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Working the system—An empirical analysis of the relationship between systems thinking, paradoxical cognition, and sustainability practices

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Abstract

Sustainability is an inherently complex problem. Often, a reductionist mindset underpins corporate sustainability practices. Understanding the collective impact of systems thinking and paradoxical cognition on sustainability practices could foster new cognitive strategies for sustainability efforts. Informed by stakeholder theory, this study investigates the impacts of systems thinking and paradoxical cognition on sustainability practices in small and medium-sized enterprises (SMEs). Primary data was collected through a survey of SME managers in the United Arab Emirates ($n = 554$), and the hypothesized model was analyzed using structural equation modelling. The findings imply that systems thinking, paradoxical thinking, and the ability to recognize paradoxical tensions positively influenced sustainability practices. The study's findings offer novel insights advocating for the integration of cognitive frameworks and sustainability practices in the context SMEs, highlighting the need for a shift from traditional linear management approaches to more adaptive and integrative strategies.

KEYWORDS

complexity, corporate sustainability, dynamic systems, interconnectivity, paradoxical tensions, wicked problems

1 | INTRODUCTION

Institutional and societal forces have increased the pressure on organizations to adopt sustainability practices (Sabini & Alderman, 2021). The practice of sustainability requires understanding the desired economic outcomes while considering social and ecological objectives to meet short-term goals without systematically impairing the ability to meet future needs (Missimer et al., 2017). The social, economic, and environmental aims are often approached in isolation. However, the interconnectedness of these dimensions within the system may adversely affect one another (Bansal, 2002) and present trade-offs (Sabini & Alderman, 2021; Tyrrell et al., 2013). The root cause of the sustainability issue stems from complex imbalances among economic, environmental, and social systems, perpetually creating complex dilemmas for decision-makers. Sustainability issues are rooted in cognitive processes and mental models (Davelaar, 2021). The pursuit of sustainable objectives requires an innovative way of thinking and managing (Sabini & Alderman, 2021). With these considerations in mind, this paper focusses on two issues associated with sustainability and cognitive models that deviate from conventional mental frames. First, traversing the complexities of a dynamic system warrants a holistic mindset. Second, managing the paradoxes within the system requires an approach that diverges from traditional management philosophies.

The literature proposes that systems thinking is a cognitive frame needed to support the development of sustainability management

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(Haney et al., 2020; Suriyankietkaew et al., 2022). Prior studies suggested a constructive connection between systems thinking and the sustainable development goals (Erzurumlu et al., 2023), wicked problems (Grewatsch et al., 2021), the transition to net zero (Madden, 2022), and addressing water security (Polaine et al., 2022). Thus, systems thinking in the context of sustainability are not a novel concept. Yet, it still poses challenges to scholars and management practitioners. Systems thinking question the assumptions underpinning strategy research, such as limitless growth and infinite resources. It challenges the notion that an investigation of a system's component is sufficient to understand the whole system. Consequently, it has been met with resistance in the strategy literature (Grewatsch et al., 2021). Starik and Kanashiro (2013) argued that current research often overlooks the fact that human activity is fundamentally part of the natural and social environment and that this permeates throughout all aspects of the organization. Short-term and myopic decision-making are pervasive, and sustainability is often not managed effectively. Furthermore, a lack of systems thinking has been identified as a contributor to poor corporate sustainability performances (Aghelie, 2017; Barkemeyer et al., 2014). Researchers have advocated for contributions to the sustainability management literature that provide more in-depth examinations into integration of dynamic, interconnected socio-ecological systems (Fischer et al., 2018; Suriyankietkaew et al., 2022; Winn & Pogutz, 2013).

A complication associated with systems is the notion of paradoxes. The process of navigating sustainability tensions and contradictions is determined by mental models. Perhaps the most obvious source of tension is posed by the relationship between financial considerations and socio-ecological choices. For example, the growth paradox centers around the prosperity fueled by economic advancement at the cost of finite natural resources (Edwards, 2021). Often, the alleviation of sustainability tensions is driven by an economic imperative (Sabini & Alderman, 2021; Zehendner et al., 2021), implying a hierarchical structure. Managing such tensions with greater cohesion calls for innovative strategies that aim to integrate environmental strategic objectives (Russo Spena & Di Paola, 2020). Innovation (Ingram et al., 2014; Miron-Spektor & Paletz, 2020; Tykkyläinen & Ritala, 2021) and creativity (Calic et al., 2019; Scuttari et al., 2021) viewed through a paradox lens have subsequently received attention from scholars. The notion of tensions in sustainability has also been acknowledged by researchers (Daddi et al., 2019; Moncef & Monnet Dupuy, 2021; Sabini & Alderman, 2021; Zehendner et al., 2021). However, the existing management literature may not be fully equipped to explain the complexity that paradoxical agendas pose (Smith & Lewis, 2011). Sabini and Alderman (2021) highlighted that trade-off decisions in sustainability have received little attention. In recognition that paradoxical tensions are intrinsic to sustainability management practices (Sabini & Alderman, 2021; Starik & Kanashiro, 2013), further understanding of paradoxical cognition on sustainability practices is warranted. Van Bommel (2018) and Tykkyläinen and Ritala (2021) identified a need to further study paradoxes in corporate sustainability management. An understanding of the nature of paradoxical tensions requires the consideration of the whole system (Zehendner et al., 2021). Nevertheless, research that marries systems thinking with a paradox lens remains peripheral (Schad & Bansal, 2018). Previous research has independently demonstrated that both systems thinking and paradoxical thinking contribute positively to the implementation of sustainability practices. However, the literature provides little clarity on the cumulative impact or the magnitude of this effect when applied together.

1.1 | Study context

The context of the study is small and medium-sized enterprises (SMEs) in the United Arab Emirates (UAE). Considered the backbone of economies, SMEs are pivotal in fostering job creation, economic growth, innovation, and development (Heenkenda et al., 2022; Masocha & Fatoki, 2018). Nonetheless, the literature proposes that studies examining sustainability in SMEs are scarce (Das et al., 2020; Ismail, 2022; Suriyankietkaew et al., 2022). Given the significance of SMEs' role in the economy, society, and environment, they are important stewards of sustainability (Aghelie, 2017; Shields & Shelleman, 2015). Even though individual SMEs' contributions are relatively minor, collectively, SMEs have a substantial impact on resource consumption and waste generation (Aghelie, 2017; Cantele et al., 2020; Yadav et al., 2018). SMEs are responsible for approximately 65% of pollution (Cantele et al., 2020; Johnson, 2015) and over 60% of commercial waste (Aghelie, 2017; Johnson, 2013).

Scholars have argued that SMEs are slower to adopt sustainability practices (Cantele et al., 2020; Mahmood et al., 2021; Shields & Shelleman, 2015; Yadav et al., 2018). Larger companies often encounter increased accountability for issues such as human rights, societal norms, employee welfare, and adherence to environmental regulations. In comparison, smaller firms are more likely to avoid attention (Das et al., 2020). Owing to the smaller operational footprint and perceived minimal impact, there is a prevailing notion among SMEs that they are exempt from the sustainability practices and accountability standards applied to larger companies (Johnson, 2013; Mahmood et al., 2021; Sheehan et al., 2023). Some argue that SMEs may not be aware of their social and environmental impact. As such, the need for sustainability practices goes unrecognized (Johnson, 2013; Journeault et al., 2021). Furthermore, barriers are posed by the complexity of implementation and a lack of strategic planning, financial resources, management commitment, knowledge, and regulatory frameworks (Journeault et al., 2021; Mahmood et al., 2021; Pinto & Allui, 2020). Smaller companies maintain an unstructured and informal approach to sustainability practices (Das et al., 2020). In a small ecosystem, the relative influence of managers is greater and less restrained by capital markets, shareholders, external governance (Koryak et al., 2018), corporate systems, approval structures, and procedures. A greater extent of flexibility characterizes their decision-making processes, agility (Aghelie, 2017; Daddi et al., 2019; Das et al., 2020; Yadav et al., 2018), responsiveness to internal or external pressures (Cantele et al., 2020), and autonomy (Koryak et al., 2018). Thus, while there are constraints, opportunities exist that SMEs can use to their advantage.

In the UAE, SMEs represent 94% of the companies, employing 86% of the workforce in the private sector (UAE Government, 2023).

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The country's rate of development has raised questions about the impact on the future (Achuthan & Dulaimi, 2011; Al Mehairi, 2016). The rapid economic transformation has contributed to the UAE's per capita carbon dioxide emissions, electricity consumption, and water consumption which far exceeds the global average (World Bank Data, n.d.; Majumdar & Paris, 2022). Sustainability is a central pillar of Vision 2030 (UAE Government, 2023) and the UAE Centennial Plan 2071 (2023). In recognition of these developments and with a view toward the future, the UAE has made substantial investments, introduced new regulations, aligned itself with global institutions, hosted COP28, and implemented a variety of initiatives across the public and private sectors.

1.2 | Research gap and research question

This study aims to address three critical gaps in the existing literature. First, it examines the interplay between systems thinking and sustainability, responding to calls for deeper insights (Fischer et al., 2018; Suriyankietkaew et al., 2022). Second, by adopting a paradoxical lens, rarely applied in conjunction with systems thinking, this research highlights how recognizing and navigating paradoxes can inform sustainability practices (Sabini & Alderman, 2021; Tykkyläinen & Ritala, 2021). Although paradoxes are inherent to systems and acknowledged quite extensively in organizational science, few studies have combined the notion of systems thinking and paradoxes. Both the paradox lens (Sabini & Alderman, 2021) and the systems lens (Grewatsch et al., 2021) require a deviation from traditional management philosophies. Understanding the collective impact of systems thinking and paradoxical cognition on sustainability practices could foster new cognitive strategies for sustainability efforts. Last, noting that SMEs have been underrepresented in sustainability research (Das et al., 2020; Ismail, 2022; Masocha & Fatoki, 2018; Suriyankietkaew et al., 2022), this study contributes novel insights for managers of UAE SMEs to navigate the dynamic, interconnected, and opposing forces that shape sustainability practices. By integrating systems thinking with paradoxical cognition, this study posits that sustainability practices are enhanced by the application of systems thinking, the recognition of paradoxical tensions and the adoption of paradoxical thinking. Thus, it investigates: how do systems thinking and paradoxical cognition collectively influence sustainability practices within SMEs in the UAE? This question guides our examination of the combined impact of these cognitive frameworks on sustainability practices of UAE SMEs.

2 | LITERATURE REVIEW AND RESEARCH HYPOTHESES

2.1 | Stakeholder theory

Stakeholder theory offers a critical lens for examining the interplay among systems thinking, paradoxical cognition, and sustainability practices for SMEs. Stakeholder theory, as articulated by Freeman (1994, 2010), posits that organizations bear a responsibility toward the individuals and groups that are affected by the pursuit of their objectives. Corporations are expected to create value for stakeholders. However, powerful stakeholders maintain a greater propensity to exert influence (Kühnen & Hahn, 2017). Often, the emphasis of stakeholder value is placed on financial value (Freudenreich et al., 2019). In practice, a narrow definition of value is presented as a dichotomy, leading to trade-offs between financial profit and socio-ecological impacts (Sabini & Alderman, 2021). Freeman et al. (2018) point out that the issue is not the tension between stakeholders and shareholders, but rather between a reductionist and a holistic perspective, or put differently, between value chains (maintaining a linear focus on economic value) and value networks (inclusive of shared value). Stakeholder theory would therefore argue for sustainability-oriented value creation, inclusive of the interests of a broader group of stakeholders. Organizations are systems and the understanding of the interaction between elements necessitates a systems perspective (Rousseau, 1979; Senge, 2006). The reorientation of a dichotomic (profitability vs. sustainability) to a balanced and holistic perspective results in complexity. However, shared values neutralize and transcend conflicting agendas (Freeman et al., 2018). Acknowledging the interdependent, yet adversarial objectives that reflect the consideration of all stakeholders demands a higher consciousness (Freeman et al., 2018). Value-creating sustainability practices could benefit from both the recognition of paradoxical tensions and application of systems and paradoxical thinking.

2.2 | Systems thinking

Organizations are often pressured to incorporate sustainability into their management practices (Awan et al., 2022; Russo Spena & Di Paola, 2020; Schulte & Paris, 2020; Sheehan et al., 2023). Nevertheless, sustainability is not sufficiently integrated in strategic frameworks (Erzurumlu et al., 2023) and social, and environmental issues are not improving at the rate required to sustain long-term development (Sheehan et al., 2023; Suriyankietkaew et al., 2022; Voulvoulis et al., 2022). There is a need to better understand the balance and dynamics of sustainability dimensions (Dorninger et al., 2020; Erzurumlu et al., 2023). Because of globalization, intercontinental supply chains, boundaryless environmental impacts, and globally connected populations, no corporation exists in isolation. Global crises highlight the interconnected relationship between firms, nature and society. Opportunities can be seized through innovative strategies that are informed by a greater understanding of these relationships (Edwards, 2021), and systems thinking is increasingly recognized as a vessel to manage the reality of a highly interdependent world.

Systems thinking is a collection of analytical and synergistic capabilities that can aid the identification, comprehension, and prediction of patterns (Dolansky et al., 2020; Dolansky & Moore, 2013) in systems behavior. Systems thinking seeks to expand temporal and spatial boundaries that constrain our perspective and to mitigate unintended

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TABLE 1 Dimensions of systems thinking.

Themes	Constructs	Source
Dynamic complexity	Set of elements, complex adaptivity, hidden values, assess conclusions, differentiating types of flows and variables, understanding dynamic behavior, adaptive capacity/ resilience, self-organization, emergence, understand system behavior, discover and represent feedback processes, identify stock and flow relationships, identify nonlinearities, understand diverse operational contexts of the system, understand complex system behavior	(Arnold & Wade, 2015; Moore et al., 2010; Moore et al., 2017; Squires et al., 2011; Stave & Hopper, 2007; Sweeney & Sterman, 2000; Whitehead et al., 2015; Williams et al., 2017)
Connectivity	Interconnections, hidden values, recognizing interconnections, identifying feedback, using conceptual models, creating simulation models, sequence of events, causal sequence, multiple causations possible, feedback, interrelations of factors patterns of relationships, interconnections, interconnectedness, discover and represent feedback processes, identify stock and flow relationships, recognize delays and understand their impact, identify nonlinearities, identify inter- and intrarelationships and dependencies	(Arnold & Wade, 2015; Moore et al., 2010; Moore et al., 2017; Squires et al., 2011; Stave & Hopper, 2007; Sweeney & Sterman, 2000; Whitehead et al., 2015; Williams et al., 2017)
Problem solving	Common goal, complex adaptivity, hidden values, evaluate evidence, assess conclusions, problem (technical and contextual), testing policies, variation of different types (random/special), goal/purpose, recognize and challenge the boundaries of mental models, spaces with fuzzy boundaries	(Arnold & Wade, 2015; Grohs et al., 2018; Moore et al., 2010; Moore et al., 2017; Squires et al., 2011; Stave & Hopper, 2007; Sweeney & Sterman, 2000; Whitehead et al., 2015)
Perspective	Assumptions, hidden values, evaluate evidence, problem (technical and contextual), perspective (and problem), using conceptual models, incorporate multiple perspectives	(Grohs et al., 2018; Squires et al., 2011; Stave & Hopper, 2007; Whitehead et al., 2015)

consequences (Voulvoulis et al., 2022). The aim is to improve the behavior of the system (Flood, 1990; Forrester, 1990, 1992) by understanding the driving forces (Grewatsch et al., 2021; Grohs et al., 2018; Senge, 2006; Voulvoulis et al., 2022) and identifying leverage points to facilitate transformative, systemic alterations through targeted actions (Dorninger et al., 2020; Voulvoulis et al., 2022). Systems thinking views the world through a holistic lens that recognizes the dynamics of interdependent variables governed by mechanisms within a system of networks (Allen et al., 2011; Caulfield & Maj, 2011; Moore et al., 2017). In doing so, it facilitates a pragmatic way of thinking, focused on the relationship between the system components (Moore et al., 2017; Whitehead et al., 2015). Based on recurring themes found in the literature (Table 1), we focused on four dimensions that are important for the management of corporate sustainability: perspective, dynamic complexity, connectivity, and problem solving.

The integration of sustainability-oriented practices requires the consideration of the perspectives of diverse stakeholders (Erzurumlu et al., 2023). Diverse stakeholders contribute a range of beliefs, experiences, assumptions, and biases to the problem-solving processes, resulting in, often, divergent perspectives (Grohs et al., 2018). Divergent perspectives can hinder policy decisions, but at the same time, how managers understand varying stakeholder views influences their ability to navigate the complexities of system structures, behaviors, and effects (Awan et al., 2022; Grohs et al., 2018; Senge, 2006). An understanding of systemic interaction between stakeholders enables a greater understanding of the governance of environmental and social systems and thus sustainability (Neely et al., 2021). Nevertheless, the multitude of interests also adds to this complexity. The complexity associated with sustainability systems requires a different approach to the prevailing, linear cause-and-effect thinking (Grewatsch et al., 2021; Neely et al., 2021; Voulvoulis et al., 2022; Whitehead et al., 2015).

A key contributor to dynamic complexity is time. The temporal dimension involves understanding time delays (Voulvoulis et al., 2022), reflection, anticipation, and prediction of problems and solutions (Grohs et al., 2018; Stacey, 1995). Although conceptual and empirical information may be available, problem solvers must contemplate consequences, implications, constraints, feedback loops, and unforeseen needs in the future to prevent myopic, short-term thinking (Grohs et al., 2018; Senge, 2006). Linear thinking generally leads to low-leverage responses, resulting in short-term symptomatic solutions (Senge, 2006). Because of nonlinearity and interdependencies, short-term solutions could have long-term, unforeseen implications. Future uncertainty highlights the need for managers to foster creative behavior instead of reactive behavior (Grohs et al., 2018; Senge, 2006). It is important to note that a component's behavior in isolation differs from its behavior in the context of a system (Grewatsch et al., 2021; Ikerd, 2012). Therefore, in a system, connectivity is a key consideration. It also explains why a reductionist approach is inadequate for solving systems problems (Ikerd, 2012; Ramirez, 2012). Reductionism favors simplicity over complexity and may overlook the effect of multiple interconnected causal variables. It maintains an isolated approach that may not adequately consider the context, interaction effects and trade-offs. Firm-level approaches are incompatible with tackling

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systems-level problems (Grewatsch et al., 2021). Scholars have argued that the literature predominantly maintains a linear approach towards sustainability (Grewatsch et al., 2021; Olsson et al., 2017; Whiteman et al., 2012). However, as a research problem, sustainability requires a departure from traditional philosophies and approaches (Grewatsch et al., 2021; Smart et al., 2017; Soderstrom & Heinze, 2021) in order to uncover innovative routes to lasting solutions.

In systems thinking, problem solvers deploy critical and interdisciplinary thinking skills, often integrated with a collaborative and flexible approach (Grohs et al., 2018). To address problems, systems thinkers seek to enable a more robust understanding of the complexity of management problems (Grohs et al., 2018; Senge, 2006). The aim is to understand and alter the system's structure to address root causes and solve a problem in the long run (Senge, 2006). Systems thinking competencies are underdeveloped in education (Palmberg et al., 2017). Studies have suggested that managers of SMEs are poorly equipped with such skills (Sun et al., 2014). Similarly, policy makers may lack the ability to approach sustainability challenges with a holistic perspective and may resort to narrowly focused strategies that address isolated issues (Voulvoulis et al., 2022). As these policies cascade down to corporations, it prompts a need to consider critically the extent to which systems thinking capabilities are present within the corporate world. Given the dynamic and interconnected nature of the social, environmental, and economic dimensions, scholars have argued the case for a systems approach to managing sustainability (Davidson & Venning, 2011; Suriyankietkaew et al., 2022; Voulvoulis et al., 2022; Williams et al., 2017). The researchers therefore hypothesize a positive effect.

> **H1.** The ability to apply systems thinking (perspective, dynamic complexity, connectivity, and problem solving) positively impacts corporate sustainability practices.

2.3 | Paradoxical tensions

Within the framework of systems thinking, characterized by complex interdependencies, companies are positioned to recognize the emergence of tensions (Erzurumlu et al., 2023; Lewis & Smith, 2014). These tensions, representing competing demands, can present companies with direct contradictions. A paradoxical lens acknowledges that complex systems inherently contain such tensions (Miron-Spektor & Paletz, 2020). In the increasingly interconnected world, new pressures have emerged, boundaries have blurred, and change has become constant, necessitating organizational strategies capable of embracing complexity and contradictions. Paradoxical tensions, conceived as socially or cognitively constructed conflicting logic or demands that arise simultaneously (Ingram et al., 2014; Schad & Bansal, 2018), require distinct logics that extend over various time horizons (Hahn et al., 2014; Sabini & Alderman, 2021). These tensions are widespread in corporations (Benkert, 2020; Ingram et al., 2014; Miron-Spektor & Paletz, 2020) (Table 2), and are manifested through the continuous interplay of opposing forces.

TABLE 2 Organizational paradoxical tensions.

Organizational paradoxical tensions	Source
Quality versus cost	(Lewis, 2000, p.762)
Differentiation versus integration	(De Angelis, 2021, p.4; Lewis, 2000, p.762)
Cohesion versus division	(Lewis, 2000, p.762)
Efficiency versus adaptability/creativity/resilience	(De Angelis, 2021, p.5; Lewis, 2000, p.767; Miron-Spektor & Paletz, 2020, p.12; Smith & Lewis, 2011, p.383)
Control versus flexibility	(Calic et al., 2019, p.400; De Angelis, 2021, p.5; Lewis, 2000, p.767; Smith & Lewis, 2011, p.383; Smith & Tushman, 2005, p.526)
Encouraging diversity versus building cohesive teams	(Andriopoulos, 2003, pp.382–383)
Risk versus innovation	(Andriopoulos, 2003, pp.384–385)
Encouraging personal initiative versus maintaining a shared vision	(Andriopoulos, 2003, pp.381–382; Smith & Lewis, 2011, p.383)
Learn and unlearn	(Smith & Tushman, 2005, p.522)
Collaboration versus competition	(Calic et al., 2019, p.398; De Angelis, 2021, p.4; Miron-Spektor & Paletz, 2020, p.3; Moncef & Monnet Dupuy, 2021, p.522; Smith & Lewis, 2011, p.383; Zehendner et al., 2021. p. 897.)
Empowerment versus direction	(Smith & Lewis, 2011, pp.383)
Stakeholders versus organizational objectives	(Moncef & Monnet Dupuy, 2021, p.522; Smith & Lewis, 2011, p.383)
Corporate social responsibility versus profitability	(Calic et al., 2019, p.398; Smith & Lewis, 2011, p.383)
Liquidity versus growth	(Ingram et al., 2014, p.4)
Exploration versus exploitation	(De Angelis, 2021, p.4; Koryak et al., 2018, p.416; Miron-Spektor & Paletz, 2020, p.13; Smith & Tushman, 2005, p.526; Venugopal et al., 2018, p.3)
Circular economy goals versus quality and competitiveness	(Daddi et al., 2019, p.771; De Angelis, 2021, p.3)
Developing radical solutions versus adhering to standards and constraints	(De Angelis, 2021: p.4; Miron-Spektor & Paletz, 2020, p.3; Moncef & Monnet Dupuy, 2021, p.523)

Sustainability in practice is underscored by the need to balance competing demands (Campbell, 2016), often navigating conflicts inherent in reconciling diverse sustainability goals (Aagaard, 2019; Hahn et al., 2018; Sabini & Alderman, 2021). Sustainability is commonly conceptualized as the intersection of the social, economic, and environmental dimensions (Elkington, 1999; Olsson et al., 2017).

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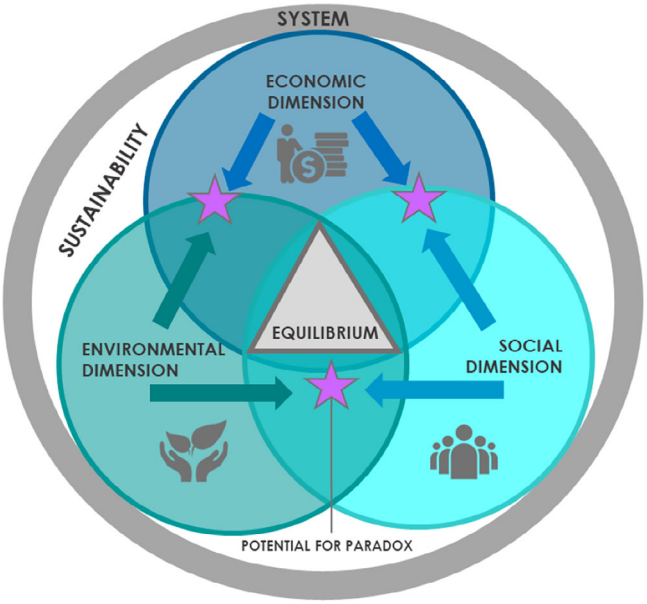

FIGURE 1 Sustainability dimensions and potential for paradoxical tensions.

A systematic perspective suggests that sustainability dimensions are not merely overlapping but are nested within each other (Ikerd, 2012; Olsson et al., 2017)—with society encompassed by the natural sphere and the economy situated within the social—thereby embedding all within the natural sphere (Olsson et al., 2017; Tsvetkova & Gustafsson, 2012). The interconnectedness of these dimensions suggests that attempts to balance economic, social, and environmental objectives often will result in inherent friction among stakeholders' priorities (Audebrand et al., 2016; Daddi et al., 2019; Sabini & Alderman, 2021) (Figure 1). The paradoxical tensions between organizational, environmental, and societal objectives are epistemological and subject to different perceptions. Tensions can arise from competing agendas, goals, and strategies of an array of stakeholders (Smith & Lewis, 2011; Van Bommel, 2018), leading to a state of disequilibrium. Tensions may also manifest between individual and systematic levels or be a result of the circular economy (Daddi et al., 2019; De Angelis, 2021). There may be intertemporal tensions between the short-term objectives of corporations and the long-term societal or ecological agendas (De Angelis, 2021; Schad & Bansal, 2018; Van Bommel, 2018) or between the utilization of resources and economic growth (Edwards, 2021; Fischer et al., 2018). Furthermore, tensions can arise between the epistemological perception of climate change, perceived as a salient matter, and the ontological reality of having to make decisions about CO_2 emissions (Schad & Bansal, 2018). Often when these trade-offs occur the economic dimension is prioritized (Olsson et al., 2017; Sabini & Alderman, 2021; Tyrrell et al., 2013).

The prioritization of financial goals often stems from overlooked or denied tensions, contrasting with views that acknowledge the paradoxical tensions of sustainability. Classical economics, epitomized by Friedman (2007), dismiss such tensions, positing sustainability as distinct from corporate activities, with a firm view that social responsibilities are for the individual rather than corporations. This perspective argues that diverting corporate resources to social initiatives dilutes profits and shareholder value (Friedman, 2007; Hayek, 1969) challenging the foundations of capitalism (Ahluwalia, 2022; Hall et al., 2010). This stance, essentially equating CSR as a threat to both the corporate bottom line and free market economy, has faced increasing scrutiny and critique over time (Freeman & Dmytriyev, 2017).

In organizational science, navigating paradoxes challenge the traditional management frameworks used to guide decision-making (Ingram et al., 2014; Sabini & Alderman, 2021), moving away from dichotomic, antithetical, or reductionist thinking toward recognizing the complexity of decisions beyond simple "either/or" outcomes. The conventional approach focused on weighing pros and cons to reach definitive decisions often overlooks the nuanced, interconnected nature of organizational dynamics (Russo Spena & Di Paola, 2020; Van Bommel, 2018; Zehendner et al., 2021). Although "either/or" decisions may offer immediate solutions, they frequently result in short-term fixes, deferring critical aspects of the decision (Hahn et al., 2010; Smith & Lewis, 2011). As systems are complex, clear-cut solutions may not be compatible with systems problems (Andriopoulos, 2003). Moreover, the binary "either/or" approach tends toward oversimplification, a significant limitation in an increasingly complex world (Ingram et al., 2014; Lewis, 2000). The reality is that business environments are inherently paradoxical, defying clear-cut categorizations of outcomes or solutions (Andriopoulos, 2003; Benkert, 2020).

Organizations must navigate and balance inherent tensions, utilizing trade-offs to foster reflexivity and unify diverse perspectives in decision-making (Benkert, 2020). Paradoxical thinking challenges managers to move beyond their comfort zones, embracing uncertainty to reconcile opposing forces and achieve a dynamic equilibrium (Andriopoulos, 2003; Smith & Lewis, 2011). This approach requires a holistic and adaptable mentality, aiming for "both/and" solutions that embrace a full spectrum of possibilities (Calic et al., 2019; Miron-Spektor & Paletz, 2020; Russo Spena & Di Paola, 2020). Effectively managing paradoxes entail radically reconsidering past assumptions, utilizing synergy and contrast within these paradoxes to unlock their full potential (Ingram et al., 2014; Lewis, 2000). By identifying commonalities and understanding the dynamics at play, managers can integrate rather than isolate conflicting logics (Smith & Lewis, 2011). Thus, corporate sustainability can be stimulated through the strategic harnessing of these tensions to address interlinked demands simultaneously (Miron-Spektor & Paletz, 2020; Smith & Lewis, 2011). Embracing paradoxical tensions is crucial for developing sustainable, long-term initiatives (Moncef & Monnet Dupuy, 2021). Organizations benefit from embracing paradoxical tensions, as doing so fosters a continuous improvement (Smith & Lewis, 2011) and unveils new strategic avenues (Daddi et al., 2019; Edwards, 2021). However, recognizing these tensions as opportunities rather than hindrances remains challenging. The initial step toward managing conflicting sustainability objectives is the identification of these tensions (Moncef & Monnet Dupuy, 2021; Sabini & Alderman, 2021; Smith & Lewis, 2011).

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To assess this capability and its impact on sustainability practices, we propose:

> **H2.** The ability to recognize paradoxical tensions positively impacts corporate sustainability practices.

2.4 | Paradoxical thinking

Identifying contradictions and inconsistencies is essential for reinterpreting issues as paradoxes, setting the stage for addressing paradoxical tensions (Miron-Spektor & Paletz, 2020; Smith & Tushman, 2005). Paradoxical thinking requires adopting an alternative cognitive frame, a knowledge structure influencing how polarities and tensions are interpreted and how information is absorbed, processed, and disseminated (Miron-Spektor & Paletz, 2020). This thought process, known as paradoxical cognition, involves understanding, accepting, and integrating knowledge of juxtaposed yet interrelated demands (Hahn et al., 2018; Ingram et al., 2014; Soderstrom & Heinze, 2021). Rather than eliminating tensions, embracing them enhances the ability to navigate ambiguity and contradictions, fostering the development of new knowledge (Miron-Spektor & Paletz, 2020).

Similar to systems thinking, paradoxical cognition deviates from linear thinking toward an integrative, pluralistic, and dialectical approach to contradictions. This shift from the status quo can introduce challenges (Sabini & Alderman, 2021), costs (Miron-Spektor & Paletz, 2020), and both psychological and structural barriers (Smith & Tushman, 2005). A preference for consistency over inconsistency may lead to simplifying uncertainties to keep behaviors and thought processes aligned (Lewis, 2000; Smith & Tushman, 2005). The drive for uniformity stems from an epistemological belief in a singular reality, dismissing the possibility of coexisting contradictions. According to this logic, inconsistencies demand resolution of only one outcome, potentially introducing bias. When competencies, strategies, and structures reinforce each other, resistance to change intensifies, perpetuating the status quo, and necessitating trade-offs (Van Bommel, 2018). A systematic and deliberate approach is essential for managing and balancing paradoxical tensions. Without such an approach, organizations risk descending into chaos due to lost control (Andriopoulos, 2003). Unacknowledged paradoxes can generate tensions that hinder employee performance and innovation (Miron-Spektor & Paletz, 2020). However, effectively harnessing paradoxical thinking enables managers to unlock strategic advantages (De Angelis, 2021; Van Bommel, 2018).

Some literature suggests that embracing a paradoxical approach enhances business continuity by addressing the need to balance contrasting issues (Smith & Lewis, 2011). Market environments, characterized by dynamism, uncertainty, strategic complexity, and unpredictability also present emergent opportunities (Koryak et al., 2018). The extent to which managers employ paradoxical thinking directly influences the organization's ability to adapt, solve problems creatively, innovate, and undergo transformative change (Andriopoulos, 2003; Ingram et al., 2014). Crucially, managing dynamic equilibriums support long-term sustainability by creating a climate that fosters creativity, organizational learning, resilience, flexibility, and unlocks human potential (Calic et al., 2019; Miron-Spektor & Paletz, 2020; Smith & Lewis, 2011). The literature highlights that paradoxical thinking is suitable for systems characterized by dynamic and opposing demands, such as sustainability (Hahn et al., 2018; Soderstrom & Heinze, 2021; Van Bommel, 2018). This study aims to examine this relationship further. Previous research has explored conceptual models (Soderstrom & Heinze, 2021), strategies (Edwards, 2021; Sabini & Alderman, 2021; Van Bommel, 2018) and frameworks (Moncef & Monnet Dupuy, 2021; Smith & Lewis, 2011) supporting paradoxical thinking within sustainability contexts. Yet, quantitative investigations into the effects of paradoxical thinking remain limited. De Angelis (2021) proposed empirically examining the presence of paradoxes and their management through versatile approaches, moving beyond a conventional trade-off mindset. Accordingly, we propose:

> **H3.** The ability to apply paradoxical thinking positively impacts corporate sustainability practices.

3 | METHODS

3.1 | Sampling and data collection

The purpose of this study was to advance understanding of sustainability practices, systems thinking, and paradoxical cognition within SMEs. To achieve this, we conducted a cross-sectional empirical analysis, employing an online survey to examine the influence of systems thinking and paradoxical cognition on sustainability practices among SME managers in the UAE. SME managers were targeted due to their pivotal influence on decision-making, corporate behavior, and information dissemination within SMEs (Aghelie, 2017; Lima, 2017). SME managers offer unique perspectives into organizational dynamics (Thoradeniya et al., 2015), shaping of the company's vision, reinforcing its legitimacy and identity, the corporate culture (Yadav et al., 2018), and determining sustainability practices (Cantele et al., 2020). This makes them an ideal population to examine the complexities of paradoxical cognition and sustainability practices (Venugopal et al., 2018).

Data were collected via an online survey (Data S1) utilizing survey monkey. The survey link was distributed through LinkedIn, employing both advertisements and direct messaging targeted at SME managers within the UAE. To ensure the relevance of our sample, a skip logic feature was implemented within the survey. This feature automatically filtered out respondents not meeting our inclusion criteria, which specified current employment with a UAE-based SME, suitable professional designation, and age range between 25 and 65. The survey yielded 765 responses. After data cleaning, which involved removing incomplete responses, a total of 554 (72.42%) were deemed valid for analysis. The respondents' characteristics are summarized in Table 3.

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TABLE 3 Respondents' characteristics.

Category	Items	Responses	Percentage
Gender	Male	259	46.8
	Female	295	53.2
Highest education	High school	45	8.1
	Bachelor	208	37.5
	Master	256	46.2
	Doctorate	45	8.1
Age group	25–34 years	349	63.0
	35–44 years	129	23.3
	45–54 years	57	10.3
	55–65 years	19	3.4
Company size	1–40 employees	238	43.0
	41–80 employees	51	9.2
	81–120 employees	28	5.0
	121–160 employees	16	2.9
	161–200 employees	221	39.9
Industry	Retail	61	11.0
	Agriculture, water, and waste	6	1.1
	Leisure, hospitality, and recreation	82	14.8
	Private, public, and commercial	30	5.4
	Transport		
	Business services	87	15.7
	Chemicals and pharmaceuticals	13	2.3
	Construction and energy	25	4.5
	Education and science	76	13.7
	Technology	12	2.2
	Public services	91	16.4
	Manufacturing	18	3.2
	Marketing and media	53	9.6

3.2 | Survey instrument and measurement

The study's theoretical framework consisted of four constructs: systems thinking, paradoxical tensions, paradoxical thinking, and sustainability practices. Measures were adapted from and informed by established scales to measure systems thinking (Ateskan & Lane, 2018; Dolansky et al., 2020; Dolansky & Moore, 2013; Mahsoon & Dolansky, 2021; Moazez et al., 2020; Moore et al., 2010; Moore et al., 2017), sustainability practices (Masocha & Fatoki, 2018), paradoxical tensions, and paradoxical thinking (Ingram et al., 2014). For consistency, all scales were measured using a seven-point Likert-type scale. To support content validity, the questionnaire underwent evaluation by subject matter experts, including two academics and one industry professional. To assess and enhance face validity, a pilot study involving 26 respondents was conducted, resulting in minor amendments to enhance the sequence, structure, and clarity of the questionnaire. Item skewness ranged from −0.215 to −0.971 and kurtosis ranged from −0.807 to 1.583, therefore the data were treated as normal and the analysis proceeded. To assume normality the skewness and kurtosis should not exceed ±3 (Kline, 2023). All scales were reliable, with Cronbach's alpha (α) exceeding the threshold of 0.700 (Cho & Kim, 2014; Nunnally, 1975; Taber, 2017) (Table 4).

4 | RESULTS

4.1 | Measurement model

Confirmatory factor analysis (CFA) using AMOS Version 28 was conducted to evaluate the relationship between factors. The CFA results indicate adequate model fit of the measurement model (χ^2/df = 2.538, RMSEA = 0.053, GFI = 0.941, CFI = 0.964, TLI = 0.955, NFI = 0.943). Three goodness of fit indices was used to assess model fit. Parsimonious fit was indicated by ratio of Chi-square to the degrees of freedom (χ^2/df), where a value around three is preferred (Awang, 2013). Root mean square error of approximation (RMSEA <0.08) and the goodness of fit index (GFI >0.90) were used to assess absolute fit (Awang, 2013; Seo et al., 2004). The comparative fit index

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TABLE 4 Factor items, internal consistency, and convergent validity.

Item	Mean	Standard deviation	Factor loading	CR	AVE	α
Systems thinking				0.883	0.655	0.879
ST-P (Perspective)	5.11	0.996	0.69			
ST-PS (Problem solving)	5.22	0.901	0.85			
ST-C (Connectivity)	5.40	0.955	0.85			
ST-DC (Dynamic complexity)	5.23	0.818	0.83			
Paradoxical tensions				0.881	0.517	0.890
P-PTENS2	4.90	1.417	0.61			
P-PTENS3	4.86	1.465	0.66			
P-PTENS4	4.90	1.480	0.70			
P-PTENS5	4.21	1.680	0.69			
P-PTENS6	4.68	1.556	0.79			
P-PTENS7	4.76	1.543	0.76			
P-PTENS8	4.78	1.402	0.81			
Paradoxical thinking				0.863	0.613	0.849
P-PTHINK5	4.68	1.398	0.68			
P-PTHINK6	4.74	1.311	0.83			
P-PTHINK7	4.90	1.326	0.82			
P-PTHINK8	4.92	1.321	0.79			
Sustainability practices				0.793	0.562	0.790
S-ECO (Economic)	5.000	1.009	0.75			
S-ENV (Environment)	4.730	1.245	0.75			
S-SOC (Social)	5.120	1.148	0.75			

Abbreviations: α, Cronbach's alpha; AVE, average variance extracted; CR, composite reliability.

TABLE 5 Discriminant validity.

	Discriminant validity					
	MSV	MaxR(H)	Systems thinking	Paradoxical tensions	Paradoxical thinking	Sustainability practices
Systems thinking	0.393	0.894	**0.809**			
Paradoxical tensions	0.081	0.890	0.285	**0.719**		
Paradoxical thinking	0.558	0.872	0.444	0.120	**0.783**	
Sustainability practices	0.558	0.794	0.627	0.261	0.747	**0.749**

Note: Diagonal values (bolded) present the square root of the AVE.
Abbreviations: MaxR(H), maximal reliability; MSV, maximum shared variance.

(CFI), the Tucker–Lewis index (TLI), and the normed fit index (NFI) were applied to measure incremental fit, each above the threshold of 0.90 (Cangur & Ercan, 2015; Schulte et al., 2021; Xiong et al., 2015).

The internal consistency, convergent validity, and discriminant validity of the measurement model were evaluated. Cronbach's Alpha and composite reliability (CR) were used to verify internal consistency and all values exceeded the threshold of 0.70 (Table 4) (Adil & Hamid, 2017). Convergent validity was supported as the average variance extracted (AVE) was greater than 0.50, and less than the CR (Table 4) (Awang, 2013). To verify discriminant validity (Table 5), the correlation coefficients of constructs were compared to the AVE (Zahoor et al., 2017). The correlation between the pairs of constructs did not exceed a value of 0.85, indicating that the model's constructs were not too closely correlated (Kline, 2016). Discriminant validity was further corroborated by the fact that the maximum shared variance (MSV) was less than the AVE (Garson, 2014). Furthermore, diagonal numbers in Table 5 indicate the square root of the AVE was greater than the correlations within the constructs (Adil & Hamid, 2017; Fornell & Larcker, 1981). The maximal reliability (MaxR[H]), based on the McDonald construct reliability, was used to evaluate latent constructs' relationships with their indicators (Adil & Hamid, 2017; Hancock & Mueller, 2001; Paudel & Kumar, 2021). All values exceeded the threshold of 0.700 (Paudel & Kumar, 2021).

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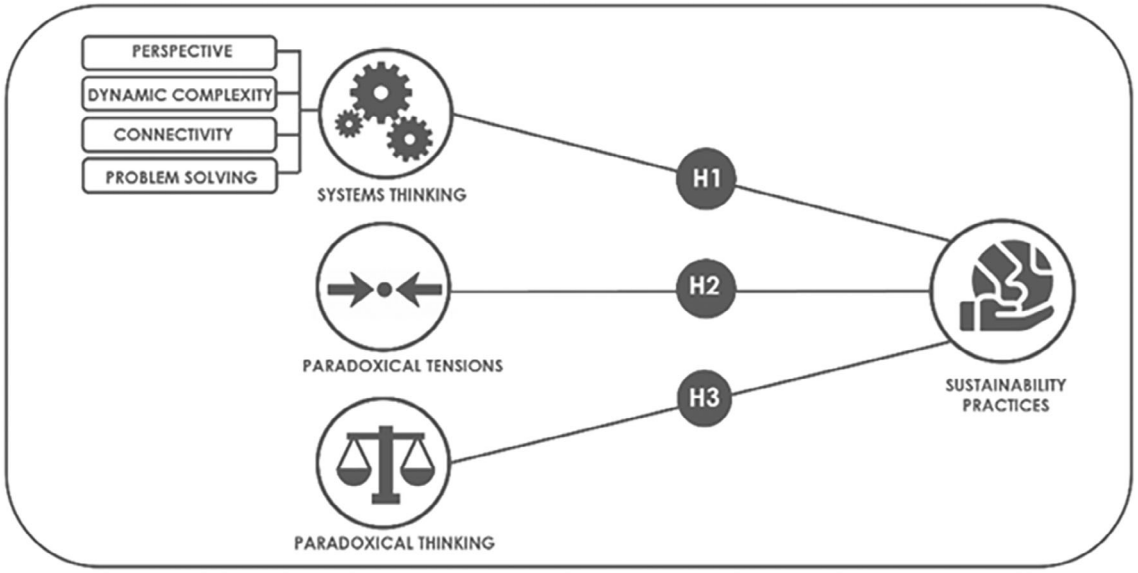

FIGURE 2 Hypothesized model.

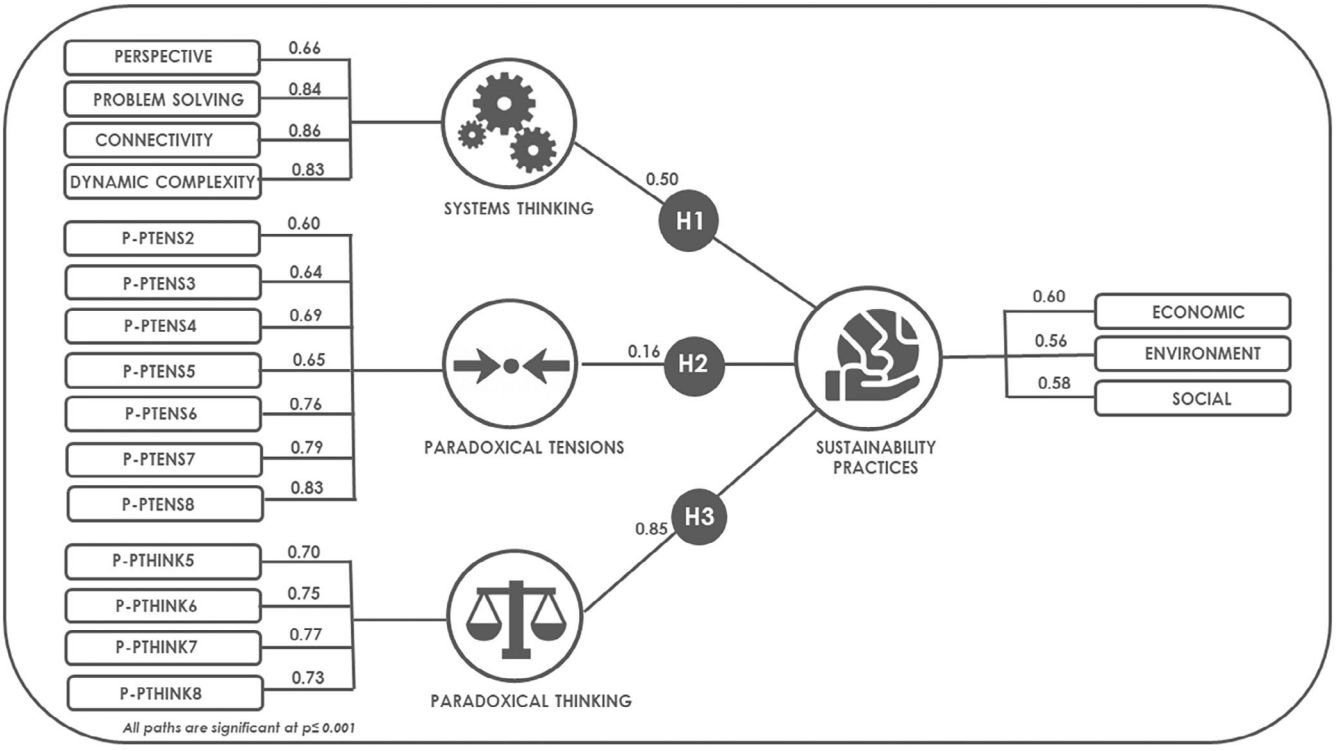

FIGURE 3 Structural equation model.

4.2 | Structural model

Following the CFA, AMOS 28 was employed to test the hypothetical model (Figure 2) using structural equation modelling (SEM). The model fit of the structural model was evaluated and indicated that the model exhibited good model fit based on the established thresholds (χ^2/df = 3.48, RMSEA = 0.067, GFI = 0.926, CFI = 0.944, TLI = 0.928, NFI = 0.923). Figure 3 presents the SEM model results. All of the hypothesized relationships were supported, and the strength of the relationships and their significance are summarized in Table 6. The analysis indicates that: H1-the ability to apply systems thinking had a positive impact on corporate sustainability practices ($\beta = 0.505$, $p < 0.001$); H2-the ability to recognize paradoxical tensions had a weak positive impact on corporate sustainability practices

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TABLE 6 Hypotheses results.

Hypothesized relationships				Estimate	β	S.E.	p-Value	Hypotheses result
H1	Systems thinking (ST)	→	Sustainability practices (S)	0.405	0.505	0.045	***	Supported
H2	Paradoxical tensions (P-PTENS)	→	Sustainability practices (S)	0.090	0.165	0.028	**	Supported
H3	Paradoxical thinking (P-PTHINK)	→	Sustainability practices (S)	0.550	0.847	0.050	***	Supported

Note: *** significant at $p < 0.001$, ** significant at $p < 0.010$.
Abbreviations: β, standardized coefficient; S.E., standard error.

($\beta = 0.165$, $p = 0.001$); and H3-the ability to apply paradoxical thinking had a strong positive impact on corporate sustainability practices ($\beta = 0.847$, $p < 0.001$).

5 | DISCUSSION

Based on extensive review of the literature, we developed and tested a hypothetical model to study the influence of systems thinking and paradoxical cognition on sustainability practices within SMEs in the UAE. All hypothesized relationships in our model were supported, indicating that both systems thinking and paradoxical cognition positively influences the sustainability practices within the study context. Aligning with stakeholder theory and existing literature, our findings reinforce the notion that systems thinking is highly beneficial, if not crucial, to understand the dynamic behavior and interrelationships underpinning sustainability practices (Suriyankietkaew et al., 2022; Voulvoulis et al., 2022; Williams et al., 2017). Further, our findings indicate that a holistic understanding of sustainability systems, recognizing spatial and temporal variations, may contribute to the advancement of sustainability practices (Voulvoulis et al., 2022; Williams et al., 2017). Echoing the assertions of Oldfield et al. (2013), our findings suggest that managers' employment of systems thinking impacts their capacity to enact meaningful change across economic, ecological, and social domains. A systems thinking approach fosters a synergistic relationship with sustainability, accommodating diverse stakeholder needs and systematic shifts. Achieving progress in corporate sustainability performance demands an integrated understanding of the interrelated forces that influence sustainability systems, requiring a departure from linear analytical approaches toward more comprehensive, anticipatory thinking.

Through our extensive literature review, we operationalized systems thinking as four capability dimensions (Table 1): perspective, problem solving, connectivity, and dynamic complexity. Our findings affirmed that all four dimensions contribute to systems thinking. Of these, perspective exhibited the least pronounced effect. This observation resonates with the understanding that many SMEs operate within a complex web of stakeholder relationships, where both internal and external stakeholders influence, and are influenced by, their operations (Journeault et al., 2021; Talbot et al., 2020). The lesser effect of perspective may stem from the nuanced role of stakeholder engagement and perspective in shaping sustainability agendas of SMEs (Talbot et al., 2020). Often, internal stakeholders' focus on economic objectives may inadvertently overshadow broader sustainability considerations driven by external stakeholders (Sabini & Alderman, 2021). Nevertheless, the significance of perspective for systems thinking is undeniable. It underscores a core premise of stakeholder theory that meaningful interactions between a company and its stakeholders are vital for the creation of shared value. In today's dynamic societal and environmental landscape, aligning organizational norms and values with those of the wider group of stakeholders enhances the company's capacity to contribute positively to both its immediate context and wider business environment. Embracing a comprehensive worldview enables SMEs to navigate the complexities of socio–ecological issues more effectively, reinforcing the argument for more inclusive consideration of stakeholder perspectives (Freeman et al., 2018). This inclusive approach, fostering a collaborative and holistic mindset, is important for formulating and implementing sustainability practices that acknowledge and address the multifaceted impacts of a firm's operations.

Problem solving is a critical component for systems thinking in addressing the "wicked problems" of sustainability. Traditional strategies that utilize causal models to achieve organizational optimalization might simplify the complex challenges by isolating key factors, inadvertently stripping away the socio–ecological nuances central to sustainability's "wickedness" (Grewatsch et al., 2021). Our findings indicate that employing a systems approach for problem solving significantly enhances sustainability practices. This highlights the importance of moving beyond a linear approach, which is inherently limited in addressing system-rooted issues. The important role of connectivity in systems thinking is echoed in the literature, with scholars emphasizing the need for managers to recognize the myriad of interdependent variables within sustainability systems (Hoffman & Ehrenfeld, 2015; Williams et al., 2017).

In our findings, connectivity was found to have the most influence among the dimensions of systems thinking. This emphasizes the criticality of recognizing and integrating interrelated components within systems thinking. Our findings further highlighted that a systems perspective, with its capacity to navigate dynamic complexity, is well suited for managing the multifaceted nature of sustainability challenges (Grewatsch et al., 2021; Grohs et al., 2018; Schad & Bansal, 2018). In this era of globalization, continuous change, and the transition toward knowledge management, systems thinking emerges as an enabler of improved decision-making. Systems thinking fosters a more nuanced understanding of complex issues moving beyond the boundaries of traditional business practices (Aghelie, 2017;

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Caulfield & Maj, 2011). The applicability of a systems approach for both sustainability and strategic management underscores the need for aligning business operations with the broader, ever-evolving business environment (Lima, 2017) and advocating for the perception of corporate contexts as nonlinear, and dynamic systems (Levy, 2000). The way that companies engage with their external environment, anticipating and responding to the actions by diverse stakeholder groups, is crucial in directing strategic decisions (Grohs et al., 2018; Stacey, 1995). Moreover, principles of nonlinearity highlight the self-reinforcing mechanisms that underpin competitive advantage, like economies of scale or standardization (Porter, 1990). Consequently, based on our findings, we argue that the adoption of a systems thinking approach to both sustainability and strategic management not only enriches the understanding of complex, interconnected challenges but also enhances organizational capabilities to execute and integrate impactful strategies.

In our model, the relationship between paradoxical tensions and sustainability practices was significant, albeit relatively weak. This finding requires a nuanced interpretation of the interplay between recognizing paradoxical tensions and implementing sustainability practices in SMEs. Schad and Bansal (2018) suggested that systems may harbor latent tensions that remain undetected, due to the subtlety of their manifestation or complexity of their origin. Factors such as scarcity, plurality, or change may precipitate paradoxical tensions to go unnoticed (Smith & Lewis, 2011). Additionally, there may be a disconnect between the ability to recognize paradoxical tensions and associating them with systemic challenges (Schad & Bansal, 2018). This gap highlights a critical area for SMEs: enhancing the ability to perceive and address paradoxical tensions could unlock innovative approaches to sustainability; fostering practices that are both responsive to and reflective of the complex dynamics at play.

There are also ontological challenges in organizational settings where differing perceptions of reality can obscure the recognition of paradoxical tensions (Smith & Lewis, 2011). This challenge can be compounded by an epistemic fallacy (Bhaskar, 2013; Schad & Bansal, 2018). This "masked man fallacy" (Taliaferro, 2019) arises when there is a conflation between what is known of the tension (epistemological) and nature of the tension (ontological) (Bhaskar, 2013; Schad & Bansal, 2018). From an ontological perspective, interconnected, dynamic, and complex systems create paradoxical tensions. Epistemically, however, there may be a failure to recognize or conceptualize the system's complexities in which paradoxical tensions are rooted (Schad & Bansal, 2018). Furthermore, a lack of consideration for the perspectives of nontraditional stakeholders may lead to paradoxical tensions going unrecognized. Although merely recognizing these tensions does not necessarily result in action (Schad & Bansal, 2018). The decision-making process is frequently characterized by the necessity to negotiate trade-offs, considering the varied interests and impacts of stakeholders. Paradoxical tensions, though potentially uncomfortable, confront firms with crucial decisions regarding shared value and the impact on, and of, stakeholders (Freeman et al., 2018). Our findings reveal the existence of an ability to recognize paradoxical tensions in the SMEs, yet there is significant room for improvement in effectively identifying and leveraging these tensions to shape sustainability practices. Enhancing this capability is crucial, as it not only positively influences sustainability practices, but could also lead to innovative opportunities for strategic management, acknowledging that both organizations (Benkert, 2020) and sustainability (Sabini & Alderman, 2021) are inherently filled with paradoxical tensions.

The strongest of the three hypothetical relationships of our study was between paradoxical thinking and sustainability practices. This highlights the important role of paradoxical thinking in navigating and balancing the competing demands of economic, social, and environmental objectives (Dossey, 2010). Aligning with earlier research, our findings affirm that the capacity for paradoxical thinking enhances the management of sustainability, offering a pathway for coherence in the face of complexity (Aagaard, 2019; Hahn et al., 2018; Soderstrom & Heinze, 2021; Van Bommel, 2018; Van der Byl & Slawinski, 2015). Through the lens of stakeholder theory, SMEs can be viewed as entities that either create, conserve, or diminish various forms of value, including financial, cultural, social, intellectual, or environmental. Stakeholder theory critiques the narrow focus on financial transactions, advocating for a broader analysis that considers the interconnected stakeholder relationships as the linchpin of value creation. By emphasizing "both/and" thinking (Freeman et al., 2018), paradoxical thinking transcends traditional, linear, and siloed approaches to sustainability management by accommodating and leveraging conflicting interests within the complex, interconnected world of businesses today. The analysis of our hypothesized model underscores that in the context of sustainability, systems thinking, paradoxical tensions, and paradoxical thinking should not be viewed as isolated domains.

5.1 | Theoretical contributions

Our study makes four main theoretical contributions to the literature. First, it directly addresses the hesitancy surrounding systems thinking within the sustainability literature by providing empirical evidence of its beneficial relationship with sustainability practices. This study not only responds to the call for more empirical research into the application of systems thinking in sustainability (Burke et al., 2020; Fischer et al., 2018; Suriyankietkaew et al., 2022; Williams et al., 2017), but also extends previous work by quantifying the impact of systems thinking on sustainability practices. This study supports the synergistic combination of perspective, problem solving, connectivity, and dynamic complexity in driving systems thinking and, by extension, sustainability practices.

Second, this study contributes to the literature on systems thinking by integrating the concepts of paradoxical cognition, a relatively novel approach in sustainability research. By integrating systems thinking with a paradox lens, the study fills a gap in the literature, emphasizing that opposing forces inherent in dynamic and complex systems should not be examined in isolation. This approach builds upon and extends previous research in both the paradox literature

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(De Angelis, 2021; Erzurumlu et al., 2023; Fischer et al., 2018; Ingram et al., 2014; Moncef & Monnet Dupuy, 2021; Sabini & Alderman, 2021) and the systems thinking literature. With this study, we moved beyond conceptual discussion to offer empirical insights into the synergy between paradoxical cognition and systems thinking on sustainability practices of SMEs.

Third, by focusing on SMEs, this study addressed the notable underrepresentation of SMEs within in sustainability literature. The study challenges prevailing assumptions about SMEs capabilities to recognize and manage interdependent relationships within sustainability systems by evidencing the presence of systems thinking and paradoxical cognition among SME managers. This contribution is particularly salient given the limited research conducted on SMEs in the UAE, thus offering novel theoretically-grounded insights into the region's corporate sustainability practices.

Finally, this study reinforces the importance of stakeholder theory for understanding a firm's sustainability practices. The study underscores the need for greater stakeholder awareness in managing the interconnected, often conflicting, agendas posed by various stakeholders, and advocates for an inclusive approach to creating sustainability-oriented value. Although trade-offs can be viewed as tensions between those holding economic interests and those pursuing a broader definition of value, arguably, these tensions are cognitive (Freeman et al., 2018). Our findings indicate that cognitive frameworks like systems thinking and paradoxical cognition are vital for navigating the complexities of sustainability, providing a foundation for future research to build upon.

5.2 | Practical implications

Our analysis elucidates the importance of systems thinking and paradoxical cognition for SME sustainability practices, and to aid the practical application of these insights we offer several key observations and recommendations. Although the results identified the presence of systems thinking in SMEs, the study does not negate the findings of previous studies that suggest a prevailing lack of systems thinking among SMEs (Yadav et al., 2018). The absence of systems thinking among managers or within SMEs is symptomatic, hinting at deeper causal factors. Addressing the need for systems thinking capability necessitates continued academic and societal contributions including the advocation for the integration of systems thinking in education and the adoption of systems thinking among policy makers and industry authorities. The positive link between systems thinking and SME sustainability practices demonstrated in this study underscores the need for a shift in institutional approaches. Further, the educational curriculum should better prepare learners with competencies for developing systems thinking mindset and the mechanisms through which to apply this lens in practice.

The traditional contrast between profitability and socio–ecological impacts mirrors the broader debate between reductionist and holistic approaches to both strategic management and sustainability (Freeman et al., 2018). Emphasizing the importance of navigating paradoxes within sustainability systems, we concur with Moncef and Monnet Dupuy (2021) and Sabini and Alderman (2021) that the ability to recognize paradoxical tensions is a fundamental first step for SMEs. The potential for transformative change is deeply rooted in our cognitive approaches as our worldview shapes our decision-making, strategies, and the effectiveness of our actions. For SME managers aiming to advance sustainability, it is vital to consider as many of the stakeholders affected by their operations and understand the pressure these groups may exert on the company. Adopting a cooperative strategy for stakeholder engagement can facilitate the recognition and management of both positive and negative impacts, as well as the paradoxical tensions that arise. Rather than barriers to sustainability, paradoxical tensions should be approached as opportunities for innovative and collaborative practice.

To drive effective sustainability practices, systems thinking and paradoxical cognition should permeate all organizational levels, not just the upper echelons of management. Leadership should foster a culture that champions these competencies throughout organizations. Based on our analysis, we advocate for sustainability to be embedded in core strategic and operational decision-making to optimize stakeholder value in the long run. To foster a systems-orientated sustainability approach, awareness-building and training are essential. Given the departure from traditional, more linear, approaches, managers should prepare for potential resistance. The adoption of systems thinking and paradoxical cognition to integrate sustainability into core strategy and operations would have significant implications for a company including the vision, policies, processes, frameworks, data management, technological infrastructure, target setting, partnerships, departmental alignment, and supply chain strategy.

Finally, the capability to manage paradoxical tensions is not limited to sustainability. Unforeseen sociopolitical, ecological, or economic events can threaten an SME's survival in the marketplace (Shields & Shelleman, 2015). Managers of SMEs are more resource-constrained than their larger counterparts (Koryak et al., 2018; Venugopal et al., 2018) and are more susceptible to external forces (Jocumsen, 2004; Lima, 2017). On the other hand, the autonomy of SMEs reduces the restraints that impede the agility to adopt new approaches seen in larger firms. In today's interconnected and rapidly changing global market, SMEs must remain agile, adaptable, and resilient to thrive.

6 | CONCLUSION

This study aimed to investigate how systems thinking and paradoxical cognition collectively influence sustainability practices within SMEs in the UAE. Through a robust empirical analysis of survey data collected among SME managers, we confirmed that systems thinking recognizing paradoxical tensions and paradoxical thinking positively influence sustainability practices. Systems thinking, with underlying dimensions of perspective, problem solving, connectivity, and dynamic complexity, enables a comprehensive understanding of the interdependencies between a firm and its socio–ecological environment. Furthermore,

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the ability to recognize paradoxical tensions and engage in paradoxical thinking are critical for navigating the complexities of sustainability, supporting the necessity of a holistic approach to addressing sustainability challenges.

6.1 | Limitations and future research

The study's findings offer novel insights advocating for the integration of cognitive frameworks and sustainability practices in the context of UAE SMEs, highlighting the need for a shift from traditional linear management approaches to more adaptive and integrative strategies. Although the findings contribute to the literature and have implications for practice, there are several considerations that should be addressed by future research. First, the UAE's unique cultural, socio–economic, and environmental context and the focus on SMEs could affect the generalizability of the findings. Future research should examine the influence of systems thinking and paradoxical cognition in larger firms and SMEs in other locations and through comparative studies. Second, due to the dynamic nature of sustainability practices, cognitive frameworks and SMEs and the limitations of cross-sectional survey research, future research should seek to build upon our findings using a multitude of methodological approaches. Future qualitative studies could explore these insights and aim to provide depth of explanation on factors that influence the recognition of paradoxical tensions and the relationships between systems thinking and paradoxical cognition on sustainability practices. Case study, ethnographic, intervention, and experimental methods could all provide valuable insights building upon our findings. Further, longitudinal studies could provide further validation of the long-term impact of systems thinking and paradoxical cognition on sustainability practices.

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