



Individual learning ambidexterity behavior and individual job performance in services: the role of organizational structure

Sebastian Ion Ceptureanu¹ · Giovanna Ferraro² · Eduard Gabriel Ceptureanu¹ · Bogdan Georgescu³

Received: 19 October 2023 / Accepted: 10 October 2024
© The Author(s) 2024, corrected publication 2024

Abstract

This study analyzed the impact of individual learning ambidexterity on individual job performance and tested the moderating effects of the organizational structure, represented in this research by formalization, decentralization, and structural differentiation. Despite the importance of individual learning ambidexterity, there is a limited understanding of how employees' explorative and exploitative learning behaviors affect their individual job performance. The study expands the research by confirming the relevance of individual learning ambidexterity for individual performance for non-managerial employees; an understudied research setting for individual ambidexterity. We demonstrate that individual learning ambidexterity is positively correlated with individual job performance. We also provide evidence that formalization, decentralization, and structural differentiation moderate the effects of individual learning ambidexterity on individual job performance. The empirical context for the research was non-managerial employees from the Romanian IT services industry. Prior research has shown that ambidexterity is important in the IT industry, making it an adequate setting to analyze the effects of individual learning ambidexterity on individual job performance. By using polynomial regressions on a sample consisting of 342 employees, we were able to analyze four research hypotheses. This study demonstrates the moderating mechanism of organizational setting in the improvement of individual job performance in relation to individual learning ambidexterity. Taken as a whole, our findings provide new insights into how and under which organizational conditions the individual-level explorative and exploitative learning behaviors affect individual job performance.

Keywords Individual learning ambidexterity · Explorative learning · Exploitative learning · Individual job performance

JEL Classification D83 · O32 · L23

Extended author information available on the last page of the article

1 Introduction

The past decade has seen an increasing number of researchers systematically study individual learning processes and individual learning ambidexterity (Perkins 2018). The learning theory highlights that explorative learning and exploitative learning (Morland et al. 2019) create mechanisms for accumulating and sharing knowledge (Matthews et al. 2017), which in turn may influence job performance.

Starting with March's study in 1991, ambidexterity and learning coexist; yet, in the literature, they have frequently taken parallel paths. While ambidexterity has been systematically analyzed in recent years, most studies have focused on organizational or innovation ambidexterity (Ceptureanu et al. 2022), with only a handful addressing learning ambidexterity (Ceptureanu and Ceptureanu 2023). Individual ambidexterity is conceptualized in the literature as the individual's capability to simultaneously pursue exploration and exploitation (Tempelaar and Rosenkranz 2019), while individual learning ambidexterity is described in the literature as the employee's learning ability to pursue explorative and exploitative learning behaviors simultaneously (Lee and Kim 2021). When studying individual ambidexterity, one should also consider it either as a behavior or as an outcome (Awojide et al. 2018). As a behavior, it represents the individual's ability to develop two contradictory actions equally well, whereas as an outcome, it represents the achievement of two conflicting objectives. In this paper, we consider individual learning ambidexterity to be a behavior.

Studying individual learning ambidexterity is important because the learning process is crucial for the creation of new knowledge and the use of existing skill sets that together influence individual job performance. Employees usually engage in learning activities to successfully cope with workplace challenges (Luger et al. 2018). Individual learning ambidexterity helps individual employees make sense of information and knowledge, and use cognitive judgment to do their job, consequently facilitating individual job performance. Individual employees can use explorative and exploitative learning behaviors alternatively or simultaneously to respond to different job-related demands, given the influence of learning on individual job performance. Although employees may engage in simultaneous exploitation of their existing professional skills developed through exploitative learning and develop new knowledge and skills in creative ways developed through explorative learning, organizational management often focuses on either exploration or exploitation instead of both (Carroll 2012). Moreover, some authors argue that individual explorative and exploitative learning behaviors represent two opposites of the individual learning process (March 1991). They are incompatible because employees have a limited amount of time to allocate to learning and must choose between them. According to other authors, employees can adopt individual exploitative and explorative learning behaviors simultaneously (Papachroni and Heracleous 2020) because these behaviors are both autonomous and complementary (Jansen et al. 2009). Therefore, the individual employees may alternate their focus on either one or may mix them to improve their individual job performance (Zhang et al. 2022).

There are two approaches regarding the direction of individual ambidexterity: bottom-up and top-down. These relate to the setting up of ambidexterity-fostering structures and processes and not to the later manifested behavior of exploration and

exploitation. The bottom-up approach suggests that individual employees should be empowered to make their own informed decisions about how to divide their time between exploration and exploitation, according to their own preferences (Mom et al. 2015a, b; Tempelaar and Rosenkranz 2019). However, autonomy may not always be possible given that most companies establish boundaries for individual employees regarding how they spend their time and their individual job performance levels. While individual employees may have some autonomy in how they generally fulfill their tasks, carrying out a specific task usually requires them to comply with certain rules and thus constrain opportunities to freely divide their time between explorative and exploitative learning behaviors. Furthermore, some employees may feel uncomfortable or incapable of effectively balancing exploration and exploitation on their own (Kauppi and Tempelaar 2016), and thus choose to focus on one or the other (Tempelaar and Rosenkranz 2019).

Managers may prefer the top-down approach to stimulate individual ambidexterity and secure a common direction of work. While it ensures more coherence, it may also reinforce resistance to change, thus making ambidextrous behavior more difficult to implement. Individual employees may start to feel overloaded when managers prefer directing their subordinate tasks (Tempelaar and Rosenkranz 2019) or reducing their autonomy by shifting to the next task according to their (the manager's) preference (Koch et al. 2010).

Research on ambidexterity has identified three different approaches that are critical to the conceptualization of the phenomenon: structural, contextual (Ubeda-Garcia et al. 2018), and sequential (Papachroni and Heracleous 2020). These are complemented by harmonic, partitional, cyclical, and reciprocal ambidexterity (Simsek et al. 2009). The structural approach proposes the simultaneous pursuit of explorative and exploitative learning, but in separate organizational units (Jansen et al. 2009). Bledow et al. (2009) support this view but argue that the structural approach may make sense at the team level but not at the individual level. Contextual ambidexterity supports the simultaneous adoption of explorative and exploitative learning behaviors. The focus is on the contextual factors that can help individuals behave ambidextrously by supporting the organizational context, which facilitates individual employees to develop and integrate exploration and exploitation over a period of time (Lam et al. 2019; Schnellbacher et al. 2019). Other authors advise against simultaneous adoption at the individual level because individual employees are forced to divide their time between two competing behaviors (Keller and Weibler 2015) or because simultaneous involvement in both seems impossible given the different modes of human attention (Laureiro-Martínez et al. 2015). Finally, sequential ambidexterity refers to a temporal cycle with periods of exploration and exploitation learning, during which individual employees can learn by switching between the two. While the contextual perspective of ambidexterity suggests that all employees are capable of behaving in an explorative and exploitative way at the same time in equal amounts in a supportive organizational context (Caniels and Veld 2019), in practice, individual employees are less likely to simultaneously explore and exploit (Schnellbacher et al. 2019). Various authors suggest that challenges of balancing may be mitigated by more behaviorally integrated approaches, proposing a supportive context in which individual members make their own choices about how to best divide their time and efforts between

exploration and exploitation (Gibson and Birkinshaw 2004; Havermans et al. 2015). Other authors suggest a top-down approach, with Andriopoulos and Lewis (2009) emphasizing the organizational conditions and individual prerequisites for contextual individual ambidexterity. Prior research has argued that, while it is difficult to pursue sequential exploration and exploitation at the organizational level due to the difficulty of detecting optimum shift times (Kammerlander et al. 2015), at the individual level, employees often switch between these two activities (Schnellbacher et al. 2019; Zhang et al. 2022). However, there remains a lack of empirical evidence for this view in the literature. Sequential ambidexterity is associated with a bottom-up approach, highlighting the individual employees' role in switching between exploration and exploitation. In our study, we use a sequential approach.

The majority of the existing literature has assumed a bottom-up approach to individual ambidexterity, in which individual employees are encouraged to decide how best to split their time between exploration and exploitation (Adler et al. 1999; Gibson and Birkinshaw 2004; Kauppila and Tempelaar 2016; Mom et al. 2015a, b; Tempelaar and Rosenkranz 2019).

Studies have confirmed the positive effects of organizational ambidexterity on performance, but the effects of individual ambidexterity remain understudied. Scholars have also reported that individual performance is fundamental to organizational performance (Hirst et al. 2018; Kauppila et al. 2018), with evidence that exploration (Lampert and Kim 2018) as well as exploitation can positively (Yamakawa et al. 2011) and negatively (Lin and Si 2019) influence performance in a firm, depending on the organizational context. Additionally, influences from the organizational structure (Jansen et al. 2012; Zhan and Chen 2013) were found to be mediating factors in the ambidexterity–performance relationship. Ceptureanu and Ceptureanu (2024) examined the relationship between learning ambidexterity and process innovation and the moderating role of the knowledge management capability. Their findings show that combining exploratory learning and exploitative learning improves process innovation while the knowledge management capability (represented by knowledge acquisition, sharing, and application) plays an important role in the relationship between learning ambidexterity and process innovation. Clauss et al. (2021) demonstrate how ambidexterity, exploration and exploitation, in conjunction with strategic agility, affect the competitive advantage of firms. Their findings show that a strategy of sole exploitation is not beneficial toward increased competitive advantage, while an ambidextrous strategy seems to even negatively influence the competitive advantage of a firm. In their review on innovation ambidexterity, Saleh et al. (2023) analyzed both learning and organizational contexts.

Only a handful of studies have investigated the individual-level exploration and exploitation effects on performance (Mom et al. 2015a, b; Schnellbacher et al. 2019). Some studies provide evidence that the simultaneous use of knowledge generated by explorative and exploitative learning at the individual level may contribute to effective knowledge accumulation that fosters performance (Mom et al. 2015a, b; Gurtner and Reinhardt 2016). Following the ambidexterity logic, one employee may look to complement knowledge to exploit already available knowledge, may seek new knowledge to explore entirely new approaches, or may combine both approaches (Schulz 2001). In addition to individual behavior, firms may encourage their employ-

ees to behave ambidextrously to improve organizational performance (Prieto and Santana 2012). Several studies found a positive correlation between individual ambidexterity and individual job performance (Jasmand et al. 2012; Good and Michel 2013). The study of Akbar and Anas (2023) shows that the talent management process significantly impacts employees' ambidexterity. Fujii (2024) found that service-sales ambidexterity mediates the positive relationship between process control and salesperson performance, while leadership humility reinforces the positive relationship between process control and service-sales ambidexterity.

Ejaz et al. (2024) examined the relationship between team cohesion and employee adaptive performance directly and through employee ambidexterity. The findings reveal that both team cohesion and employee ambidexterity positively relate to employee adaptive performance and that employee ambidexterity mediates the relationship between team cohesion and employee adaptive performance. McClure et al. (2024) analyzed the effects of stress on job satisfaction. They found that ambidextrous salespeople are generally more stressed than their monodextrous counterparts and that stress mediates the ambidexterity–job satisfaction relationship. The findings suggest that ambidextrous salespeople are less satisfied in their role because of the added stress of switching between activities. Hanu et al. (2022) suggest that work-based learning has a significant and positive impact on employee ambidexterity, while Joseph et al. (2023) found that employee ambidexterity generally has a positive impact on individual performance in various forms. Weigel et al. (2022) analyzed the role of HR in achieving organizational ambidexterity in German companies. Their results suggest that, especially in firms with scarce resources, managers can be either an important supporter or obstacle when aiming for ambidexterity.

The organizational structure may influence whether individual employees prefer and adopt exploitative or explorative learning behaviors. The literature emphasizes that learning as a process requires adequate organizational context, which is one reason why achieving individual learning ambidexterity is challenging (Soto et al. 2018). The organizational structure can act as a facilitator or inhibitor of learning (Victor 2020). Martínez-León and Martínez-García (2011) linked the characteristics of the organizational structure with learning results, finding that when the organizational structure is closer to the organic model, the level of learning is higher; when it is closer to a mechanistic model, the level of learning is lower. Hao et al. (2012) argue that organizational structure has more effects on learning than on innovation. Pertusa-Ortega and Molina-Azorin (2018) argue that there is a connection between ambidexterity and organizational structure. An interesting approach to organizational context represented by complexity is provided by Rojas-Córdova et al. (2023). They argue that there are two opposing viewpoints on the effects of complexity on exploration and exploitation. Some scholars (Burgers and Covin 2016) argue that firms with high complexity may favor exploitation over exploration because firms develop hierarchies to manage their complexity. Other scholars (Larsen et al. 2018) suggest that resources and capabilities of complex firms may positively influence exploration because the employees increase the depth of the knowledge base, which in turn promotes the development of new ideas. For Filippini et al. (2012), organizational structure can serve as an integration mechanism facilitating learning transfer. While explorative learning creates new knowledge and skills, exploitative learning devel-

ops current knowledge and skills. Organizational structure can enhance individual job performance by codifying new knowledge resulting from explorative learning into procedures, thus facilitating individual job performance. On the other hand, the organizational structure facilitates the exploitation of existing routines, supported by exploitative learning, thereby enabling the replication and diffusion of knowledge. However, few empirical results have proved this, with most evidence originating from case studies. In our study, we hypothesize that individual job performance is influenced by individual learning ambidexterity, which itself is influenced by organizational structure represented by formalization, decentralization, and structural differentiation.

Non-managerial employees from IT services industry firms in Romania represent the empirical context for our research. Prior research has shown that ambidexterity is important in IT industries (Cui et al. 2019; Ceptureanu et al. 2022), thus providing an adequate context to analyze the effects of individual learning ambidexterity on individual job performance.

The purpose of this study is to elucidate the relationship between individual learning ambidexterity, individual job performance, and organizational structure; such a relationship can have critical implications for all three. The findings improve our understanding of individual learning ambidexterity and the role of organizational structure by providing new empirical evidence for these matters. Moreover, our study responds to calls in the literature for multi-level investigations of organizational structure, which offer new evidence on how organizational structure facilitates greater effectiveness in individual-level performance. Furthermore, our understanding of how individual learning ambidexterity influences individual job performance will improve, thereby facilitating more focused training initiatives directed at achieving effective learning and improved individual job performance. Finally, by focusing on ambidexterity at the non-managerial level, this study extends the landscape of ambidexterity analysis at grass-roots levels, given that most of the studies on the topic consider top management team (managerial) roles in achieving ambidexterity and neglect non-managerial roles.

2 Theoretical background and hypotheses development

2.1 Individual learning ambidexterity and individual job performance

Learning is an experiential process in which individuals develop, share, and acquire new knowledge, modify their behavior in response to a collective experience, and then determine how the organization will interpret and retrieve these experiences as practices and routines. To create and distribute their learning outcomes, individuals interact with their peers, both within and outside the company (Oh and Kim 2022). Social cognitive theory provides a reliable explanation of how employees learn to improve their individual performance, stating that employees' learning is the psychosocial consequence of their internal and external environment. According to social cognitive theory, learning occurs in a social context with a dynamic and reciprocal interaction between the person, environment, and behavior. It argues that individu-

als' cognitive and ability traits are influenced both by micro-level behavioral features and institutional environments. In social cognitive theory, the concept of self-efficacy encapsulates the intrinsic motivation individuals derive from their perceived capabilities (Lee and Tseng 2024). Given that exploration and exploitation stem from different underlying knowledge, they induce different challenges and require different learning processes to develop (Lee and Meyer-Doyle 2017). As a result, individuals' decisions on ambidexterity are not dependent on organizational management (Ossenbrink et al. 2019).

The cognitive perspective of ambidexterity suggests that individual ambidexterity is associated with complex cognitive characteristics and processes (Tempelaar and Rosenkranz 2019), which itself relies on social cognitive theory, arguing that an individual's behavior is influenced by the characteristics of a set of personal resources and capabilities in environmental contexts. It holds that learning, motivation, and performance are guided by several self-regulatory mechanisms working in synchronization. A central role among these is the beliefs of the employees in their personal efficacy, which can in turn mobilize the motivation, resources, and activities needed to successfully cope with the challenges at hand (Kauppila and Tempelaar 2016).

For Schnellbacher and Heidenreich (2020), individual learning ambidexterity encompasses two distinct but connected knowledge processes: knowledge seeking and knowledge offering. Knowledge seeking refers to processes that focus on finding complementary knowledge to individual employees' skill sets to incrementally improve established processes (Birkinshaw and Gibson 2004) and to add new knowledge to existing skill sets to shake up existing procedures and implement superior ways of conducting business (March 1991). Exploitative knowledge seeking expands the available knowledge base, which is complementary to the established processes (Chen et al. 2018), while explorative knowledge seeking aims to integrate novel concepts, new paradigms, and general knowledge. Knowledge offering refers to all processes that focus on distributing novel explorative and complementary knowledge to others (Mom et al. 2007). Exploitative knowledge offering supports improvements through the rapid diffusion of knowledge, which supplements existing processes. Explorative knowledge offering enables the dissemination of knowledge that is radically different and unrelated to the knowledge of the recipient to whom it is offered.

Even though this approach is certainly interesting, we prefer a second approach focused on social identity (Gioia et al. 2000). According to social identity, much of what determines identity on the individual level is affected by the relationship to others, impacting a person's set of beliefs, values, and expected behavior (Gioia et al. 2010). The concept of role identities captures this phenomenon. In organizational settings but also in everyday life, individuals are assigned roles that come with a socially expected behavioral pattern, mindset, and values. Role identities capture different facets of the self, depending on the diverse social contexts in which an individual is embedded (Stryker and Burke 2000). Thus, individuals have multiple role identities that delimit appropriate cognitions, effects, and behaviors. Therefore, one can assume that identity similarly affects an individual's learning potential. The ability of individuals to handle multiple roles with little conflict is crucial to the successful pursuit of learning ambidexterity at the individual level (Floyd and Lane 2000). The assumption is that these individuals are able to transcend the exploration–exploitation para-

dox, as they are more likely to engage in paradoxical thinking (Andriopoulos and Lewis 2009). Instead of perceiving exploration and exploitation as contradictory and subject to a trade-off, individual employees use paradoxical thinking on potential synergies between exploration and exploitation, and seek out ways to bring them together.

From a learning perspective, individual employees need learning ambidexterity to be able to cope with multiple and different tasks simultaneously. They may use explorative learning behavior to perform experiments with novel alternatives whose results may be uncertain, and use exploitative learning behavior to directly adopt or slightly modify existing approaches and procedures whose effectiveness is predictable (Lee and Kim 2021). In this vein, exploitative learning enables employees to efficiently use their existing knowledge to support their task achievement, while explorative learning improves employees' capacity to develop new approaches using external knowledge resources, both of which improve job performance. In this regard, explorative learning and exploitative learning strengthen individuals' learning abilities (Fainshmidt et al. 2016). Learning may initiate positive and systematic change in employees' knowledge and skills, which in turn can lead to improved individual job performance. Individual employees switching between explorative and exploitative learning can fulfill multiple roles, engage in very different tasks, and utilize paradoxical thinking (Mom et al. 2015a, b). However, at the individual level, it is difficult to fully separate exploration and exploitation behaviors, with Birkinshaw and Gupta (2013) even claiming that a strict separation between them is impossible.

The initial stream of research on ambidexterity supported a conflicting relationship between exploration and exploitation based on resource scarcity. Exploitative and explorative behaviors are incompatible because they compete for scarce mental and psychological resources and require different organizational mechanisms (March 1991). Gebert et al. (2010) suggest that too much exploration leads to confusion among employees, while too much exploitation leads to rigidity. In recent years, more and more scholars have advocated for a complementary relationship between them at the organizational level (Ceptureanu and Ceptureanu 2023) or at the individual level (Rosing and Zacher 2017).

Individual ambidexterity plays a crucial role in balancing exploration and exploitation, and determining whether simultaneous pursuit or alternation between them is the most effective way. Rosing and Zacher (2017) question whether individuals can focus exclusively on exploration or exploitation tasks, while Laureiro-Martínez et al. (2015) propose that individuals may not be able to pursue both simultaneously.

Mom et al. (2009) define employees' explorative behavior as searching for, discovering, creating, and experimenting with new opportunities, and learning from errors, while exploitative behavior is defined as reliance on previous experience, putting things into action, and incrementally improving well-learned actions.

Employees focusing on explorative learning tend to focus on long-term outcomes (Tuncdogan et al. 2015), which motivates them to continuously learn through experimentation with new alternatives, and helps them to better understand and identify opportunities. Explorative learning also allows employees to focus on the configuration and reconfiguration of their knowledge and skills (Tempelaar and Rosenkranz 2019), which often leads to employees creating new means of completing their tasks

and finding creative solutions for their tasks (Mom et al. 2015a, b), thereby improving individual job performance. Although engaging in exploration entails high risk, any failure will drive employees to adjust and search for alternative ideas and solutions (Mom et al. 2019). In this case, explorative learning results in employee creativity (Gong et al. 2013; Good and Michel 2013); namely, the generation of novel ideas as a response to employees' tasks (Kauppila et al. 2018). The literature provides evidence that employee creativity has a positive effect on individual job performance (Eissa et al. 2017).

On the other hand, employees focusing on exploitative learning are more likely to maximize short-term outcomes (Tuncdogan et al. 2015) through their existing knowledge and skills when completing tasks (Gong et al. 2013), leading to positive performance outcomes (Lee and Meyer-Doyle 2017; Mom et al. 2019). Learning also enables employees to align incremental development in their knowledge and skills with organizational procedures (Fainshmidt et al. 2016), with individual employees experiencing less uncertainty when fulfilling their tasks and achieving better and more reliable performance (Mom et al. 2019). Exploitative learning requires less experimentation (Enkel et al. 2017) and does not substantially disrupt existing knowledge development processes. As a result, exploitative learning behavior enables employees to achieve and maximize positive performance over a shorter period of time (Tuncdogan et al. 2015).

Schnellbacher et al. (2019) point out that employees tend to be biased in their focus on either explorative or exploitative behavior. They are likely to have a stronger behavioral orientation toward exploitation, given the complexity and higher risk associated with exploration (Lee and Meyer-Doyle 2017).

In our view, taken together, both explorative and exploitative learning behaviors are likely to be necessary for improving individual job performance. Therefore, we propose that:

H1 Individual learning ambidexterity is positively correlated with individual job performance.

2.2 Moderating effects of organizational structure

In the literature, organizational factors that moderate the impact of individual ambidexterity on other variables are often related to the context of work (Mom et al. 2015a, b) and the perceived organizational support (Affum-Osei et al. 2020). Organizational structure may play a critical role in the implementation of ambidexterity (Csaszar 2013). Various authors have pointed out that exploration and exploitation require completely different organizational structure characteristics (Gupta et al. 2006). However, there is little empirical evidence on the specific characteristics of organizational structure that companies may adopt to encourage individual learning ambidexterity. In this study, we examine decentralization, formalization, and structural differentiation because these are the main variables that characterize the structure of an organization in the literature (Pertusa-Ortega and Molina-Azorin 2018).

2.2.1 Decentralization

Decentralization is a result of hierarchic authority partition within organizations (Pertusa-Ortega and Molina-Azorin 2018). Decentralization is more likely to promote innovation, experimentation, idea-sharing, and spontaneity at the individual level. Decentralized organizations expose employees to multiple opinions and amounts of information, fostering a creative integration of perspectives. By encouraging participation among employees, decentralized decision-making processes can promote knowledge generation. Increased individual employee participation in decision-making at lower levels of an organization can boost the production and application of new knowledge by enhancing the diversity and quantity of generated ideas, thus raising the likelihood of these ideas leading to exploration or exploitation (Pertusa-Ortega et al. 2010).

A highly centralized structure hampers the interaction of individual employees, reduces opportunities for innovation and knowledge solutions, and limits the creation of new knowledge. Decentralization may influence individual job performance by providing autonomy to employees in making adjustments to resource allocation and knowledge development (Foss et al. 2015), thereby improving information awareness (Jansen et al. 2012), and providing encouragement and support for experimentation and creativity (Wei et al. 2011). With explorative learning deviating from existing routines, decentralization facilitates specific problem-solving (Wei et al. 2011) and improves information flows (Hempel et al. 2012). Decentralization generally supports the sharing of new ideas, favors explorative learning when these ideas are divergent from existing knowledge (Wei et al. 2011), provides the individual employees with the autonomy they need to track new opportunities, and enables efficient use of knowledge (Foss et al. 2015). In more decentralized firms, individuals may vary in their commitment levels to pursue individual learning ambidexterity. Accordingly, decentralization can favor both explorative and exploitative learning.

Empirical evidence suggests that explorative learning is preferred in decentralized units with loose processes and procedures, while exploitative learning is preferred in centralized units with tight processes and procedures (Benner and Tushman 2003).

Decentralization is important for the proper development of explorative and exploitative learning because it provides employees with the autonomy to make unilateral adjustments and modifications. Moreover, decentralization increases the likelihood that individuals in the firm seek innovative solutions. In decentralized organizations, employees may be more motivated and committed to assessing and using information to pursue individual learning ambidexterity.

Decentralization eases ad hoc problem resolution by broadening the range of potential solutions and is fostered by employees' engagement in explorative learning. It facilitates the recognition of changes in customer demand, technological advancements, and market prospects (Wei et al. 2011) and improves information flows (Hempel et al. 2012). It may also favor explorative learning. Jansen et al. (2006) argue that exploitative learning has limited scope and newness, with problem-solving associated with exploitation being viewed as more routine. According to Foss et al. (2015), decentralization allows for the effective utilization of knowledge that is located at lower levels in the organization and gives employees the freedom to change their

strategies for pursuing new possibilities in response to environmental changes. Decentralization can facilitate exploitation in this way. It might boost operational flexibility by enabling staff to react to new opportunities more quickly and encouraging ambidextrous behavior at lower levels of the hierarchy. Therefore, decentralization can facilitate the development of distinct explorative and exploitative learning behaviors in employees, and create an organizational setting in which employees may be more motivated and involved in individual learning ambidexterity.

Therefore, we propose that:

H2 Decentralization positively moderates the effects of individual learning ambidexterity on individual job performance.

2.2.2 Formalization

Formalization represents the extent to which rules, procedures, instructions, responsibilities, and communications are formalized or written down in a firm (Moreno and Lloria 2008). It mandates that all employees follow certain guidelines, instructions, and norms. In the literature on organizational research, formalization is the subject of two competing theories.

The first, coercive formalization, views formalization negatively since it revokes individual freedom to reduce deviations from pre-established goals (Adler and Borys 1996). In this sense, formalization's primary purpose is to compel employees to act in a certain way. Formalization may reduce flexibility since it demands strict obedience to regulations, encourages control, discourages changes, and penalizes errors (Hempel et al. 2012). It may restrict the creation of new knowledge, making explorative learning more difficult. The coercive type of formalization results in job unhappiness, stress, and absenteeism rather than fostering learning. Employees become alienated in these situations as they must follow work instructions without receiving explanations or reasons (Johari and Yahya 2009). As a consequence, it reduces motivation, inventiveness, and adaptability (Vlaar et al. 2006). However, in firms with a higher level of formalization, employee actions are more structured, allowing for more structured learning. Additionally, formalization allows firms to codify best practices more effectively.

The second perspective, known as enabling formalization (Adler and Borys 1996), sees formalization as advantageous since it fosters interpersonal cooperation and makes employees more effective in performing their tasks. We use this second perspective in our study.

Enabling formalization makes it easier for employees to develop routines and practices that boost their effectiveness and job performance, and makes it simpler to use the new knowledge resulting from explorative learning. It allows individual employees to change or adapt the existing rules and procedures to some extent, thereby improving cooperation and collaboration with peers and those outside the firm, and facilitating knowledge transfer. Moreover, formalization enables employees to solve problems, take initiative, and improve their performance, thus making

them more motivated by a flexible use of the rules and systems in place (Wouters and Wilderom 2008).

Enabling formalization makes it easier to establish organizational routines and practices, thus boosting the effectiveness of new knowledge utilization. In this way, enabling formalization provides a coherent framework for all employees to comprehend their roles within the firm, encouraging them to pursue new learning opportunities (Wouters and Wilderom 2008). Increased flexibility and adoption of informal learning behaviors within the firm can promote learning and lead to the efficient creation and use of knowledge in fulfilling job requirements, contributing to individual job performance. Enabling formalization mobilizes rather than replaces employees' knowledge and acts to help them form mental models of the tasks they are carrying out and modify procedures if necessary to deal with the specific work demands (Johari and Yahya 2009). It also assists in creating a working environment based on mutual trust and respect. Enabling formalization intends to help employees understand how their specific duties contribute to the bigger picture (Wouters and Wilderom 2008), thereby fostering creative interaction and the development of new procedures and processes. Enabling formalization promotes learning from mistakes and facilitates problem-solving. Thus, it may positively influence explorative and exploitative learning behaviors, favoring individual learning ambidexterity.

Therefore, we propose that:

H3 Formalization positively moderates the relationship between individual learning ambidexterity and individual job performance..

2.2.3 Structural differentiation

Structural differentiation is the state of segmenting the organizational systems into components, each developing specific attributes regarding the requirements posed by its relevant external environment. Such structural separation ensures that each organizational unit is configured to meet the specific needs of its task environment (Jansen et al. 2012).

Structural differentiation enables firms to prepare for various future scenarios (Gilbert 2005), but at the same time requires the capacity to balance tensions and manage contradictions (Güttel et al. 2015). Establishing knowledge bridges at multiple hierarchical firm levels and using formal as well as informal integration mechanisms, including cross-functional teams or social integration (Mihalache et al. 2014), can relieve the pressure on the top level by acting as an intermediary between various highly specialized departments or business units (Güttel et al. 2015). Bledow et al. (2009) highlight that exploration and exploitation can be structurally separated into different subsystems or temporally separated within the same subsystem. Caniels and Veld (2019) empirically compare the case when individuals specialize in one of the two activities with the case when individuals develop both exploration and exploitation during the last year. They find that when employees specialize, their outcomes are higher than when employees undertake both exploration and exploitation equally.

Structural differentiation highlights variations in mindsets, time orientations, and product or market domains among units. It is likely to improve employees' skills and capabilities in day-to-day activities as they become specialized (Pertusa-Ortega et al. 2010). It can play an important role in facilitating the flow of knowledge because absorbing new knowledge requires a base of prior knowledge. Conducting exploitative and explorative learning simultaneously is not simple because they require different organizational routines (Diaz-Fernandez et al. 2017). Structural differentiation can be useful in handling the tension between exploration and exploitation, giving individual employees the organizational space to do both (De Visser et al. 2010). Structural differentiation gives organizational units a sense of freedom and ownership over their actions by promoting more innovation and adaptation to specific demands, thereby improving individual job performance. Structural differentiation enables each organizational unit to adopt working practices that are better adapted for individual exploration or exploitation (Burgers et al. 2009). Furthermore, structural differentiation prevents overlaps or conflicts in units performing either exploration or exploitation. As a result, employees enjoy the flexibility to develop new knowledge and skills (Jansen et al. 2009).

Structural differentiation (Benner and Tushman 2003) helps avoid conflicts arising from the diverse demands associated with various learning modalities. Furthermore, focusing on exploration and exploitation facilitates excellence in both domains.

Therefore, we propose that:

H4 Structural differentiation positively moderates the relationship between individual learning ambidexterity and individual job performance.

3 Data and methodology

3.1 Data collection and methodology

This study investigates individual employees from Romanian medium- and large-sized firms operating in the IT services industry. Prior research has shown that ambidexterity is typically important in IT industries (Cui et al. 2019; Ceptureanu et al. 2022). Various authors state that, in some industries, activities, and jobs, it is possible for individuals to simultaneously develop exploration and exploitation, such as in services (Faia and Vieira 2017) or in consulting firms (Luu et al. 2018), where firms look for employees who have the dual ability of exploiting existing competencies and exploring new sales opportunities at the same time. Employees dealing directly with customers are under increased pressure to simultaneously engage in cross-selling or up-selling opportunities and fulfill service requests (Sok et al. 2016). As a result, it provides an appropriate context for assessing the relationship between individual learning ambidexterity, organizational structure, and job performance.

The IT services industry in Romania is divided into two NACE classes: 62 Computer programming, consultancy, and related activities, comprising: (a) *Computer programming activities*; (b) *Computer consultancy activities*; (c) *Computer facili-*

ties management activities; (d) *Other information technology and computer service activities*; and 63 Information service activities, comprising: (e) *Data processing, hosting, and related activities*; (f) *Web portals*; (g) *News agency activities*; and (h) *Other information service activities*.

We designed a questionnaire to test the research hypotheses. The initial draft was discussed with five scholars. An updated version enabled us to conduct a pilot test, interviewing employees from 10 firms in the IT services industry based on their recommendations.

In cooperation with 112 companies (via meetings with their employees facilitated by various top executives or entrepreneurs), a member of the research team introduced the purpose of the study and invited employees to participate. After the meetings, the researcher collected the contact data from those employees who expressed an interest. All participants were involved voluntarily, and they were assured that their personal, private data would not be disclosed. Between September 2022 and May 2023, we distributed the final version of the questionnaire by e-mail to 1,000 employees with no managerial positions or roles. To improve the response rate, a reminder e-mail was sent three weeks after sending the initial e-mail. We collected and analyzed 342 valid questionnaires from employees hired by 94 companies; the maximum number of employees originating in a company was 6, with an average of 3.63 employees per company. The analyzed sample is suitably small in size, meaning a certain degree of heterogeneity in the companies is expected. In this respect, our intent was to avoid having a very homogenous sample to allow us better generalizability of the findings. On the other hand, we had to consider that formalization and decentralization may vary considerably across organizations even in the same industry, while our measures for formalization and decentralization tap into the organization of work. As such, it was decided not to include additional variables measuring the organization of work as doing so would reduce the explanatory power of our analysis.

Seventy percent of the respondents had a degree in at least secondary education, and their average age was 39 years old. About half of the sample (48%) were men. Our research is focused on the IT service industry. In particular, we consider employees involved in the following IT services: managed services that involve the outsourcing of IT management of specific functions, remote monitoring, and cybersecurity services; network services including the configuration, management, and security of network systems; cloud computing services including storage and access to data over the Internet; support and help desk services covering ongoing support for IT issues within an organization; and software development and implementation involving development of customized software solutions, integration into existing systems and software solutions tailored to business needs.

In terms of occupation, the sample consisted of the following categories: support specialist (11.42%), it technician (10.80%), applications engineer (9.26%), cloud system engineer (8.33%), computer programmer (7.72%), network engineer (7.41%), computer support specialist, computer systems analyst, software engineer and systems analyst (each category representing 6.48% of the sample), data quality manager and database administrator (each representing 6.17% of the sample), information security analysts (5.86%), web developer (4.94%) and user experience

designer (1.54%). Most of the participants (77%) worked both on site and at clients' locations, depending on the specific contractual agreements. In terms of remote working, the sample was more balanced, with 52% of respondents working in person and 48% working remotely.

Differences between respondents and non-respondents for the final sample were analyzed to check for non-response bias. A *t*-test was conducted, and the result proved no significant differences between the early response and late response groups. In the end, we concluded that this study did not have a problem of non-response bias. Regarding common method bias, we followed the suggestions of Podsakoff et al. (2003) by adopting pilot testing to identify ambiguities and to assure item clarity and confidentiality to increase response accuracy. Finally, a Harman's single-factor test was performed, which showed a poor fit. Therefore, we concluded that common method bias was not a major concern in the study.

The response surface analysis is a collection of mathematical and statistical techniques useful for modeling and analyzing problems in which a response of interest is influenced by several variables and the objective is to optimize this response (Montgomery 2005). In particular, polynomial regression with response surface analysis is an approach that allows researchers to examine the extent to which combinations of two predictive variables relate to an outcome variable especially if the discrepancy between the two predictive variables is a central consideration (Rhoades Shanock et al. 2010).

3.2 Measurements

3.2.1 Dependent variable

(1) *Individual job performance (IJP)* was based on the studies of Soane et al. (2012) and Lin and Cheung (2023). The average of the scores on the items was used to assess *IJP*, with a scale-centered measure used to alleviate the multi-collinearity issue. The average score is a basic statistical calculation used to determine the central tendency of a data set and can be used to identify trends and patterns. It is considered a simple step in conducting any statistical analysis.

3.2.2 Independent variables

(1) *Individual exploitative learning behavior (IETL)* was adapted from Kostopoulos and Bozionelos (2011), Lee and Kim (2021), and Tian et al. (2021).

(2) *Individual explorative learning behavior (IERL)* was based on Kostopoulos and Bozionelos (2011), Lee and Kim (2021), and Tian et al. (2021).

All independent variables were measured on a five-point Likert scale ranging from 1 (corresponding to a low focus on learning in the last year of employment) to 5 (corresponding to a high focus on learning in the same year). Most empirical studies on the topic measure individual exploration and exploitation carried out during the last year (Mom et al. 2009).

3.2.3 Moderating variables

- (1) *Formalization (FORM)* was adapted from Andersen and Jonsson (2006), Pertusa-Ortega and Molina-Azorin (2018) and Ceptureanu and Ceptureanu (2023). A five-point Likert scale was utilized, with 1 corresponding to low formalization and 5 corresponding to high formalization.
- (2) *Decentralization (DEC)* was adapted from Andersen and Jonsson (2006), Pertusa-Ortega and Molina-Azorin (2018) and Ceptureanu and Ceptureanu (2021). A five-point Likert scale was utilized, with 1 corresponding to low decentralization and 5 corresponding to high decentralization.
- (3) *Structural differentiation (SDIF)* was based on Jansen et al. (2009) and Úbeda-García et al. (2020). A five-point Likert scale was utilized, with 1 corresponding to low structural differentiation and 5 corresponding to high structural differentiation.

3.2.4 Control variables

- (1) *Gender*, according to Golden and Veiga (2018), influences individual employees' job performance. In our study, it was measured as a dummy variable (0 for Female and 1 for Male).
- (2) *Age (AGE)*, according to Zhang et al. (2022), makes a difference in individual employees' performance. In our study, it was categorized into 4 groups (1 for under 25 years old, 2 for 26–40 years old, 3 for 41–55 years old, and 4 for above 56 years old).
- (3) *Industry (IND)* was measured by a dichotomous variable: 1 if the firm belonged to high-technology services or 0 if the firm belonged to low-technology services. In our study, 1 was assigned to firms that had their main NACE in one of the following: (a) *Computer programming activities*, (c) *Computer facilities management activities*, (e) *Data processing, hosting and related activities*, (f) *Web portals*, while 0 was assigned to firms operating in (b) *Computer consultancy activities*, (d) *Other information technology and computer service activities*, (g) *News agency activities*, and (h) *Other information service activities*.
- (4) *Educational level (EDU)*, according to Van Woerkom and Meyers (2015), is important in the individual employees' job performance. It was operationalized by three categories: 1 for graduates of high schools, 2 for undergraduates, and 3 for postgraduates.
- (5) *Tenure (TEN)*, according to Eissa et al. (2017), makes a difference in individual employees' performance. In our study, it was measured by the total number of years with the firm of respondents.
- (6) *Work schedule flexibility (WSF)* was measured by a dichotomous variable: 1 if the working schedule was flexible (the working time is controlled by the employee), or 0 if the work schedule was not flexible (the working time was controlled by the employer).

3.2.5 Construct validity and reliability

We computed Cronbach's alpha coefficients and the composite reliabilities for all items to test the construct reliability. As shown in Table 1, all the Cronbach's coefficients and composite reliabilities were above the recommended threshold value of 0.70 (Fornell and Larcker 1981).

Using IBM SPSS Amos 22 software, we built a confirmatory factor analysis (CFA) model. The measurement model showed a good fit (goodness of fit index=0.918; comparative fit index=0.919; incremental fit index=0.910; root mean square error of approximation=0.039). The results show that average variance-extracted values were greater than 0.5 and standardized factor loadings were greater than 0.5, showing convergent validity support (Hair et al. 2014).

4 Results

4.1 Testing the direct effect of individual learning ambidexterity on individual job performance

To test the research hypotheses, polynomial regressions were used; a common method to analyze ambidexterity based on recommendations from Dawson (2014) and Cho et al. (2020).

To test hypothesis 1, the following polynomial regression was used:

$$\begin{aligned}
 IJP = & b_0 + b_1IETL + b_2IERL + b_3IETL^2 \\
 & + b_4(IETL \times IERL) + b_5IERL^2 + b_6GEN \\
 & + b_7AGE + b_8IND + b_9EDU + b_{10}TEN \\
 & + b_{11}WSF + e
 \end{aligned}$$

Two independent variables (*IETL* and *IERL*) along with the control variables (*GEN*, *AGE*, *IND*, *EDU*, *TEN* and *WSF*) were entered in Model 1, and then the two quadratic terms ($IETL^2$ and $IERL^2$) and one interaction term ($IETL \times IERL$) were entered in Model 2. Due to quadratic terms in a polynomial regression model leading to a difficulty in interpreting the significance of the coefficients from the analysis, we examined if changes in variance explained (R^2) were significant after quadratic and interaction terms were added (Edwards 2008).

Results are presented in Table 2. Model 1 reveals that both *IETL* and *IERL* are significantly and positively associated with individual job performance. The value of R^2 significantly increases by adding the quadratic terms ($IETL^2$ and $IERL^2$) and the interaction term ($IETL \times IERL$).

To further test the robustness of the results, we also performed a response surface analysis by examining the slope and curvature values of symmetry and asymmetry lines. The results are presented in Table 3. Along the symmetry ($Y=X$) line, the results show a significant slope of the symmetry line, indicating that individual learning ambidexterity is significantly associated with *IJP* ($\beta=0.342$, t -value=3.564**;

Table 1 Validity and reliability of measurements

Construct	Std loadings	t-value
<i>Individual exploitative learning behavior</i>		
Composite reliability=0.90, average variance extracted=0.74, Cronbach's alpha=0.86		
I use my current knowledge and skills when performing my tasks	0.82	28.12***
I primarily perform routine activities	0.86	30.24***
In performing my tasks, I implement standardized methodologies and work practices	0.81	26.85***
I improve and refine my existing knowledge and expertise during my work by collaborating with suppliers, customers, and peers	0.81	24.72***
I recombine my existing knowledge to accomplish my work goals by collaborating with suppliers, customers, and peers	0.82	29.91***
<i>Individual explorative learning behavior</i>		
Composite reliability=0.89, average variance extracted=0.62, Cronbach's alpha=0.85		
I evaluate diverse options regarding the course of task accomplishment	0.83	27.65***
I develop many new skills during task accomplishment	0.89	25.93***
I am systematically searching for new possibilities to accomplish my tasks by collaborating with suppliers, customers, and peers	0.78	28.17***
I offer new ideas and solutions to complicated problems by collaborating with suppliers, customers, and peers	0.81	24.77***
I experiment with new and creative ways to accomplish work by collaborating with suppliers, customers, and peers	0.80	29.03***
<i>Formalization</i>		
Composite reliability=0.90, average variance extracted=0.83, Cronbach's alpha=0.85		
The firm provides all employees with written job descriptions	0.77	26.19***
The firm uses descriptions of job regulations and has manuals of procedures	0.82	26.72***
The firm makes operating instructions and the work schedule available for all employees	0.85	24.95***
<i>Decentralization</i>		
Composite reliability=0.91, average variance extracted=0.83, Cronbach's alpha=0.85		
In the firm, decisions regarding the amount of overtime to be worked are made at the next hierarchical level	0.81	28.29***
In the firm, decisions regarding the delivery dates and priority of orders are made at the next hierarchical level	0.82	25.84***
In the firm, decisions regarding the method of work to be used are made at the next hierarchical level	0.77	26.71***
In the firm, decisions regarding the allocation of work among available employees are made at the next hierarchical level	0.80	24.74***
<i>Structural differentiation</i>		
Composite reliability=0.93, average variance extracted=0.83, Cronbach's alpha=0.85		
The firm serves the customer's needs from separate departments	0.82	26.15***
The firm has units that are either focused on the short term or the long term	0.85	28.78***
The firm has clearly separated the line and staff departments	0.83	27.29***
<i>Individual job performance</i>		
Composite reliability=0.92, average variance extracted=0.80, Cronbach's alpha=0.89		
My individual job performance is good	0.84	37.12***
The degree to which I complete my work tasks is very high	0.82	36.57***
I always complete the duties specified in my job description	0.84	37.49***
I meet the formal performance requirements of the job	0.86	35.95***
I fulfill the responsibilities required by my job		

***p < 0.001; $\chi^2 = 175.26$. (df=62)

Table 2 Results of regression analysis

	Individual job performance			
	Model 1		Model 2	
	Unstan- dardized β coefficients	<i>t</i> -value	Unstan- dardized β coefficients	<i>t</i> -value
Constant (b_0)	1.573**	2.389	2.228***	3.237
(1) <i>Gender</i>	0.723***	5.467	0.668***	4.687
(2) <i>Age</i>	-0.082	-0.717	-0.072	-0.671
(3) <i>Industry</i>	0.061	0.720	0.083	0.812
(4) <i>Educational level</i>	0.177*	0.129	0.175*	1.735
(5) <i>Tenure</i>	0.165*	0.687	0.094	0.702
(6) <i>Work schedule flexibility</i>	0.181*	0.129	0.185*	0.203
Individual exploitative learning behavior	0.265***	3.506	0.264***	1.676
Individual explorative learning behavior	0.129*	2.568	0.158*	2.893
Individual exploitative learning behavior sq			0.062**	1.492
Individual exploitative learning behavior \times Individual explorative learning behavior			0.226	1.911
Individual explorative learning behavior sq			0.087**	2.625
Adjusted R^2			0.224	
ΔR^2			0.045	
ΔF			3.778**	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; $N = 342$; R^2 indicates an increase in variance explained by adding the set of non-linear terms above the linear terms; Ordinary least squares regression coefficients were estimated using heteroscedasticity-consistent standard errors

Table 3 Significance in the surface values for *IJP*

b_1 (*IETL*), b_2 (*IERL*), b_3 ($IETL^2$), b_4 ($IETL \times IERL$), b_5 ($IERL^2$); ** $p < 0.01$

	Unstandardized β coefficients	<i>t</i> -value
Symmetry ($Y = X$) line	Slope ($b_1 + b_2$)	0.342 3.564**
	Curvature ($b_3 + b_4 + b_5$)	-0.076 -0.053
Asymmetry ($Y = -X$) line	Slope ($b_1 - b_2$)	0.107 1.026
	Curvature ($b_3 - b_4 + b_5$)	0.006 -0.003

$\beta = -0.076$, $t\text{-value} = -0.053$). Moreover, the non-significant curvature of the asymmetry line supported demonstrates that higher levels of individual learning ambidexterity are positively related to individual job performance. Along the asymmetry ($Y = -X$) line, the slope and curvature are all found to be insignificant ($\beta = 0.112$, $t\text{-value} = 1.026$; $\beta = 0.008$, $t\text{-value} = -0.003$), implying that when levels of *IETL* and *IERL* are not balanced, the relationship between them is significantly associated with individual job performance.

The results of the response surface analysis demonstrate that individual learning ambidexterity is positively related to individual job performance. Along the symmetry line ($Y = X$), *IJP* is higher when both *IETL* and *IERL* are higher than when *IETL* and *IERL* are both lower. This finding suggests that high levels of individual learning ambidexterity are positively related to *IJP*. Along the asymmetry line ($Y = -X$), we also examined how unbalanced levels of *IETL* and *IERL* are related to *IJP*. *IJP* is low when *IETL* is higher than *IERL* and also when *IETL* is lower than *IERL*. This indicates that *IJP* is greater improved when *IETL* and *IERL* are in an ambidextrous condition than when *IETL* and *IERL* are not in an ambidextrous condition.

As a result, we find a significant and positive relationship between individual learning ambidexterity and individual job performance, thus confirming H1.

4.2 Testing the moderating effects

We tested separately the moderating effects for three constructs: decentralization, formalization, and structural differentiation. The research models were tested involving a three-step procedure. In Model 1, five variables were entered: two independent variables (*IETL* and *IERL*), two quadratic terms ($IETL^2$ and $IERL^2$) and one interaction term ($IETL \times IERL$) along with the control variables. In Model 2, the moderating variables (*DEC*, *FORM*, and *SDIF*, respectively), were added. In Model 3, three interaction terms were added.

Likewise, increases in R^2 values (generated by adding the moderating variable and the additional interaction terms) were assessed to test justification for using the polynomial regression equation. As seen in Tables 4, 5, and 6, the increase in R^2 in Model 2 is significant. Furthermore, R^2 in Model 3 significantly increases for decentralization, formalization, and structural differentiation.

4.2.1 Formalization

To test the moderating role of formalization, the following polynomial regression was used:

Table 4 Results of testing the moderating effect of *Formalization*

	Individual job performance					
	Model 1		Model 2		Model 3	
	Unstan- dardized β coefficients	<i>t</i> -value	Unstan- dardized β coefficients	<i>t</i> -value	Unstan- dardized β coefficients	<i>t</i> - value
Constant (b_0)	2.383***	3.475	2.119***	3.102	2.487***	3.717
(1) <i>Gender</i>	0.731***	3.964	0.739***	5.161	0.641***	4.521
(2) <i>Age</i>	-0.063	-0.752	-0.075	-0.812	-0.019	-0.174
(3) <i>Industry</i>	0.076	0.850	0.070	0.791	0.067	0.793
(4) <i>Educational level</i>	0.153*	1.883	0.128	1.588	0.116	1.463
(5) <i>Tenure</i>	0.064	0.811	0.082	0.812	0.052	0.719
(6) <i>Work schedule flexibility</i>	0.242**	1.735	0.247**	1.809	0.269**	1.912
Individual ex- ploitative learning behavior	0.259***	1.788	0.253***	3.145	0.354***	3.546
Individual explorative learning behavior	0.147*	3.140	0.119*	1.543	0.168*	1.745
Individual ex- ploitative learning behavior sq	0.050	1.575	0.380***	1.526	0.082*	2.182
Individual ex- ploitative learning behavior \times Individual explorative learning behavior	0.046	1.053	0.261***	0.752	0.347***	1.146
Individual explorative learning behavior sq	0.085**	2.873	0.195**	3.084	0.104**	2.317
Formalization			0.291***	2.922	1.125***	4.883
Individual exploit- ative learning behav- ior \times Formalization					0.245*	2.137
Individual explorative learning behav- ior \times Formalization					0.279*	2.493
Individual ex- ploitative learning behavior \times Individual explorative learning behavior \times Formal- ization					0.199**	1.831
Adjusted R^2			0.238		0.249	
ΔR^2			0.024		0.052	
ΔF			5.813***		6.553**	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; $N = 342$; R^2 indicates an increase in variance explained by adding the set of non-linear terms above the linear terms; Ordinary least squares regression coefficients were estimated using heteroscedasticity-consistent standard errors

Table 5 Results of testing the moderating effect of *Decentralization*

	Individual job performance					
	Model 1		Model 2		Model 3	
	Unstan- dardized β coefficients	<i>t</i> -value	Unstan- dardized β coefficients	<i>t</i> -value	Unstan- dardized β coefficients	<i>t</i> -val- ue
Constant (b_0)	2.121***	3.093	1.886***	2.761	2.213***	3.309
(1) <i>Gender</i>	0.650***	3.529	0.658***	4.593	0.570***	4.024
(2) <i>Age</i>	0.056	0.670	0.067	0.723	0.017	0.155
(3) <i>Industry</i>	0.068	0.756	0.062	0.704	0.060	0.706
(4) <i>Educational level</i>	0.136*	1.676	0.114	1.413	0.103	1.302
(5) <i>Tenure</i>	0.075	0.775	0.088	0.783	0.073	0.727
(6) <i>Work schedule flexibility</i>	0.295***	1.822	0.301***	1.809	0.307***	1.917
Individual ex- ploitative learning behavior	0.230***	1.591	0.225***	2.799	0.315***	3.156
Individual explorative learning behavior	0.130*	2.795	0.106*	1.373	0.150*	1.553
Individual ex- ploitative learning behavior sq	0.045	1.402	0.338***	1.358	0.073*	1.942
Individual ex- ploitative learning behavior \times Individual explorative learning behavior	0.041	0.937	0.232***	0.670	0.309***	1.020
Individual explorative learning behavior sq	0.075**	2.557	0.173**	2.745	0.092**	2.062
Decentralization			0.259***	2.601	1.001***	4.347
Individual exploit- ative learning behav- ior \times Decentralization					0.218*	1.902
Individual explorative learning behav- ior \times Decentralization					0.249*	2.219
Individual ex- ploitative learning behavior \times Individual explorative learning behavior \times Decentral- ization					0.177**	1.630
Adjusted R^2			0.235		0.244	
ΔR^2			0.021		0.047	
ΔF			5.174***		5.833**	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; $N = 342$; R^2 indicates an increase in variance explained by adding the set of non-linear terms above the linear terms; Ordinary least squares regression coefficients were estimated using heteroscedasticity-consistent standard errors

Table 6 Results of testing the moderating effect of *Structural differentiation*

	Individual job performance					
	Model 1		Model 2		Model 3	
	Unstan- dardized β coefficients	<i>t</i> -value	Unstan- dardized β coefficients	<i>t</i> -value	Unstan- dardized β coefficients	<i>t</i> - value
Constant (b_0)	2.006***	2.926	1.784***	2.612	2.094***	3.130
(1) <i>Gender</i>	0.615***	3.338	0.623***	4.345	0.540***	3.806
(2) <i>Age</i>	-0.053	-0.633	-0.063	-0.684	-0.016	-0.147
(3) <i>Industry</i>	0.064	0.715	0.059	0.666	0.057	0.668
(4) <i>Educational level</i>	0.129*	1.586	0.108	1.337	0.097	1.232
(5) <i>Tenure</i>	0.047	0.675	0.051	0.683	0.048	0.701
(6) <i>Work schedule flexibility</i>	0.134*	1.688	0.147*	1.712	0.152*	1.723
Individual exploitative learning behavior	0.218***	1.505	0.213***	2.648	0.298***	2.986
Individual explorative learning behavior	0.123	2.644	0.100*	1.299	0.141*	1.469
Individual exploitative learning behavior sq	0.042	1.326	0.320***	1.285	0.069*	1.837
Individual exploitative learning behavior \times Individual explorative learning behavior	0.039	0.886	0.220***	0.633	0.292***	0.965
Individual explorative learning behavior sq	0.071**	2.419	0.164**	2.596	0.087**	1.950
Structural differentiation			0.245***	2.460	0.947***	4.112
Individual exploitative learning behavior \times Structural differentiation					0.206*	1.799
Individual explorative learning behavior \times Structural differentiation					0.235*	2.099
Individual exploitative learning behavior \times Individual explorative learning behavior \times Structural differentiation					0.168**	1.541
Adjusted R^2			0.238		0.247	

Table 6 (continued)

	Individual job performance					
	Model 1		Model 2		Model 3	
	Unstan- dardized β coefficients	<i>t</i> -value	Unstan- dardized β coefficients	<i>t</i> -value	Unstan- dardized β coefficients	<i>t</i> - value
ΔR^2			0.020		0.044	
ΔF			4.895***		5.517**	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; $N = 342$; R^2 indicates an increase in variance explained by adding the set of non-linear terms above the linear terms; Ordinary least squares regression coefficients were estimated using heteroscedasticity-consistent standard errors

$$\begin{aligned}
 IJP = & b_0 + b_1 IETL + b_2 IERL + b_3 IETL^2 \\
 & + b_4 (IETL \times IERL) + b_5 IERL^2 + b_6 FORM \\
 & + b_7 (IETL \times FORM) + b_8 (IERL \times FORM) \\
 & + b_9 (IETL \times IERL \times FORM) + b_{10} GEN \\
 & + b_{11} AGE + b_{12} IND + b_{13} EDU + b_{14} TEN \\
 & + b_{14} WSF + e
 \end{aligned}$$

4.2.2 Decentralization

To test the moderating role of decentralization, the following polynomial regression was used:

$$\begin{aligned}
 IJP = & b_0 + b_1 IETL + b_2 IERL + b_3 IETL^2 \\
 & + b_4 (IETL \times IERL) + b_5 IERL^2 + b_6 DEC \\
 & + b_7 (IETL \times DEC) + b_8 (IERL \times DEC) \\
 & + b_9 (IETL \times IERL \times DEC) + b_{10} GEN \\
 & + b_{11} AGE + b_{12} IND + b_{13} EDU + b_{14} TEN \\
 & + b_{14} WSF + e
 \end{aligned}$$

4.2.3 Structural differentiation

To test the moderating role of structural differentiation, the following polynomial regression was used:

$$\begin{aligned}
 IJP = & b_0 + b_1 IETL + b_2 IERL + b_3 IETL^2 \\
 & + b_4 (IETL \times IERL) + b_5 IERL^2 + b_6 SDIF \\
 & + b_7 (IETL \times SDIF) + b_8 (IERL \times SDIF) \\
 & + b_9 (IETL \times IERL \times SDIF) + b_{10} GEN \\
 & + b_{11} AGE + b_{12} IND + b_{13} EDU \\
 & + b_{14} TEN + b_{14} WSF + e
 \end{aligned}$$

5 Discussion

Despite the importance of individual learning ambidexterity, we have a limited understanding of how employees' explorative and exploitative learning behaviors affect their individual job performance. The current paper fills this gap in the literature by demonstrating a positive and direct relationship between both individual learning ambidexterity behavior and individual job performance.

This study also demonstrates the moderating mechanism of organizational setting in the improvement of individual job performance in relation to individual learning ambidexterity. Taken as a whole, our findings add new insights into how and under which organizational conditions individual-level explorative and exploitative learning behaviors affect individual job performance.

In terms of *decentralization*, our findings show that individual learning behaviors may benefit from decentralization by providing more autonomy to individual employees and by allowing employees to make adjustments to resource allocation. In more decentralized firms, employees may have different levels of commitment to pursue individual learning ambidexterity. Decentralization generally supports the sharing of new ideas, favoring explorative learning when these ideas are divergent from the existing knowledge or favoring exploitative learning when they improve the existing knowledge. It gives individual employees the autonomy to track new opportunities and enables them to make efficient use of knowledge located inside and outside the firm. It also increases flexibility at all hierarchical levels, which allows employees to better capitalize on emerging opportunities to learn. On the contrary, centralization creates a non-participatory environment that reduces motivation, social interaction, and involvement with tasks, thereby impeding learning. Under increasingly dynamic and competitive pressure, however, individual employees in the services industry, and specifically IT, would need greater autonomy and self-regulation. Decentralization increases interpersonal exchanges and social interaction, reduces the cognitive workload of employees with more decision-making capacity, and provides opportunities for employees to learn from their colleagues. Improving the involvement of individual employees in decision-making can increase the production and application of new knowledge. This is achieved by increasing the diversity and quantity of ideas generated, which in turn increases the likelihood of these ideas being explored or exploited (Pertusa-Ortega et al. 2010). The self-empowerment of individual employees to pursue new opportunities and facilitate the efficient utilization of knowledge (Foss et al. 2015) is a notable effect. It improves individual employees' abilities to identify shifts in customer demand, technological progress, and market opportunities

(Wei et al. 2011) and enhances the efficiency of information dissemination (Hempel et al. 2012). Decentralization can enable employees to develop distinct behaviors that involve both exploration and exploitation. It also creates an organizational environment where employees are more motivated and engaged in individual learning that involves both exploration and exploitation.

Formalization affects both individual exploitative and explorative learning behaviors and individual job performance. The authors argue that it is not only the task of top management to foster learning and encourage learning ambidexterity, but also that of individual employees, who may play a more important role in developing the necessary mechanisms and procedures. Highly formalized firms make extensive use of written procedures and explicit rules, reducing the alternatives to developing creative solutions, diminishing individual employees' creativity and empowerment, as well as impeding the necessary spontaneity and flexibility for individual learning. However, in firms with low formalization, learning behaviors are relatively unstructured, and members have greater freedom in dealing with the demands of their relevant tasks. This means they are more willing to consider and discuss alternatives. The social interaction among organizational members is also more frequent and intensive when implementing tasks. A less formalized work process is therefore more likely to encourage social interactions among organizational members and stimulate their creativity and learning processes, thus improving individual learning.

Facilitating the process of formalization simplifies the ability of employees to establish and implement routines and practices that enhance their effectiveness and job performance. Additionally, it streamlines the utilization of newly acquired knowledge obtained through explorative learning. In addition, the process of formalization empowers employees to effectively address issues, demonstrate proactivity, and enhance their performance. This flexibility in adhering to established rules and protocols serves as a source of motivation for employees (Wouters and Wilderom 2008). Facilitating the process of formalization allows for the establishment of organizational routines and practices, thereby enhancing the effectiveness of utilizing new knowledge. By fostering formalization, a consistent framework is established for all employees to understand their duties within the organization, which in turn motivates them to seek out new learning opportunities (Wouters and Wilderom 2008). Enhancing flexibility and encouraging the use of informal habits within the company can facilitate learning and result in the effective generation and utilization of knowledge to meet job demands, leading to enhanced individual job performance. Formalization facilitates the activation of employees' knowledge and assists them in developing mental models of their activities. It also enables them to adapt procedures as needed to address individual work requirements (Johari and Yahya 2009).

In terms of *structural differentiation*, individual learning ambidexterity requires developing idiosyncratic mentalities among individual employees in diverse areas. Moreover, it helps individual employees to defuse conflicts that may otherwise arise from the heterogeneous demands associated with different learning modes. The integration of both individual exploitative and explorative learning behaviors has to be accomplished at the next higher hierarchical level, though. As a result, facilitating knowledge transfer between highly specialized subunits is a challenge for top management. Establishing knowledge bridges at multiple hierarchical firm levels and

using formal as well as informal integration mechanisms, including cross-functional teams or social integration, can relieve the pressure on the top level by acting as an intermediary between various highly specialized departments (Caniels and Veld 2019).

Specialization is likely to enhance employees' skills and capabilities in their daily tasks, as shown by Pertusa-Ortega et al. (2010). Structural differentiation is a valuable approach for managing the conflict between exploration and exploitation. It allows individual employees to have the necessary organizational freedom to engage in both activities (De Visser et al. 2010). Structural difference empowers organizational units by granting them autonomy and accountability for their activities. This fosters greater innovation and adaptability to meet specific demands, ultimately enhancing individual job performance. Structural differentiation, as proposed by Benner and Tushman (2003), can prevent conflicts that may arise due to the differing needs of distinct learning modalities.

5.1 Theoretical contributions

Focusing on the relationship between individual learning ambidexterity and individual job performance, our research contributes to the literature in several important ways.

First, this research highlights how employee explorative and exploitative learning behaviors explain individual job performance, confirming the hypothesized relationship between individual learning ambidexterity and individual job performance. By showcasing both explorative and exploitative behaviors, the findings shed light on how employees' ability to learn may improve their individual job performance, which helps to further validate the ambidexterity–performance relationship at the employee level (Jasmand et al. 2012). Even though there are conflicting views about whether individual employees typically pursue exploitation in their tasks (Lee and Meyer-Doyle 2017), our results demonstrate that both explorative and exploitative behaviors are positively associated with individual job performance. The findings confirm other studies suggesting that employee performance may be explained by their explorative and exploitative behaviors over time (Mom et al. 2015a, b). Our findings suggest that employees should be encouraged to focus and seek high levels of both explorative and exploitative learning behaviors in accomplishing their tasks to improve their individual performance.

Second, our study broadens the research by confirming the relevance of individual ambidexterity for individual performance, and complements those other studies focusing on managerial performance (Mom et al. 2015a, b) and individual job performance (Jasmand et al. 2012; Good and Michel 2013). By encouraging individual learning ambidexterity, firms place themselves in a better position to improve their overall performance based on the improvement of their employees' individual job performance.

Third, our study goes beyond looking at ambidexterity and performance at the organizational level; it looks at it at the individual level. It does this by showing how employees' explorative and exploitative behaviors directly affect their job performance. This is important because individual employees must cope with significant

challenges to be competent in both learning behaviors due to the distinct knowledge and skills associated with each (Gupta et al. 2006). This challenge is exacerbated by individual employees' ambidexterity behavior. Specifically, prior research has argued that at the organizational level, it is difficult to pursue both exploration and exploitation given the different capabilities needed (Kammerlander et al. 2015), while at the individual level, employees switch between these two activities much more often (Schnellbacher et al. 2019).

Fourth, our study shows how exploratory and exploitative behaviors at the individual level affect performance in a synergistic way. This was achieved by thinking of individual learning ambidexterity as the ability to switch between explorative and exploitative learning behaviors in a combinative way. Employees focusing on explorative learning may have better opportunities to improve individual job performance in the long term by increasing the effectiveness of generating new knowledge and skills. However, they should also engage in exploitative learning to optimize the use of their existing knowledge and skills, thereby ensuring better individual job performance by supporting the development of routine-based skills in their tasks.

Moreover, we argue that polynomial regression is a viable research solution to explore ambidexterity; in this case, individual learning ambidexterity. We found polynomial regression to be more appropriate than other methods such as the difference, sum, or product scores for analyzing individual ambidexterity.

Finally, learning processes are often studied in companies operating in manufacturing industries (Kim et al. 2018). Our study examines ambidexterity in the IT services industry, which is typically understudied.

On the moderating effects of organizational structure on the relationship between individual learning ambidexterity and individual job performance, our research contributes to the literature in several important ways.

First, it extends social cognitive theory to ambidexterity research by demonstrating that organizational structure moderates the relationship between individual learning and individual job performance.

Second, our findings extend other studies' findings (Kauppila et al. 2016; Kauppila et al. 2018) by examining how micro-level processes (in our case, individual learning and individual performance) are influenced by organizational factors.

Third, by proving that formalization, decentralization, and structural differentiation moderate the effects of individual learning ambidexterity on individual job performance, it reconsiders the importance of organizational structure in increasing individual job performance.

Finally, regarding the organizational measures that can help individuals balance exploration and exploitation, our study suggests that a bottom-up approach can support individual learning and ambidextrous behavior.

5.2 Managerial implications

Our study suggests that a bottom-up approach is beneficial for individual learning ambidexterity. In addition to managers, individual employees could work with their peers to help them understand the duality of behaviors that facilitate individual job

performance. Enhancing employees' knowledge and skills regarding exploration and exploitation should improve their individual job performance.

Second, firms could explain their employees the importance of ambidexterity and learning and reinforce those behaviors meant to encourage employees' engagement in high levels of explorative and exploitative learning. As a result, firms should seek to create an organizational setting and conditions in which employees' ambidextrous learning behaviors are encouraged.

Third, while employees are most likely to focus on exploitative learning behavior due to its stronger association with improved job performance, managers should be aware that explorative learning may increase employees' willingness toward exploitation as a way to perform better in their tasks. It is the managers' responsibility to help employees be more engaged in ambidextrous behaviors, enabling them to be more effective regardless of changes in the internal or external environment or in the nature of their tasks.

Finally, formalization, decentralization, and structural differentiation can represent a solution, given that rigid, mechanistic organizational structures may hinder individual learning (Reitzig 2022). The configuration of organizational structure impedes or facilitates the capacity of individual employees to learn, to innovate, or to improve their ability to generate added value for their customers. Structure is a dynamic factor because it can change over time as a consequence of new organizational conditions or can be modified so that staff gain access to and acquire new and varied knowledge that can help in overcoming certain problems. Thus, organizational structure is not an organizational uniform condition: different components of a firm may face differing environmental pressures and may need to respond by developing distinct practices that influence the individual behaviors of the employees.

5.3 Limitations and future research

Going forward, several limitations of this study should be considered for future improvement. First, this study does not address other variables, such as personality, to clarify the formation of individual job performance. A second limitation is that our analysis was based on self-reported data, which may inflate correlations because of the common method variance. Still, common method variance is of lesser concern in polynomial regression analyses (Siemsen et al. 2010). Third, because the study is not longitudinal, the long-term effects of the direct relationship between individual learning ambidexterity and individual job performance and the moderating effects of organizational structure are not assessed. Longitudinal data can provide new insights into how employees' learning behaviors evolve over time and whether any patterns emerge, particularly in relation to the financial incentives they receive or the strategic approach of the company. Fourth, our study is based on a convenience sample consisting of medium- and large-sized firms operating in the IT services industry, which may reduce the generalizability of the results. The effect of ambidexterity on performance is generally greater in this industry compared to other industries. One reason for this general notion is that it is rather volatile and several studies found that higher market uncertainty positively moderates the performance effects of ambidexterity (Junni et al. 2013; Kafetzopoulos 2021). Finally, the generalizability of our find-

ings is limited to IT services firms in Romania. While these findings are likely to be valid for firms operating in other industries and other cultural settings, future research should investigate different empirical contexts, such as manufacturing industries or alternative geographic locations.

This study offers several avenues for future research. Future studies could investigate explorative and exploitative learning behaviors that are not complementary but rather incompatible. In this vein, the issue of tension and balancing them both at the individual level may be of interest. Then, the various conceptualizations of ambidexterity (sequential, structural, or contextual) should be investigated at the individual level. This research is restricted to the effects of individual learning ambidexterity on a single construct of performance: individual job performance. An interesting avenue could be to examine how employees' learning behaviors change over time and if there are any patterns, particularly considering the financial incentives the employees receive or the company's strategic approach. Future research may study such dynamic effects on individual learning ambidexterity in more detail by exploring how changes over time in explorative and exploitative behaviors are related to changes in individual job performance. Finally, our sampling approach allowed us to derive interesting results, which led to a broad general perspective on the faced research questions. The inclusion of a larger number of companies and the reduction of the heterogeneity level of the sample is a task that deserves a devoted study, with a scope more focused on homogeneously sized companies.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s11846-024-00819-0>.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Adler P, Borys B (1996) Two types of bureaucracy: enabling and coercive. *Adm Sci Q* 41(1):61–89
- Adler PS, Goldoftas B, Levine D (1999) Flexibility versus efficiency? A case study of model changeovers in the Toyota production system. *Organ Sci* 10:43–68
- Affum-Osei E, Asante E, Forkouh S, Abdul-Nasiru I (2020) Career adaptability and ambidextrous behavior among customer-service representatives: the role of perceived organizational support. *J Person Sell Sales Manag* 40(1):4–18
- Akbar H, Anas M (2023) Talent management and employee ambidexterity: the moderating role of learning organization. *Learn Organ* 31(4):484–507
- Andersen J, Jonsson P (2006) Does organization structure matter? On the relationship between structure, functioning and effectiveness. *Int J Innov Technol Manag* 3(2):237–263
- Andriopoulos C, Lewis M (2009) Exploitation-exploration tensions and organizational ambidexterity: managing paradoxes of innovation. *Organ Sci* 20(4):696–717

- Awojide O, Hodgkinson I, Ravishankar M (2018) Managerial ambidexterity and the cultural toolkit in project delivery. *Int J Project Manag* 36(8):1019–1033
- Benner M, Tushman M (2003) Exploitation, exploration, and process management: the productivity dilemma revisited. *Acad Manag Rev* 28(2):238–256
- Birkinshaw J, Gibson C (2004) Building ambidexterity into an organization. *MIT Sloan Manag Rev* 45(4):47–55
- Birkinshaw J, Gupta K (2013) Clarifying the distinctive contribution of ambidexterity to the field of organization studies. *Acad Manag Perspect* 27(4):287–298
- Bledow R, Frese M, Anderson N, Erez M, Farr J (2009) A dialectic perspective on innovation: conflicting demands, multiple pathways, and ambidexterity. *Ind Organ Psychol* 2(3):305–337
- Burgers J, Covin J (2016) The contingent effects of differentiation and integration on corporate entrepreneurship. *Strateg Manag J* 37:521–540
- Burgers J, Jansen J, Van den Bosch F, Volberda H (2009) Structural differentiation and corporate venturing: the moderating role of formal and informal integration mechanisms. *J Bus Ventur* 24(3):206–220
- Caniels M, Veld M (2019) Employee ambidexterity, high performance work systems and innovative work behaviors: how much balance do we need? *Int J Hum Resour Manag* 30(4):565–585
- Carroll T (2012) Designing organizations for exploration and exploitation. *J Organ Des* 1(2):64–68
- Ceptureanu S, Ceptureanu E (2021) Innovation ambidexterity effects on product innovation performance. The mediating role of decentralization. *Kybernetes* 52(5):1698–1719
- Ceptureanu S, Ceptureanu E, Cerqueti R (2022) Innovation ambidexterity and impact on the performance in IT companies: the moderating role of business experience. *Technol Anal Strateg Manag* 34(7):746–759
- Ceptureanu S, Ceptureanu E (2023) Learning ambidexterity and innovation in creative industries. The role of enabling formalization. *Technology Analysis & Strategic Management*, early access
- Ceptureanu S, Ceptureanu E (2024) Organizational learning ambidexterity and process innovation performance. The moderating role of knowledge management capability. *Knowl Manag Res Pract* 1–21
- Chen C, Lin B, Lin J, Hsiao Y (2018) Learning-from-parents: exploitative knowledge acquisition and the innovation performance of joint venture. *J Technol Transf* 45:1–31
- Cho M, Bonn M, Han S (2020) Innovation ambidexterity: balancing exploitation and exploration for startup and established restaurants and impacts upon performance. *Ind Innov* 27(4):340–362
- Clauss T, Kraus S, Kallinger F, Bican P, Brem A, Kailer N (2021) Organizational ambidexterity and competitive advantage: The role of strategic agility in the exploration-exploitation paradox. *J Innov Knowl* 6(4):203–213
- Csaszar F (2013) An efficient frontier in organization design: organizational structure as a determinant of exploration and exploitation. *Organ Sci* 24(4):1083–1101
- Cui V, Ding W, Yanadori Y (2019) Exploration versus exploitation in technology firms: the role of compensation structure for R&D workforce. *Res Policy* 48(6):1534–1549
- Dawson J (2014) Moderation in management research: what, why, when, and how. *J Bus Psychol* 29(1):1–19
- De Visser M, Faems D (2015) Exploration and exploitation within firms: the impact of CEOs' cognitive style on incremental and radical innovation performance. *Creativ Innov Manag* 24(3):359–372
- De Visser M, de Weerd-Nederhof P, Faems D, Song M, Van Looy B, Visscher K (2010) Structural ambidexterity in NPD processes: a firm-level assessment of the impact of differentiated structures on innovation performance. *Technovation* 30:291–299
- Diaz-Fernandez M, Pasamar-Reyes S, Valle-Cabrera R (2017) Human capital and human resource management to achieve ambidextrous learning: a structural perspective. *Bus Res Q* 20(1):63–77
- Edwards J (2008) Person–environment fit in organizations: an assessment of theoretical progress. *Acad Manag Ann* 2(1):167–230
- Eissa G, Chinchanchokchai S, Wyland R (2017) The influence of supervisor undermining on self-esteem, creativity, and overall individual job performance: a multiple mediation model. *Organ Manag J* 14(4):185–197
- Ejaz H, Shafique I, Qammar A (2024) The role of team cohesion and ambidexterity in enhancing employee adaptive performance: an examination of a multilevel model. *J Organ Change Manag* 37(5):1082–1101
- Enkel E, Heil S, Hengstler M, Wirth H (2017) Explorative and exploitative innovation: to what extent do the dimensions of individual level absorptive capacity contribute? *Technovation* 60–61:29–38
- Faia V, Vieira V (2017) Generating sales while providing service. The moderating effect of the control system on ambidextrous behaviour. *Int J Bank Market* 35(3):447–471

- Fainshmidt S, Pezeshkan A, Frazier M, Nair A, Markowski E (2016) Dynamic capabilities and organizational performance: a meta-analytic evaluation and extension. *J Manag Stud* 53(8):1348–1380
- Filippini R, Güttel W, Nosella A (2012) Ambidexterity and the evolution of knowledge management initiatives. *J Bus Res* 65(3):317–324
- Floyd S, Lane P (2000) Strategizing throughout the organization: Managing role conflict in strategic renewal. *Acad Manag Rev* 25(1):154–177
- Fornell C, Larcker D (1981) Evaluating structural equation models with unobserved variables and measurement errors. *J Mark Res* 18:39–50
- Foss N, Lyngsie J, Zahra S (2015) Organizational design correlates of entrepreneurship: the roles of decentralization and formalization for opportunity discovery and realization. *Strateg Organ* 13(1):32–60
- Fujii M (2024) Do sales control systems affect service–sales ambidexterity and salesperson performance? A job demands–resources perspective. *J Retail Consum Serv* 77:103640
- Gebert D, Boerner S, Kearney E (2010) Fostering team innovation: why is it important to combine opposing action strategies? *Organ Sci* 21(3):593–608
- Gibson C, Birkinshaw J (2004) The antecedents, consequences, and mediating role of organizational ambidexterity. *Acad Manag J* 47(2):209–226
- Gilbert C (2005) Unbundling the structure of inertia: resource versus routine rigidity. *Acad Manag J* 48(5):741–763
- Gioia D, Schultz M, Corley K (2000) Organizational identity, image, and adaptive instability. *Acad Manag Rev* 25(1):63–81
- Gioia D, Price K, Hamilton A, Thomas J (2010) Forging an Identity: an insider-outsider study of processes involved in the formation of organizational identity. *Adm Sci Q* 55(1):1–46
- Golden T, Veiga J (2018) Self-estrangement's toll on job performance: the pivotal role of social exchange relationships with coworkers. *J Manag* 44(4):1573–1597
- Gong Y, Zhou J, Chang S (2013) Core knowledge employee creativity and firm performance: the moderating role of riskiness orientation, firm size, and realized absorptive capacity. *Pers Psychol* 66(2):443–482
- Good D, Michel E (2013) Individual ambidexterity: exploring and exploiting in dynamic contexts. *J Psychol* 147(5):435–453
- Gupta A, Smith K, Shalley C (2006) The interplay between exploration and exploitation. *Acad Manag J* 49(4):693–706
- Gurtner S, Reinhardt R (2016) Ambidextrous idea generation-antecedents and outcomes. *J Prod Innov Manag* 33(S1):34–54
- Güttel W, Konlechner S, Trede J (2015) Standardized individuality versus individualized standardization: the role of the context in structurally ambidextrous organizations. *RMS* 9(2):261–284
- Hair J, Black W, Babin B, Anderson R (2014) *Multivariate data analysis*, 7th edn. Pearson New International Edition
- Hanu C, Amegbe H, Yawson M, Mensah P (2022) Differential impact of work-based learning on employee agility, ambidexterity and proactive goal generation. *J Work Learn* 35(1):92–111
- Hao Q, Kasper H, Muehlbacher J (2012) How does organizational structure influence performance through learning and innovation in Austria and China. *Chin Manag Stud* 6(1):36–52
- Havermans L, Den Hartog D, Keegan A, Uhl-Bien M (2015) Exploring the role of leadership in enabling contextual ambidexterity. *Hum Resour Manag* 54(S1):179–200
- Hempel P, Zhang Z, Han Y (2012) Team empowerment and the organizational context: decentralization and the contrasting effects of formalization. *J Manag* 38(2):475–501
- Hirst G, van Knippenberg D, Zhou Q, Zhu C, Tsai P (2018) Exploitation and exploration climates' influence on performance and creativity: diminishing returns as function of self-efficacy. *J Manag* 44(3):870–891
- Jansen J, Van Den Bosch F, Volberda H (2006) Exploratory innovation, exploitative innovation, and performance: effects of organizational antecedents and environmental moderators. *Manag Sci* 52(11):1661–1674
- Jansen J, Tempelaar M, Van den Bosch F, Volberda H (2009) Structural differentiation and ambidexterity: the mediating role of integration mechanisms. *Organ Sci* 20(4):797–811
- Jansen J, Simsek Z, Cao Q (2012) Ambidexterity and performance in multiunit contexts: cross-level moderating effects of structural and resource attributes. *Strateg Manag J* 33(11):1286–1303
- Jasmand C, Blazevic V, de Ruyter K (2012) Generating sales while providing service: a study of customer service representatives' ambidextrous behavior. *J Mark* 76(1):20–37

- Johari J, Yahya K (2009) Linking organizational structure, job characteristics, and individual job performance constructs: a proposed framework. *Int J Bus Manag* 4(3):145–152
- Joseph J, Firmin S, Oseni T, Stranieri A (2023) Decoding Employee ambidexterity: understanding drivers, constraints, and performance implications for thriving in the evolving work landscapes—a scoping review. *Helyion* 9(12):e22493
- Junni P, Sarala R, Taras V, Tarba S (2013) Organizational ambidexterity and performance: a meta-analysis. *Acad Manag Perspect* 27(4):299–312
- Kafetzopoulos D (2021) Organizational ambidexterity: antecedents, performance and environmental uncertainty. *Bus Process Manag J* 27(3):922–940
- Kammerlander N, Burger D, Fust A, Fueglistaller U (2015) Exploration and exploitation in established small and medium-sized enterprises: the effect of CEOs 'regulatory focus. *J Bus Ventur* 30(4):582–602
- Kauppila O, Tempelaar M (2016) The social-cognitive underpinnings of employees' ambidextrous behavior and the supportive role of group managers' leadership. *J Manag Stud* 53(6):1019–1044
- Kauppila O, Bizzi L, Obstfeld D (2018) Connecting and creating: Tertius iungens, individual creativity, and strategic decision processes. *Strateg Manag J* 39(3):697–719
- Keller T, Weibler J (2015) What it takes and costs to be an ambidextrous manager: linking leadership and cognitive strain to balancing exploration and exploitation. *J Leadership Organ Stud* 22(1):54–71
- Kim M, Park J, Paik J (2018) Factors influencing learning of small and medium-sized enterprises in Korean manufacturing sector: facilitators, barriers and moderators. *Int J Technol Manag* 76(3/4):214–235
- Koch I, Schuch S, Philipp A, Gade M (2010) The role of inhibition in task switching: a review. *Psychon Bull Rev* 17:1–14
- Kostopoulos K, Bozionelos N (2011) Team explorative and exploitative learning: psychological safety, task conflict, and team performance. *Group Org Manag* 36(3):385–415
- Lam S, DeCarlo T, Sharma A (2019) Salesperson ambidexterity in customer engagement: do customer base characteristics matter? *J Acad Mark Sci* 47:659–680
- Lampert C, Kim M (2018) Going far to go further: offshoring, exploration and R&D performance. *J Bus Res* 103:376–386
- Larsen M, Manning S, Pedersen T (2018) The ambivalent effect of complexity on firm performance: a study of the global service provider industry. *Long Range Plan* 52:221–235
- Laureiro-Martínez D, Brusoni S, Canessa N, Zollo M (2015) Understanding the exploration–exploitation dilemma: an fMRI study of attention control and decision-making performance. *Strateg Manag J* 36(3):31–338
- Lee K, Kim Y (2021) Ambidexterity for my job or firm? Investigation of the impacts of psychological ownership on exploitation, exploration, and ambidexterity. *Eur Manag Rev* 18(2):141–156
- Lee S, Meyer-Doyle P (2017) How performance incentives shape individual exploration and exploitation: evidence from microdata. *Organ Sci* 28(1):19–39
- Lee K, Tseng Y (2024) Driving the dual learning process of management knowledge: a social cognitive theory perspective. *Int J Manag Educ* 22:100940
- Lee J, Seo Y, Jeung W, Kim J (2019) How ambidextrous organizational culture affects individual job performance: a multilevel study of the mediating effect of psychological capital. *J Manag Organ* 25(6):860–875
- Lin C, Cheung Y (2023) Developing learning ambidexterity and individual job performance: training and educational implications across the cultural divide. *RMS* 17:1595–1614
- Lin S, Si S (2019) The influence of exploration and exploitation on born globals' speed of internationalization. *Manag Decis* 57(1):193–210
- Luger J, Raisch S, Schimmer M (2018) Dynamic balancing of exploration and exploitation: the contingent benefits of ambidexterity. *Organ Sci* 29(3):449–470
- Luu T, Rowley C, Dinh K (2018) Enhancing the effect of frontline public employees' individual ambidexterity on customer value co-creation. *J Bus Ind Market* 33(4):506–522
- March J (1991) Exploration and exploitation in organizational learning. *Organ Sci* 2(1):71–87
- Martínez-León M, Martínez-García J (2011) The influence of organizational structure on organizational learning. *Int J Manpow* 32(5/6):537–566
- Matthews R, MacCarthy B, Braziotis C (2017) Organizational learning in SMEs: a process improvement perspective. *Int J Oper Prod Manag* 37(7):970–1006
- McClure C, DeCarlo T, Hansen J (2024) The dark side of salesperson ambidexterity: how salesperson ambidexterity increases felt stress. *Ind Mark Manag* 122:78–88
- Mihalache O, Jansen J, Van den Bosch F, Volberda H (2014) Top management team shared leadership and organizational ambidexterity: a moderated mediation framework. *Strateg Entrep J* 8(2):128–148

- Mom T, Van Den Bosch F, Volberda H (2007) Investigating managers' exploration and exploitation activities: the influence of top-down, bottom-up, and horizontal knowledge inflows. *J Manag Stud* 44(6):910–931
- Mom T, Van Den Bosch F, Volberda H (2009) Understanding variation in managers' ambidexterity: investigating direct and interaction effects of formal structural and personal coordination mechanisms. *Organ Sci* 20(4):812–828
- Mom T, Fourné S, Jansen J (2015a) Managers' work experience, ambidexterity, and performance: the contingency role of the work context. *Human Resour Manag* 54:133–153
- Mom T, Fourné S, Jansen J (2015b) Managers' work experience, ambidexterity, and performance: the contingency role of the work context. *Hum Resour Manag* 54(S1):s133–s153
- Mom T, Chang Y, Cholakova M, Jansen J (2019) A multilevel integrated framework of firm HR practices, individual ambidexterity, and organizational ambidexterity. *J Manag* 45(7):3009–3034
- Montgomery D (2005) *Design and analysis of experiments: response surface method and designs*. Wiley, New Jersey
- Moreno M, Lloria M (2008) The role of non-structural and informal mechanisms of integration and coordination as forces in knowledge creation. *Br J Manag* 19(3):250–276
- Morland K, Breslin D, Stevenson F (2019) Development of a multi-level learning framework. *Learn Organ* 26(1):78–96
- Oh S, Kim S (2022) Effects of inter- and intra-organizational learning activities on SME innovation: the moderating role of environmental dynamism. *J Knowl Manag* 26(5):1187–1206
- Ossenbrink J, Hoppmann J, Hofmann V (2019) Hybrid ambidexterity: how the environment shapes incumbents' use of structural and contextual approaches. *Organ Sci* 30(6):1319–1348
- Papachroni A, Heracleous L (2020) Ambidexterity as practice: individual ambidexterity through paradoxical practices. *J Appl Behav Sci* 56(2):143–165
- Perkins G (2018) How does self-direction within learning operate to affect idea generation in small medium enterprise contexts? *Hum Resour Dev Q* 29(4):307–328
- Pertusa-Ortega E, Molina-Azorin J (2018) A joint analysis of determinants and performance consequences of innovation ambidexterity. *Bus Res Q* 21(2):84–98
- Pertusa-Ortega E, Zaragoza-Sáez P, Claver-Cortés E (2010) Can formalization, complexity, and centralization influence knowledge performance? *J Bus Res* 63(3):310–320
- Pertusa-Ortega E, Molina-Azorin J, Tari J, Pereira-Moliner J, López-Gamero M (2021) The microfoundations of organizational ambidexterity: a systematic review of individual ambidexterity through a multilevel framework. *BRQ Bus Res Q* 24(4):355–371
- Podsakoff P, MacKenzie S, Lee J, Podsakoff N (2003) Common method bias in behavioral research: a critical review of the literature and recommended remedies. *J Appl Psychol* 88:879–903
- Prieto I, Santana M (2012) Building ambidexterity: The role of human resource practices in the performance of firms from Spain. *Hum Resour Manage* 51(2):189–211
- Reitzig M (2022) How to get better at flatter designs: considerations for shaping and leading organizations with less hierarchy. *J Organ Des* 11:5–10
- Rhoades SL, Baran B, Gentry W, Pattison S (2010) Polynomial regression with response surface analysis: a powerful approach for examining moderation and overcoming limitations of difference scores. *J Bus Psychol* 25:543–554
- Rojas-Córdova C, Williamson A, Pertuze J, Calvo G (2023) Why one strategy does not fit all: a systematic review on exploration–exploitation in different organizational archetypes. *RMS* 17:2251–2295
- Rosing K, Zacher H (2017) Individual ambidexterity: the duality of exploration and exploitation and its relationship with innovative performance. *Eur J Work Organ Psy* 26(5):694–709
- Rosing K, Frese M, Bausch A (2011) Explaining the heterogeneity of the leadership-innovation relationship: ambidextrous leadership. *Leadersh Quart* 22(5):956–974
- Saleh R, Durugbo C, Almahamid S (2023) What makes innovation ambidexterity manageable: a systematic review, multi-level model and future challenges. *RMS* 17:3013–3056
- Schnellbacher B, Heidenreich S (2020) The role of individual ambidexterity for organizational performance: examining effects of ambidextrous knowledge seeking and offering. *J Technol Transf* 45:1535–1561
- Schnellbacher B, Heidenreich S, Wald A (2019) Antecedents and effects of individual ambidexterity: a cross-level investigation of exploration and exploitation activities at the employee level. *Eur Manag J* 37(4):442–454
- Schulz M (2001) The uncertain relevance of newness: organizational learning and knowledge flows. *Acad Manag J* 44(4):661–681

- Siemens E, Roth A, Oliveira P (2010) Common method bias in regression models with linear, quadratic, and interaction effects. *Organ Res Methods* 13(3):456–476
- Simsek Z, Heavey C, Veiga J, Souder D (2009) A typology for aligning organizational ambidexterity's conceptualizations, antecedents, and outcomes. *J Manag Stud* 46(5):864–894
- Soane E, Bailey C, Alfes K, Shantz A (2012) Development and application of a new measure of employee engagement: the ISA engagement scale. *Hum Resour Dev Int* 15(5):529–547
- Sok K, Sok P, De Luca L (2016) The effect of can do” and reason to do” motivations on service-sales ambidexterity. *Ind Mark Manag* 55:144–155
- Soto P, Popa S, Martinez I (2018) Information technology, knowledge management and environmental dynamism as drivers of innovation ambidexterity: a study in SMEs. *J Knowl Manag* 22(4):824–849
- Stryker S, Burke P (2000) The Past, present, and future of an identity theory. *Social Psychol Quart* 63(4):284–297
- Tempelaar M, Rosenkranz N (2019) Switching hats: the effect of role transition on individual ambidexterity. *J Manag* 45(4):1517–1539
- Tian H, Dogbe C, Pomegbe W, Sarsah S, Otoo C (2021) Organizational learning ambidexterity and openness, as determinants of SMEs' innovation performance. *Eur J Innov Manag* 24(2):414–438
- Tuncdogan A, Van Den Bosch F, Volberda H (2015) Regulatory focus as a psychological micro-foundation of leaders' exploration and exploitation activities. *Leadersh Q* 26(5):838–850
- Ubeda-Garcia M, Claver-Cortes E, Marco-Lajara B, Zaragoza Saez P, Garcia-Lillo F (2018) High performance work system and performance: opening the black box through the organizational ambidexterity and human resource flexibility. *J Bus Res* 88:397–406
- Ubeda-Garcia M, Claver-Cortes E, Marco-Lajara B, Zaragoza-Saez P (2020) Toward a dynamic construction of organizational ambidexterity: exploring the synergies between structural differentiation, organizational context, and interorganizational relations. *J Bus Res* 112:363–372
- Van Woerkom M, Meyers M (2015) My strengths count! Effects of a strengths based psychological climate on positive affect and job performance. *Hum Resour Manag* 54(1):81–103
- Victor R (2020) Connectivity knowledge and the degree of structural formalization: a contribution to a contingency theory of organizational capability. *J Organ Des* 9(1):1–22
- Vlaar P, Van den Bosch F, Volberda H (2006) Coping with problems of understanding in interorganizational relationships: using formalization as a means to make sense. *Organ Stud* 27(11):1617–1638
- Wei Z, Yi Y, Yuan C (2011) Bottom-up learning, organizational formalization, and ambidextrous innovation. *J Organ Chang Manag* 24(3):314–329
- Weigel C, Derfuss K, Hiebl M (2022) Financial managers and organizational ambidexterity in the German Mittelstand: the moderating role of strategy involvement. *RMS* 17:569–605
- Wouters M, Wilderom C (2008) Developing performance-measurement systems as enabling formalization: a longitudinal field study of a logistics department. *Acc Organ Soc* 33(4):488–516
- Yamakawa Y, Yang H, Lin Z (2011) Exploration versus exploitation in alliance portfolio: performance implications of organizational, strategic, and environmental fit. *Res Policy* 40(2):287–296
- Zacher H, Robinson A, Rosing K (2016) Ambidextrous leadership and employees' self-reported innovative performance: the role of exploration and exploitation behaviors. *J Creat Behav* 50(1):24–46
- Zhan W, Chen R (2013) Dynamic capability and IJV performance: the effect of exploitation and exploration capabilities. *Asia Pac J Manag* 30(2):601–632
- Zhang J, Chen G, O'Kane C, Xiang S, Wang J (2022) How employee exploration and exploitation affect individual job performance: the influence of organizational competitive orientation. *Int J Hum Resour Manag* 33(5):930–964

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Authors and Affiliations

Sebastian Ion Ceptureanu¹  · Giovanna Ferraro²  · Eduard Gabriel Ceptureanu¹  · Bogdan Georgescu³ 

✉ Sebastian Ion Ceptureanu

sebastian.ceptureanu@man.ase.ro

Giovanna Ferraro
giovanna.ferraro@uniroma2.it

Eduard Gabriel Ceptureanu
eduard.ceptureanu@man.ase.ro

Bogdan Georgescu
bogdan.georgescu@mk.ase.ro

- ¹ Department of Management, Bucharest University of Economic Studies, Bucharest, Romania
- ² Department of Enterprise Engineering, University of Rome Tor Vergata, Rome, Italy
- ³ Department of Marketing, Bucharest University of Economic Studies, Bucharest, Romania