationship between exploration and exploitation, meaning that while high levels of both are optimal for achieving strong ambidexterity, increases in one can offset reductions in the other to some extent (Pietsch, Tulowitzki, and Cramer 2022; Rosing and Zacher 2017). Three items referred to exploitation activities (e.g. 'activities which you carry out as if it were routine') and the latter three were on exploration activities (e.g. 'activities requiring quite some adaptability of you'). All items were rated on a four-point Likert scale ranging from '1 = to a very small extent' to '4 = to a very large extent'. The overall reliability value computed within this study was $\alpha = 0.87$ ($\omega = 0.87$). The AVE value for the TA construct was calculated to be 0.532, indicating an acceptable level of convergent validity.

Constraints of actor: teacher organisational commitment

Mowday, Steers, and Porter (1979) originally developed this scale and adapted it into Turkish by Efeoglu (2006). We measured the perceived organizational commitment of teachers (TOC) using three items on a four-point Likert-type scale ranging from '1 = strongly disagree' to '4 = strongly agree'. TOC has a single-factor solution. A sample item is as follows: 'I find that my values and the school's values are very similar'. The estimated

internal consistency was calculated as $\alpha = 0.84$ ($\omega = 0.85$). The AVE was 0.651, pointing to good convergent validity.

Macro factor x: leader trust

School principals' trust in teachers (LT) was measured using four items developed by Dederich and Pietsch (2025), based on the concepts of Cunningham and MacGregor (2000) and Mayer, Davis, and Schoorman (1995) on organizational trust. Accordingly, the items were designed to capture four domains of trust: benevolence, competence, honesty and integrity. The school principals were asked to rate the extent to which they agreed with the statements reflecting these domains. All items were measured on a four-point Likert scale ranging from '1 = totally disagree' to '4 = totally agree'. A sample item was, 'I can, by and large, trust that teachers at my school are absolutely honest with me'. The α internal consistency of the scale was 0.85 ($\omega = 0.85$), and the AVE value was calculated to be 0.592 in the current study.

Control variables

The study controlled for demographic and contextual variables, including teacher gender and years of experience, as well as school-level factors such as education level, size, and SES (percentage of socioeconomically disadvantaged students). Prior research suggests that these variables can influence teachers' perceptions and attitudes (Bogler and Berkovich 2022; Da'as 2023) and affect school processes and outcomes (Nguyen, Pietsch, and Gümüş 2021).

Analytic approach

This study adopted a two-level 2-1-1-2 multilevel mediation model (Preacher, Zyphur, and Zhang 2010) and was conducted using Mplus 8.6 (Muthén and Muthén 1998-2017) with maximum likelihood estimation to ensure robust parameter estimation (see the Appendix for Mplus syntax). Given that three scales were administered to teachers, we assessed common method bias using Harman's single-factor test (Harman 1960). The results indicated that the items collectively accounted for 39.5% of the variance for a single factor, which was below the commonly accepted threshold of 50%. Consequently, we concluded that common method bias did not pose a significant concern in this study (Lance et al. 2010). The AVE was calculated for each construct to assess convergent validity. The values ranged from 0.53 to 0.76, indicating good levels of validity according to the recommended

threshold of 0.50 (Fornell and Larcker 1981). We calculated and reported both Cronbach's alpha and McDonald's omega coefficients to demonstrate the internal consistency of the scale items. All values ranged from 0.85 to 0.95, indicating good to excellent composite reliability (Hair et al. 2010). To assess multicollinearity, the variance inflation factor (VIF) values were examined. Values varied between 1.006 (LT) and 1.041 (TA), which were well below the commonly accepted thresholds of 5.0 (Hair et al. 2010) and 10.0 (Kutner, Nachtsheim, and Neter 2004), indicating no multicollinearity issues.

The analytic process began with a preliminary descriptive analysis, in which we calculated descriptive statistics and correlations across teacher- and school-level variables. To assess the suitability of aggregating teacher-level variables, we computed ICC(1), ICC(2), and rWG(J) values, examining internal consistency and group agreement, even with modest between-group differentiation. We centred all variables using the group (school) mean to separate within-group and between-group variation, and established measurement isomorphism across levels for teacher-level variables.

Results

Primarily analysis

Table 1 presents descriptive statistics and correlations among key variables across both teacher and school levels. The teacher-level data indicated moderate levels of ambidexterity ($M = 2.66$) and organizational commitment ($M = 3.03$), with minor skewness and kurtosis values, suggesting normal distribution. TA positively correlates with TOC ($r = 0.195$, $p < 0.01$), indicating that teachers with higher organizational commitment may be more adaptable and versatile in their roles. Gender and job experience exhibit no significant correlation with ambidexterity, though experience negatively correlates with gender ($r = -0.115$, $p < 0.01$). At the school level, ambidexterity ($M = 2.79$) shows positive correlations with organizational commitment ($r = 0.145$, $p < 0.05$) and SA ($r = 0.252$, $p < 0.01$), emphasizing a trend where commitment and adaptability are jointly present in schools.

LT also correlates with SA ($r = 0.167$, $p < 0.01$), suggesting that environments with high trust in leadership may foster greater organizational adaptability. School size correlates positively with socioeconomic status ($r = 0.165$, $p < 0.01$), highlighting a possible trend where larger schools may have a higher concentration of socioeconomically disadvantaged students. Moreover, the moderate negative correlation between school size and TA ($r = -0.243$, $p < 0.01$) might imply that as teachers grow, there may be challenges in maintaining flexibility or adaptability.

Table 1. Mean, standard deviation, correlations, intra-class correlations, and inter-rater agreement values.

	M	SD	1	2	3	4	5	6	7	8	9	10
<i>Teacher level (n = 3075)</i>												
1. Teacher ambidexterity	2.66	0.69	1	0.195**	0.017	0.017	1	0.145*	0.252**	-0.006	-0.243**	-0.116
2. Teacher organizational com.	3.03	0.78		1	0.029	-0.001		1	0.701**	0.167**	-0.066	-0.199**
3. Teaching experience	8.91	7.11			1	-0.115**			1	0.125	-0.039	-0.246**
4. Gender (female)	65%	-				1				1	0.083	-0.117
<i>School level (n = 261)</i>												
5. Teacher ambidexterity	2.79	0.49					1		0.252**	-0.006	-0.243**	-0.116
6. Teacher organizational com.	2.68	0.34						1	0.701**	0.167**	-0.066	-0.199**
7. School ambidexterity	3.04	0.40							1	0.125	-0.039	-0.246**
8. Leader trust	2.91	0.59								1	0.083	-0.117
9. Total number of students	706	568									1	0.165**
10. SES	11% to 30%	-										1
ICC1	-	-	-	-	-	-	0.02	0.15	0.22	-	-	-
ICC2	-	-	-	-	-	-	0.39	0.68	0.77	-	-	-
rWG(j)	-	-	-	-	-	-	0.90	0.83	0.91	-	-	-
Skewness	-	-	0.13	0.46	0.85	-	0.22	0.31	0.08	0.04	1.31	0.05
Kurtosis	-	-	0.17	0.56	0.29	-	0.19	3.07	0.37	-0.22	1.67	0.09
Tl	-	-	-	0.99	0.98	0.98	0.95	0.94	-	0.98	0.93	0.90
VIF	-	-	-	1.01	1.00	1.00	1.05	1.06	-	1.02	1.08	1.10

M: Mean; SD: Standard deviation; Gender: female = 1; Level of education: Lower secondary and secondary = 1; SES: percentage of socioeconomically disadvantaged students reported by school principal.

** : $p < 0.05$; * : $p < 0.01$.

Structural equation model

For our research objectives, which include examining the direct effect of teacher commitment on individual ambidexterity, the direct impact of LT on SA, and the indirect influence of LT on SA through the mediating roles of TOC and TA, we estimated a 2–1–1–2 multilevel mediation model. Before conducting the model, we analysed ICC(1), ICC(2), and rWG(J) to assess the group fit of teacher-level variables. In examining the construct of TA, we observed an ICC(1) value of 0.02, an ICC(2) value of 0.39, and an rWG(J) value of 0.90.

These results demonstrate a strong level of internal consistency, even with minimal differentiation across groups. Although the ICC(1) value for individual teacher ambidexterity (TA) is relatively low, it is consistent with findings by Chen and Bliese (2002), who reported ICC(1) values of 0.02 accompanied by higher ICC(2) and rWG values, suggesting that robust rWG values can sufficiently indicate consensus. Provided there are no convergence issues, the low ICC(1) can be reasonably overlooked, with a focus instead placed on the high rWG as an indicator of consensus reliability. For TOC, ICC(1) was 0.15, ICC(2) was 0.68, and rWG(J) was 0.83, showing moderate reliability and internal fit. For SA, ICC(1) was 0.22, ICC(2) was 0.77, and rWG(J) was 0.91, indicating high group agreement and reliability. These findings demonstrate that individual ambidexterity is an individual-level construct, and SA is a school-level construct.

Since LT was collected from school principals and is already a school-level variable, no additional calculations were needed. Before evaluating our proposed model, we conducted a measurement model that included all variables. The fit indices indicated an overall good model fit. The chi-square test ($\chi^2 = 1027.974$, $df = 222$, $p < 0.001$) showed significant model fit, although chi-square values should be interpreted cautiously with the Maximum likelihood estimator with robust standard errors (MLR). The root mean square error of approximation (RMSEA) was 0.035, indicating a close fit (< 0.05), while the comparative fit index (CFI) and Tucker-Lewis index (TLI) values of 0.975 and 0.969, respectively, both exceeded the 0.90 threshold (Hu and Bentler 1999). The standardized root mean square residual (SRMR) values were 0.052 for the within level (good fit) and 0.107 for the between level. Overall, the model demonstrated a strong fit. Then, we employed our proposed model to examine the relationships among the latent variables. Figure 3 and Table 2 display the results of our analysis, highlighting the estimated paths and their significance levels.

Our proposed model indicated good model fit ($\chi^2 = 949.437$, $df = 278$, $p < 0.001$, RMSEA = 0.029, CFI = 0.979, TLI = 0.975, SRMR_w = 0.043, SRMR_B = 0.114). The results indicated that TOC was a significant predictor of TA at the teacher level ($\beta = 0.207$, 95% CI = 0.159–0.254). Furthermore, at the

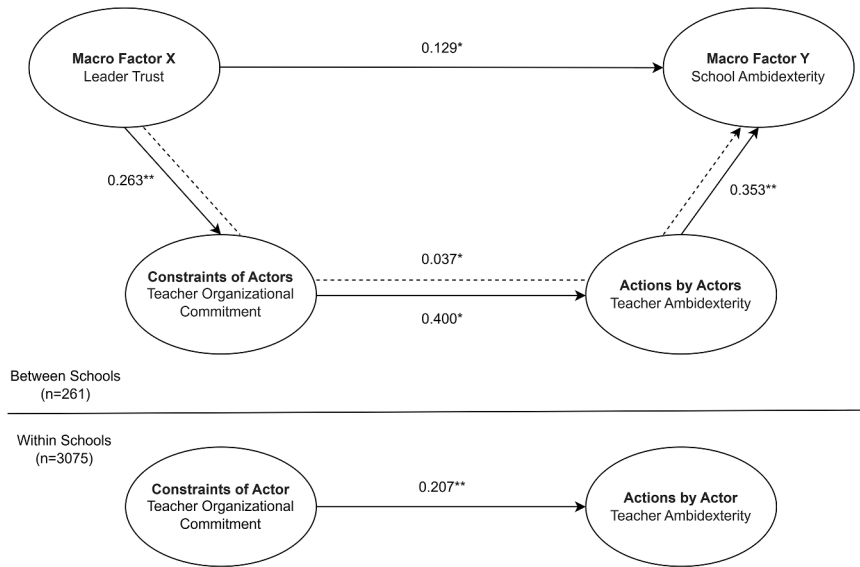


Figure 3. Path coefficients from the multilevel structural equation model.

Table 2. Estimates, standard errors and confidence intervals for the model.

Construct	Coefficient		95% Confidence Interval		p	Result
	Estimate	SE	Lower Bound	Upper Bound		
<i>Direct effects (Within)</i>						
TOC → TA	0.207	0.024	0.159	0.254	0.000	Significant
<i>Control variables (Within)</i>						
G → TA	-0.029	0.020	-0.068	0.011	0.151	N.S.
G → TOC	0.028	0.022	-0.016	0.072	0.207	N.S.
JE → TA	0.003	0.019	-0.035	0.041	0.859	N.S.
JE → TOC	0.007	0.020	-0.033	0.046	0.742	N.S.
<i>Direct effects (Between)</i>						
LT → TOC	0.263	0.088	0.091	0.436	0.003	Significant
TOC → TA	0.400	0.161	0.084	0.717	0.013	Significant
TA → SA	0.353	0.102	0.153	0.553	0.001	Significant
LT → SA	0.129	0.064	0.003	0.256	0.045	Significant
<i>Control variables (Between)</i>						
TNS → TOC	-0.176	0.063	-0.300	-0.052	0.005	Significant
TNS → TA	-0.250	0.099	-0.443	-0.057	0.011	Significant
SES → SA	-0.182	0.070	-0.319	-0.045	0.009	Significant
SES → TOC	-0.253	0.091	-0.431	-0.075	0.005	Significant
<i>Indirect effect (Between)</i>						
LT → TOC → TA → SA	0.037	0.019	0.001	0.074	0.046	Significant
<i>Total effect (Direct + Indirect)</i>						
LT → SA	0.167	0.072	0.025	0.308	0.021	Significant

TA: Teacher Ambidexterity, TOC: Teacher organizational commitment, G: Gender, JE: Teacher job experience, LT: Leader trust, SA: School ambidexterity, TNS: Total number of students, SES: Percentage of socioeconomically disadvantaged students, SE: Standard Error, N.S.: non-significant.

school level, LT was identified as a macrofactor independent variable (x), which demonstrated a positive influence on TOC as a constraint of actors ($\gamma = 0.263$, 95% CI = 0.091–0.436). TOC was found to influence TA as actions by an actor ($\gamma = 0.400$, 95% CI = 0.084–0.717). TA was found to influence SA as a macrofactor dependent variable ($\gamma = 0.353$, 95% CI = 0.153–0.553). Consequently, LT indicates a direct ($\gamma = 0.129$, 95% CI = 0.001–0.253) and indirect effect on SA, whereby teacher commitment and ambidexterity act as mediating variables ($\gamma = 0.037$, 95% CI = 0.001–0.074). This study indicates that LT may encourage professional attitudes and both exploitative and explorative practices among teachers, resulting in higher levels of SA.

The results of the analysis of the control variables in [Table 2](#) show that the individual teacher-level variables of gender and job experience did not have a statistically significant effect on teachers' ambidexterity and organizational commitment. At the school level, an increase in the total number of students had a negative effect on teachers' organizational commitment and ambidexterity levels. These findings indicated that in schools with a high number of students, teachers exhibited reduced commitment to the school organization or encountered challenges in establishing a balance between innovation and existing practices. Similarly, a negative effect on teachers' organizational commitment and ambidexterity levels was observed in schools with a high proportion of socioeconomically disadvantaged students. This finding suggests that socioeconomic disadvantages may have an impact on teachers' motivation, flexibility and commitment, and may result in greater difficulties in dealing with the structural challenges of the school.

Discussion

Interpretation of findings

While previous studies have linked principals' leadership to various teacher and school outcomes – such as teacher creativity, psychological capital, collective innovativeness, exploration – exploitation balance, and ambidexterity (Da'as 2023, 2024; Dederling and Pietsch 2025; Özdemir et al. 2024; Pietsch, Tulowitzki, and Cramer 2022, 2023; Pietsch et al. 2025) – they mainly address cross-level associations within schools without situating these findings in the broader context of public organizations. Therefore, although these studies highlight important leadership – teacher links, they leave open questions about the microfoundations of ambidexterity and the mechanisms through which trust, commitment, and individual teacher behaviours influence organizational outcomes.

Overall, our findings suggest that Coleman's bathtub model offers a robust framework for examining the microfoundations of educational innovation and change. Specifically, they confirm that individual

ambidexterity is a key source of organizational ambidexterity (Gibson and Birkinshaw 2004; Mom, Van Den Bosch, and Volberda 2009), underscoring its multilevel and bottom-up nature (Good and Michel 2013; Tarba et al. 2020). When public institutions balance exploration and exploitation, service quality and public service motivation improve (Alkaabi et al. 2024; Cannaerts, Steijn, and Duijn 2025). From a contextual perspective (O'Reilly and Tushman 2013), schools with higher levels of trust are more likely to foster cultures that enable teachers to flexibly balance exploration and exploitation in response to situational demands (Gibson and Birkinshaw 2004; Havermans et al. 2015).

Consequently, this study first highlights the role of school principals' trust in teachers in fostering teachers' organizational commitment. Unlike reciprocal trust, this form of donated trust mainly reflects leaders' deliberate choice to believe in their teachers' labour, competence, integrity and alignment with the goals of the organization (Dedering and Pietsch 2025). Such trust naturally creates a climate that favourably influences teachers' perceptions, behaviours, and attitudes in the workplace (Knoll and Gill 2011). As demonstrated in this study, teachers who receive greater trust from their leaders, and thereby feel more empowered at work, are more likely to genuinely consider their roles within the organization as more meaningful and integral to its broader goals, in turn reinforcing their sense of commitment (Brower et al. 2009; Spreitzer & Mishra 1999). In this way, teachers tend to act more in line with their leader's expectations due to this fulfilling perception of encouragement and support (Mayer, Davis, and Schoorman 1995). In doing so, leaders who trust their teachers achieve not only reliable and prosocial relationships and outcomes (Brower et al. 2009; Knoll and Gill 2011) but also a collective ethos that binds teachers to organizational values and mission, such as innovation, learning and change.

A further essential element in understanding the microfoundations of ambidexterity lies in individual characteristics. Prior research suggests that ambidextrous behaviour is not an innate trait but rather a capacity enabled by personal attributes such as cognitive flexibility, divergent thinking, and proactive orientation (Bledow et al. 2009; Good and Michel 2013). In educational contexts, these characteristics become particularly salient because teachers are required to maintain stability in routine practices while also experimenting with innovative approaches to instruction. Recent studies show that teachers' creativity and openness to change enable them to shift effectively between exploration and exploitation activities, thereby contributing to organizational ambidexterity in schools (Da'as 2023; Dedering and Pietsch 2025). Taken together, teachers' individual characteristics, such as creativity, cognitive flexibility, proactivity, and openness to change, can be considered among drivers of ambidexterity in schools as well, helping explain variation in how teachers respond to organizational demands for

both routines and change. Variation in such characteristics across teachers may further serve as a resource for schools by enabling diverse approaches that would collectively enhance organizational ambidexterity.

It is also important to note that ambidexterity is shaped not only at the individual level but also through social and contextual interactions. While our findings indicate that leader trust contributes to ambidexterity through commitment, prior research highlights that this process is reinforced by a collective climate of collaboration and trust as well (Carmeli and Halevi 2009). Particularly, studies emphasize that trust-based leadership facilitates teachers' engagement in both exploration and exploitation (Gieske, Duijn, and van Buuren 2019; Pietsch, Tulowitzki, and Cramer 2022; Ugwuanyi, Bellibaş, and Pietsch 2025). For example, Da'as (2023) shows that principals' ambidexterity influences teacher creativity, while Da'as (2025) demonstrates that principals' attentional scope, via knowledge sharing, fosters teachers' explorative and exploitative behaviours. Ugwuanyi, Bellibaş, and Pietsch (2025) demonstrate that trust-based relationships between school leaders and teachers cultivate a paradoxical mindset, enabling ambidexterity and, in turn, greater teacher creativity. Complementing these, Özdemir et al. (2024) highlight how teachers' open innovation mindset moderates the relationship between leadership and knowledge exploration and exploitation in schools. Therefore, beyond individual commitment, teachers' relational ties, social interactions, trust networks, knowledge sharing, and collaborative practices represent key microfoundations of ambidexterity in educational settings. Our model thus captures the pathway from leader trust to individual and organizational ambidexterity, but broader relational and contextual dynamics also sustain ambidexterity in schools.

In our analysis, we found that there is a positive relationship between TOC and TA at the individual level, and we also discovered that schoolwide collective faculty perceptions of TOC are positively related to perceptions of TA. The relationship between organizational commitment and organizational ambidexterity is also supported by the literature. For instance, Heavey, Simsek, and Fox (2015) expressed that the strength of this relationship is positively associated with the level of commitment to innovation; as commitment increases, the relationship is reinforced, whereas a decline in commitment leads to its weakening. As highlighted in the work of Mowday, Steers, and Porter (1979), when teachers strongly believe in the goals of the organization, put in high effort for these goals, and feel proud to be part of the school, this situation triggers exploitation and exploration (Heavey, Simsek, and Fox 2015; Nakata and Sivakumar 1996), and they both perform their existing capabilities and innovative practices in their classes (Bingham and Burch 2019). Additionally, strong commitment in the community based on a high level of trust evokes exploitative and explorative practices (Raisch and Birkinshaw 2008).

In our study, we considered TOC a constraint on actors to emphasize the importance of proactive commitment for ambidexterity. The higher the teachers' organizational commitment, the more exploitative and explorative actions increase in schools, which increases the schools' understanding of innovation to a higher level. Conversely, if TOC is weak, the implementation of innovative thinking and the execution of routine tasks in that school will also be in trouble (Bingham and Burch 2019). As proposed by Chams-Anturi, Moreno-Luzon, and Escorcia-Caballero (2020), individual commitment functions as a mediator between organizational trust and organizational ambidexterity.

March's (1991) classical distinction highlights organizations' simultaneous need to improve existing routines (exploitation) while experimenting with innovative approaches (exploration). In the educational context, this translates into teachers both maintaining curriculum-based practices and experimenting with new pedagogical methods. Benner and Tushman (2003) emphasize that this duality entails a productivity dilemma but can be balanced through ambidextrous practices. Likewise, O'Reilly and Tushman (2013) argue that among the three pathways to organizational ambidexterity (structural, sequential, contextual), the contextual approach relies most directly on individual practices. This implies that teachers' day-to-day practices, beyond their commitment, represent important behavioural mechanisms through which organizational ambidexterity can emerge in schools.

In essence, our findings present a compelling case in which trust by leaders constitutes a fundamental resource for fostering ambidexterity within schools. In doing so, our research bridges the domains of educational research (Bryk 2002) and organizational theory (Edmondson and Moingeon 1999), both of which underscore the pivotal role of trust in facilitating organizational learning, innovation, and change. Cannaerts, Segers, and Warsen (2019) suggested that public organizations simultaneously balance exploitation and exploration by incorporating both the structural and contextual elements of ambidexterity in their design and leadership practices. Similarly, Gieske, Duijn, and van Buuren (2019) found that public organizations with low levels of ambidexterity typically adhere to a transactional leadership style, whereas those with higher levels of ambidexterity tend to adopt a transformational leadership approach. Furthermore, our results reinforce the principles of contextual ambidexterity, which posit that a trust-based organizational culture is a prerequisite for the emergence of ambidexterity (Gibson and Birkinshaw 2004). Specifically, teachers who demonstrate higher levels of ambidexterity are more likely to be situated in schools where leaders exhibit strong trust in their professional competence and commitment.

By explicitly modelling how principal trust (macro-level) shapes organizational ambidexterity through teacher commitment (micro-level), our study

extends these prior findings and situates them within a broader perspective relevant for public sector management. Our results suggest that trust-based leadership practices observed in schools may serve as a template for other public organizations that seek to balance exploitation and exploration simultaneously, enhancing service quality, innovation, and collective motivation. In this way, our study bridges the gap between school-specific findings and general principles of public organizational management, showing that microfoundations of ambidexterity – individual behaviours, commitment, relational ties – interact with macro-level conditions to foster organizational outcomes in structured and regulated environments. Our study contributes to the literature, particularly in the field of public administration, by focusing on leaders' trust in their teachers, or 'donated trust' (Dedering and Pietsch 2025). This perspective assumes that a leader's trust reflects their confidence in teachers' commitment to organizational goals, as well as their competence, reliability and integrity. This reduces perceived risks and fosters teachers' willingness to take initiative (Spreitzer and Mishra 1999). As demonstrated by Chiu and Chiang (2019), leaders function as role models in this process, fostering a climate of trust among their teachers and facilitating the diffusion of trust across organizational levels from top to bottom. In this understanding, leaders shift their focus from control to trust (Handy 1993; Ladegard and Gjerde 2014), a transition that is usually accompanied by reduced supervision and control, which in turn fosters greater exploration activities among teachers.

From a theoretical standpoint, our findings also offer a nuanced reflection on the application of Coleman's (1990) bathtub model in public administration research. Although the model has been criticized for its linearity and lack of attention to feedback loops, our results demonstrate that, when integrated with microfoundational logic, it can serve as a flexible analytical tool to trace multi-level mechanisms of trust and commitment. By empirically testing both upward (micro-to-macro) and downward (macro-to-micro) relations, our approach transforms Coleman's static framework into a dynamic explanatory model suited to the complexity of public organizations.

Conclusion and implications

In essence, the present study makes several theoretical contributions to the literature on organizational ambidexterity and public administration. First, by applying Coleman's (1990) bathtub model to a public education context, the study extends the microfoundations perspective beyond its private-sector focus. It empirically demonstrates how macro-level trust relationships can translate into individual commitment and ambidextrous behaviour, which then aggregate into organizational-level (school) ambidexterity. This multi-

level operationalization provides a clearer understanding of the mechanisms linking leadership, individual attitudes, and organizational outcomes in a highly structured public organization context. Second, the results of our study also refine the theoretical use of Coleman's (1990) model by integrating it with a dynamic and interactional logic (Felin and Foss 2020), highlighting both downward and upward processes between organizational levels. In doing so, this study contributes to the theorization of micro – macro linkages in public administration and showcases how microfoundational reasoning can be used to trace the emergence of collective outcomes such as ambidexterity. Next, by conceptualizing leader trust as a macro-level social condition (Dederich and Pietsch 2025) rather than an individual perception, our study advances discussions on trust-based leadership and contextual ambidexterity as well.

In terms of managerial implications, our results emphasize the importance of cultivating trust-based leadership as a mechanism for fostering both teacher commitment and adaptive capacity in schools (Chams-Anturi, Moreno-Luzon, and Escorcia-Caballero 2020). Beyond the school context, these results also hold broader relevance for public sector administration. Trust-based leadership can serve as a governance strategy to enhance public value by empowering employees, promoting collaboration, and balancing exploitation with exploration (O'Reilly and Tushman 2013). Policymakers and administrators are therefore encouraged to design professional development and leadership training programs emphasizing psychological safety, and relational trust. In doing so, public organizations can develop the ambidextrous capabilities necessary to respond effectively to dynamic and uncertain environments.

It is, however, noteworthy that even after controlling for individual teacher variables, a relationship between principal trust as reported by principals and organizational ambidexterity as reported by teachers remains evident at the organizational level. This suggests that the relationship between trust in teachers and organizational ambidexterity is not fully mediated or explained by the micro-level and cross-level mechanisms examined in our study. This indicates that the leader's trust in teachers can also facilitate the establishment of stable and enduring social exchange patterns, which are reflected in tangible work processes and outcomes. Consequently, an ambidextrous climate can be regarded as a social condition in itself that exerts influence on individuals within an organization.

The results emphasize the importance of trust-based practices in fostering ambidexterity and encourage leaders to establish relationships of trust with and among teachers. This study sheds light on the individual and organizational dynamics in schools that facilitate improvement, innovation and change. When leaders trust their teachers, teachers engage in both exploitation and exploration, applying

their existing skills while pursuing innovative practices. These findings offer valuable guidance to policymakers in Turkiye and similar contexts on how to enhance school leaders' leadership skills, promote organizational learning, improve student outcomes and lay the groundwork for future educational innovations.

Limitations and further Research

Our research has some limitations that need to be taken into consideration when interpreting the results. First, we collected data through self-reported data tools, which may be prone to bias due to the social desirability or confidentiality of responses (Podsakoff et al. 2003). According to Thomas' theorem, self-reported measures can reflect people's perceptions of reality (McCall 2013). Based on this theorem, we believe that self-reporting mirrors someone's own thoughts and ideas rather than a socially biased perspective. Furthermore, we used multisource data to improve the validity of our study (Podsakoff et al. 2024).

Second, our study was cross-sectional in design, and we captured only one moment in teachers' commitment, ambidexterity and school principals' trust. Alternative research designs, such as experimental or longitudinal designs, may provide more comprehensive insights into the relationships among these variables. This would further enable the analysis of temporal dynamics (Mueller, Renzl, and Will 2020) and sequential manifestations of ambidexterity in schools (Birkinshaw, Zimmermann, and Raisch 2016).

Third, our study's theoretical framework is based on research conducted in Western countries. Future research from non-Western countries could contribute to the understanding of the big picture by incorporating their unique cultural norms, values and social practices. Finally, few studies have used these scales in educational research, which limits our ability to compare our results with previous studies. We recommend further studies to validate the scales and compare the results of the studies.

Finally, this study was limited to teachers and school principals employed in public schools, not including teachers and school principals working in private schools. Further studies may analyse teacher commitment and ambidexterity and school principals' LT in private schools. Despite these limitations, our study contributes to the theoretical and empirical knowledge in education research by examining micro-and macro-level variables and using a bathtub model.

Acknowledgments

We would like to acknowledge the assistance of ChatGPT and deepL in proofreading parts of the final version of the manuscript. The corresponding author was subsequently responsible for reviewing and adjusting all AI-revised text passages, in order to maintain accuracy and uphold the original intent.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work is supported by the Deutsche Forschungsgemeinschaft (DFG) through a DFG Heisenberg Professorship to Marcus Pietsch (451458391). Hilal Buyukgoze is supported by the Scientific and Technological Research Council of Türkiye (TÜBİTAK) under the 2224-A program (Project No: 1919B022505068).

ORCID

Sedat Gümüüş  <http://orcid.org/0000-0003-0453-3341>

Consent for publication

All authors have reviewed and approved the final manuscript and consent to its publication in *Public Management Review*.

Availability of data and materials

Data is available upon reasonable requests.

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Appendix

Mplus Code 'Bathtub Model'

USEVARIABLES ARE SCHOOLID

PQ16A PQ16B PQ16C PQ16D !Leader trust (LT)

TQ9G TQ9H TQ9I !Teacher organizational commitment (TOC)

TQ5A TQ5B TQ5C TQ5D TQ5E TQ5F! Teacher Ambidexterity (TA)

TQ13A TQ13B TQ13C TQ13D TQ13E TQ13F !School ambidexterity (SA)

TQ1! Teacher gender (control variable)

PQ3A! Total number of students (control variable)

PQ3C! percentage of socioeconomically disadvantaged students (control variable)

TQ3;! Teaching experience (control variable)

CLUSTER = SCHOOLID;! Cluster variable for school-level analyses

BETWEEN = PQ16A PQ16B PQ16C PQ16D PQ3A PQ3C;! Variables designated for between-level (school-level) analysis

WITHIN = TQ1 TQ3;! Variables designated for within-level (teacher-level) analysis

DEFINE:

CENTER TQ9G TQ9H TQ9I TQ5A TQ5B TQ5C TQ5D TQ5E

TQ5F TQ13A TQ13B TQ13C TQ13D TQ13E TQ13F

PQ16A PQ16B PQ16C PQ16D PQ3A PQ3C (GRANDMEAN);! Centering around the grand mean for specified variables

CENTER TQ3 (GROUPMEAN);! Centering TQ3 around the group mean (within-cluster mean centring)

ANALYSIS:

TYPE = TWOLEVEL;! Specifies a two-level model (teacher and school levels)

H1ITERATIONS = 10,000;! Sets the maximum number of iterations for H1 model estimation to 10000

MODEL:

%WITHIN%

! Measurement Model for Within-Level

TAW BY TQ5A TQ5B TQ5C TQ5D TQ5E TQ5F;! Latent variable Teacher Ambidexterity (TA)

SAW BY TQ13A (1);! Number in parentheses: Defining measurement isomorphism across levels, i.e. constructs have the same measurement structure, with the same factor loadings, at both levels of analyses (within and between).

SAW BY TQ13B (2);

SAW BY TQ13C (3);

SAW BY TQ13D (4);

SAW BY TQ13E (5);

SAW BY TQ13F (6);! Latent variable School Ambidexterity (SA)

TOCW BY TQ9G (7);

TOCW BY TQ9H (8);

TOCW BY TQ9I (9);! Latent variable Teacher Organizational Commitment (TOC)

! Teacher-level Hypotheses

TAW ON TOCW;! Predicts Teacher Ambidexterity by Teacher Organizational Commitment

TAW TOCW SAW ON TQ1 TQ3;! Control for Teacher Gender and Teaching Experience

TAW TOCW WITH SAW;! Specifies correlation between TAW, TOCW, and SAW

%BETWEEN%

! Measurement Model for Between-Level

LTB BY PQ16A PQ16B PQ16C PQ16D;! Latent variable Leader Trust

TAB BY TQ 5A TQ5B TQ5C TQ5D TQ5E TQ5F;! Latent variable Teacher

Ambidexterity

SAB BY TQ13A (1);

SAB BY TQ13B (2);

SAB BY TQ13C (3);

SAB BY TQ13D (4);

SAB BY TQ13E (5);

SAB BY TQ13F (6);! Latent variable School Ambidexterity

TOCB BY TQ9G (7);

TOCB BY TQ9H (8);

TOCB BY TQ9I (9);! Latent variable Teacher Organizational Commitment

! School-level Hypotheses

TOCB ON LTB;! Predicts Teacher Organizational Commitment by Leader

Trust

TAB ON TOCB;! Predicts Teacher Ambidexterity by Teacher Organizational Commitment

SAB ON TAB;! Predicts School Ambidexterity by Teacher Ambidexterity

TOCB WITH SAB;! Specifies correlation between TOCB and SAB

SAB ON LTB;! Predicts School Ambidexterity by Leader Trust

TOCB TAB ON PQ3A;! Control for Total Number of Students

SAB TOCB LTB ON PQ3C;! Control for Percentage of Socioeconomically

Disadvantaged Students

MODEL INDIRECT:

SAB IND LTB;! Tests indirect effects of Leader Trust on School Ambidexterity

OUTPUT:

STDYX MODINDICES CINTERVAL;! Requests standardized estimates, modification indices, and confidence intervals for output