Manager ambidexterity in healthcare: The effect of paradoxical thinking, reflective learning, and context responsiveness.

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Abstract

Manager ambidexterity is the capability to demonstrate equally well exploiting and exploring behaviour. Managers vary in ambidexterity capability therefore there is need for further scholarly work to examine the factors which explain this variation. The purpose of the current study was to explore and develop hypotheses on the influence of paradoxical thinking, leader role behaviour, and contextual factors on managerial ambidexterity. A self-report questionnaire was distributed to 152 managers of a public healthcare organisation. Findings of the study indicated although paradoxical thinking did not significantly predict manager ambidexterity, leader role behaviours characterising reflective learning and context responsiveness accounted for higher levels of exploiting and exploring behaviour. These findings suggest manager ambidexterity could be developed and enhanced through the development of skills and competencies for reflective learning and context responsiveness.

Introduction

Ambidexterity is commonly understood to be the ability to use the right and left hands equally well. In an organisational context, organisations can be ambidextrous when they have the capacity to both align with and proactively adapt to their environments (Birkinshaw & Gupta, 2013; Junni et al., 2013). Aligning is exploitive in nature, consisting of refining choices, reducing variation and risk, and maximising efficiency resulting in stability and sustainability. Adapting is explorative in nature, involving discovery and creativity, allowing variation and risk, and increasing flexibility and innovation toward competitive advantage (Birkinshaw & Gupta, 2013; Gibson & Birkinshaw, 2004). A predominantly aligning (exploiting) focus can increase efficiency for organisational success but may be accompanied by complacency and overconfidence, causing opportunities to be missed and creating inertia. In contrast, a predominantly adapting (exploring) focus runs the risk of over-emphasis on pursuing the novel with potentially little or poor return on investment, and little mastery and competence within existing services and products (March, 1991). Balancing aligning and adapting activities is optimal for organisational ambidexterity, with the capacity to integrate both aligning and adapting activities (i.e., organisational ambidexterity) being linked to innovative performance (Tian et al., 2021), competitive advantage (Clauss et al., 2021), and multinational globalisation capability (Vahine & Jonsson, 2017).

Ambidexterity can be reflected in an organisation's ability to accommodate the inherent contradictions (i.e. paradoxes) of aligning and adapting activities through physical or structural separation. This is referred to as structural ambidexterity, wherein different business units, or groups within a unit, may be tasked with aligning or adapting activities, such as research and development or maximising existing process efficiency. Systems,

processes, and cultures within these units/groups are shaped, or evolve, to support, enhance, and focus attention on the assigned activity (Gibson & Birkinshaw, 2004; Tushman & O'Reilly, 1996). In contrast to structural ambidexterity Gibson and Birkinshaw (2004, p. 209) suggest the concept of contextual ambidexterity, where organisations enable individuals to exhibit "the behavioural capacity to simultaneously demonstrate alignment and adaptability across an entire business unit". At the micro-level every individual can autonomously select and execute aligning or adapting activities, within existing systems, to respond to contextual demands and needs. The organisation's role is to create supportive environments which empower aligning and adapting activity engagement (Gibson & Birkinshaw, 2004; March, 1991; van Assen, 2020).

Aligning and adapting activities can appear contradictory but compatible, independent yet interdependent, and rational when considered separately but irrational when considered together (i.e. paradoxical) (Chen, 2002). When individuals are aware of these tensions, moving toward either an aligning or adapting strategy highlights the alternative's opportunity costs, or potential benefits forfeited (Andriopoulos & Lewis, 2009). In practice, paradoxical tensions arise when leaders become aware of the trade-offs associated with micro-managing followers versus allowing autonomy, enforcing standard operating procedures versus allowing creative adjustment, focusing on core rigidities or core competences, employing transactional or transformational leadership, and balancing the motivational forces of extrinsic reward and intrinsic pleasure (Bledow et al., 2009; Mueller et al., 2020).

The extant literature suggests individuals differ in how they perceive, evaluate, and respond to paradoxical tensions (Bonesso et al., 2014; Jarzabkowski et al., 2013; Papachroni & Heracleous, 2020). This implies that, further to an organisation's support and

encouragement of ambidexterity, some individuals are more adept at ambidexterity and able to go beyond potential constraints of their contexts, such as established rules and norms. Though scholars have recently suggested that ambidexterity is partly predicted on individual characteristics (Schnellbächer et al., 2019), empirical support for this assertion remains limited (Lô & Diochon, 2020). The overarching aim of this study is to explore the individual and contextual factors that account for managerial ambidexterity.

Regarding the individual factors, paradoxical thinking as an individual difference may contribute to ambidexterity as it signals the capability to differentiate and integrate contradictions. Recent research suggests the capability to simultaneously differentiate and integrate the contradictions of contextual information and demands, is a personal characteristic associated with ambidexterity (Koryak et al., 2018). In addition to paradoxical thinking, leader integrator behaviours have been linked to ambidexterity (Dennison et al., 1995; Lavine, 2014; Quinn & Rohrbaugh, 1981; Vilkinas & Cartan, 2001, 2006). Integrating behaviour signals the capacity to effectively adapt and match leader behaviours with contextual demands and expectations (Vilkinas & Cartan, 2001, 2006). For instance, an individual who assumes dual roles of team leader and union representative within their organisation is more effective when they enact behaviours that reconcile and integrate intra- and extra-organisational demands. Subsequently they are likely to perform the dual roles equally well. Thus, the association between integrator behaviours and managerial ambidexterity will be investigated in this study.

Contextual factors serve to elicit leaders to exhibit certain roles and associated behaviours which may enable or constrain exhibiting ambidexterity. Roles and their associated behaviours enhance an individual's understanding of themselves within their organisational position, their position within the wider organisation, and position relative to

the external organisational environment, by virtue of the matching of contextual

information and demands to the roles (Floyd & Lane, 2000; Tempelaar & Rosenkranz, 2019).

To examine individual and contextual factors associated with managerial ambidexterity this

study relied on a sample of managers from a large public healthcare organisation. The aim

of the research is two-fold. Firstly, to explore whether paradoxical thinking and leader

behaviours that indicate the ability to reconcile competing demands predict managerial

ambidexterity. Secondly, the study examines whether and how managerial ambidexterity is

influenced by role requirements and occupational factors, namely manager span of control,

managerial role, and workload.

Literature Review

Paradoxes in Healthcare Organisations

Paradox theory defines paradox as "contradictory but interrelated elements that

exist simultaneously and persist overtime" (Smith & Lewis, 2011, p. 382). Paradoxes are not

hypothetical but encountered during everyday life, challenging what would normally be

expected (Papachroni & Heracleous, 2020). As single entities, the contradictory elements

appear logical and rational, but in combination illogical and irrational. Time and space shape

paradoxes, thus requiring continual perspective and response adjustments (Clarke, 1998;

Smith & Tushman, 2005).

Paradoxes differ from dilemmas and dialectics. Dilemmas are characterised as

'either/or' weighted alternatives with advantages and disadvantages, each alternative

having associated opportunity costs and benefits. The underlying contradictions or conflicts

of weighing the advantages and disadvantages can cause leaders to feel stuck and create

blockages for going forward (Karhu & Ritala, 2018; Lüscher & Lewis, 2008; Smith & Lewis,

2011). On the other hand, dialectics integrate contradictions and transform them into a

solution as the inherent conflict from integrating drives an individual to find a solution. However, the solution is only temporary as the contradictions are not fully acknowledged or engaged with and continue to latently exist. Individuals gravitate from achieving a 'both/and' framing of the issue back to the original 'either/or' framing (Hargrave & Van den Ven, 2017; Smith & Lewis, 2011). For example, nurses may experience conflicting demands of providing the level of care required by a patient's condition while contending with staff shortages. Nurses may either prioritise the patient or the working conditions when providing care, but the inherent paradox is not addressed and thus tension remains (Fagerström, 2016).

Paradoxes abound in healthcare due to (a) superficial contradictions, (b) ambiguities, (c) complexity and interpretation differences, and (d) conflicts of interest (Hofmann, 2001). Superficial contradictions include the paradox of significant healthcare improvement over the past century increasing cures, general health, and life expectancy, against the increasing prevalence of disease states concomitant with longer life expectancy, such as dementia, which healthcare systems have not previously encountered (Hofmann, 2001). Ambiguity is evidenced in the paradox of quantity over quality of life. Preserving life as an imperative of the medical profession is often at odds with the ability to ensure quality of life and challenges an individual's right to die. This tension is further complexified when patient and clinician views collide. Complexity and interpretation differences arise for hybrid healthcare managers who assume both clinical and managerial roles and responsibilities. These managers often must reconcile differing values and objectives associated with each role (Burgess et al., 2015; Hofmann, 2001). The issue of who is the client - the patient or government - is likely perceived differently between clinical and non-clinical managers. Finally, conflicts of interest can arise for healthcare professionals with the move toward

patient-centred treatment and care (Martin & Finn, 2011). Traditionally greater power and responsibility are accorded to more senior and/or experienced healthcare team members, creating a hierarchical power dynamic (Singh et al., 2017). The inclusion of patients as part of the healthcare team changes their role from service users to service co-creators, with the aim of giving the patient a greater role in decisions concerning treatments and self-management of their disease (Singh et al., 2017). Unless power relationships are directly and openly addressed by healthcare professionals, it may be assumed the patient accepts the traditional hierarchical power dynamic leading to reinforcing existing power dynamics (Martin & Finn, 2011; Singh et al., 2017).

At the macro-level of the organisation, across sectors, much is known of the overarching tensions associated with organisational paradoxes (Miron-Spektor et al., 2018); Smith & Tushman, 2005; Zimmerman et al., 2018). However, at the micro-level less is known of the individual and contextual factors which underlie the unique responses individuals exhibit to paradoxes. In the recent literature, empirical evidence supports decision-making authority as enhancing exploiting and exploring behaviours (Mom et al., 2009; Zimmerman et al., 2018). Similarly, self-efficacy and paradoxical leadership enhance ambidexterity (Kauppila & Tempelaar, 2016). As such, exploring the micro-foundations of ambidexterity will contribute to a greater understanding of differing responses to paradoxes, ambidexterity potential, and how organisations can support and develop this potential.

Paradoxical Thinking

To be aware, evaluate, and understand inherent conflicts, contradictions, and ambiguities or paradoxes within organisations requires paradoxical thinking. Paradoxical thinking can be defined as "a more fluid and holistic mindset that leverages the distinctions and synergies between elements in search of both/and solutions" (Ingram et al., 2016, p.

162). The Chinese yin and yang symbol succinctly expresses the inherent duality and tensions of paradoxical thinking; the existence of two interdependent opposites within a whole. The internal border outlines the distinctiveness of the opposites, while the external border delineates wholeness, synergy, and the concept of both 'this *and* that' (Chen, 2002; Smith & Lewis, 2011). To date much of the work on paradoxical thinking is conceptual, clarifying paradox concepts, theory, and models (Lüscher & Lewis, 2008; Smith & Lewis, 2011). Previous literature links paradoxical thinking with innovation in family firms (Ingram et al., 2016), sense-making of contextual demands, performing multiple often inconsistent tasks and roles (Lüscher & Lewis, 2008), transcending organisational contradictions (Cunha et al., 2019), and managing values and beliefs during times of change (Smith & Lewis, 2011). Areas less explored include the relationship between paradoxical thinking and leadership characteristics and behaviours.

Paradoxical thinking frames contradictions as 'both/and', or a duality, identifying there is no solution because the underlying elements are distinctive and interdependent, inherent, and persistent (Lüscher & Lewis 2008). By identifying differences but simultaneously searching for patterns and connections between the seemingly opposing poles, the contradictions can be integrated to form synergies. Contradiction and tensions arise because of the interrelatedness and interdependence, but only through this entwinement can synergetic meaning and relevance be gained (Chen, 2002; Hargrave & Van den Ven, 2017).

Paradoxical thinking allows an individual to accommodate and manage paradoxical tensions through a variety of responses, including defensive avoiding or active adjusting responses (Jarzabkowski et al., 2013; Lewis, 2000; Lüscher & Lewis, 2008; Smith & Lewis, 2011). An individual's perception and construction of paradox interlinks with their response,

often "in-the-moment" (Jarzabkowski & Lê, 2017). Paradox-response cycles dynamically

evolve over time, playing out through either a defensive or active pathway (Jarzabkowski et

al., 2013; Lewis, 2000; Smith & Lewis, 2011). The defensive pathway heightens tensions and

conflicts, enhancing organisational embedding and avoidance responses. This is illustrated

by the tensions and conflicts of prioritising financial objectives and targets over

sustainability and environmental impact or continuing to improve products/services to meet

existing consumer demands and expectations at the expense of innovation. Defensive

responses provide short-term paradox tension management but create 'vicious' cycles of

defensiveness and avoidance. Cognitive consistency is preserved by either altering or

maintaining beliefs, values, and behaviours to align the past with the present however

emotional anxiety, confusion, and inertia increase (Jarzabkowski et al., 2013; Smith & Lewis,

2011). Defensive responses include splitting, suppressing, and opposing. Splitting responses

either separate tensions into subgroups or differentiate by dividing into polarised 'we and

them' groups. Splitting assumes objectives within the paradox can be separated either

temporally, focusing on 'this' then 'that', or spatially with one group attending to 'this' and

the other 'that' (Jarzabkowski et al., 2013; Lewis, 2000; Lüscher & Lewis, 2008). Temporal

separation allows for attending to one side of a paradox over the other, exemplified in

healthcare by the rapid development of clinically safe vaccines against the SARS-CoV-2 virus

in significantly shorter timeframes than normal vaccine production protocols would require.

Similarly, spatial or structural separation of activities with inherently different goals and

tasks can increase focusing on a specific activity and reduce distraction from other activities.

The natural tendency to gravitate toward the known, certain, and business as usual, is

avoided while allowing pursuit of the unknown, uncertain, and innovation, exemplified by

separating research and development activities from standard production activities (Cunha

et al., 2019; Smith & Tushman, 2005). Suppressing responses suppress one side of the paradox in favour of the other. The objectives associated with the needs of one group, or one side of an issue, are perceived to be more important and pursued while the other sides are relegated and dampened down (Jarzabkowski et al., 2013). Prioritising healthcare targets (financial objectives) over service provision excellence (patient objectives) exemplifies suppressing. Opposing responses involve different groups aligning and supporting the different sides of a paradox. The needs and objectives of one side are pushed regardless of the other sides, causing conflict, confrontation, and opposition. Opposing differs from suppressing as there is a winner-loser outcome, such as in the conflict between preserving life regardless of quality and dignity in contrast to preserving quality and dignity and the right to die (Jarzabkowski et al., 2013; Lewis, 2000; Lüscher & Lewis, 2008).

Conversely, the active pathway reduces tensions and conflicts, enhancing organisational non-embedding and adapting responses. Within healthcare, this is exemplified by the inclusion of patients as both service users and service co-creators (Jarzabkowski et al., 2013). An active response recognises paradox is often inevitable, and the necessity to accept, address, and integrate conflicts and contradictions. 'Virtuous cycles' result whereby the recognition and engagement of paradox further supports paradoxical thinking and paradox management. Conflicts and contradictions are engaged, sense-making aided, and synergies and interconnectedness found. Longer-term solutions are achieved through the increased understanding of 'and/or', generating new ways to work with paradox (Jarzabkowski et al., 2013; Lewis & Dehler, 2000; Smith & Tracey, 2016). The active adjusting response recognises both sides of the paradox are important and interconnected, with the needs and objectives of both sides or each group to be accommodated and achieved. This is exemplified in Māori health models where the extended family have a role

in decision-making with respect to disease management and treatment of a family member. To ensure health equity, healthcare professionals must acknowledge and include these stakeholders (Wilson et al., 2021).

Thinking paradoxically requires moving toward tensions, engaging with contradiction (Rosing & Zacher, 2017), and experiencing and reflecting upon tension, thus actively responding to paradox (Tse, 2013; Wilms et al., 2019). The potential for learning, creativity and innovation is enhanced as distinctions and synergies are identified, including the discovery of potential personal paradoxes such as misalignment of personal and organisational objectives, or differences in self-perceived and actual capabilities (Caniëls & Veld, 2019; Ingram et al., 2016; Miron-Spektor et al., 2011). The ability to detect distinctions may indicate tolerance of differing perspectives and novelty, enhancing ambidexterity (Calic et al., 2019). Paradoxical thinking is "being purposeful, open, sceptical, contrary, paralogical, imaginative and courageous" (Lewis & Dehler, 2000, p. 723). Paradoxical thinking enhances accommodation and management of inherent paradoxes of contextual demands and expectations and is expected to support the ability to simultaneously align and proactively adapt to the environment, i.e., ambidexterity.

Paradoxical Thinking and Manager Ambidexterity

Managerial ambidexterity is the "ability to both use and refine existing knowledge (exploitation) while also creating new knowledge to overcome knowledge deficiencies or absences identified with the execution of work (exploration)" (Turner et al., 2013, p. 320). The ability to simultaneously exhibit exploiting and exploring behaviours is debated. On one side of the debate exploitation and exploration behaviours are proposed to be opposite ends of a continuum, mutually exclusive and likely cycling sequentially rather than being simultaneously displayed (Gupta et al., 2006). On the other side, these behaviours are

proposed to be simultaneously displayed and mutually inclusive such that the outcomes of simultaneously actioning either side reinforces the other side. Conceptually this has been attributed to recursive cycles of feedback, reflection, and learning, but requires empirical validation (Gibson & Birkinshaw, 2004; Laureiro-Martinez et al., 2019; Mom et al., 2009; Rogan & Mors, 2014; Turner et al., 2013).

Exploiting and exploring behaviour activity utilises and combines organisational capital (structures and systems), social capital (relationship networks and knowledge within), and human capital (individual capabilities such as cognitive abilities) (Turner et al., 2013). Eisenhardt et al. (2010) suggest the cognitive abilities of abstraction, cognitive variety, and interruption help with simultaneous exploitative and explorative behaviour activities. Abstraction, or abstract thinking, reflects the ability to identify non-surface level similarities among events or issues which interconnect, enhancing exploration. For instance, development of captopril, one of the first drugs for lowering blood pressure, came from exploring the mode of action of the venom of the Brazilian pit viper. Cognitive variety refers to possession of diverse mental models for problem solving, enhancing both exploitation and exploration. Joint collaborations between public and private healthcare systems effectively utilise capacity while creating new ways to deliver healthcare, such as mobile surgical buses. Interruption is the pausing of activity to allow for reassessment, consolidation and refinement, enhancing exploitation. The utilisation of pharmacists, an existing community-based healthcare professional, to speed up administration COVID-19 vaccination is an example of exploiting. Similarly, Good and Michel (2013) found divergent thinking, focused attention, and cognitive flexibility were positively associated with cycling between exploitative and explorative behaviour activity *within* a task in dynamic contexts. Divergent thinking enables thinking of as many creative responses as possible. Focusing

attention, attends to the known while ignoring new or challenging information. Cognitive flexibility enables shifting between mental models and controlling automatic responses thus improving the match of exploiting/exploring behaviour to contextual demands. This aligns with the aforementioned cognitive capability of interruption. Together these capabilities encapsulate the mechanisms underlying paradoxical thinking for identifying and managing distinctions and synergies of issues and events, which are expected to enhance exploiting and exploring behaviour, thus manager ambidexterity ability.

Hypothesis 1. Paradoxical thinking has a positive and significant association with manager ambidexterity.

Leader Role Behaviours: Integration

Leadership requires of individuals to perform a range of leader roles or functions as part of their position, with each role being associated with specific behaviours. The term leader role encompasses underlying sets of value-based criteria, judged by an organisation to represent leadership performance which contributes to organisational effectiveness (Quinn & Rohrbaugh, 1981). Leader roles are also associated with boundaries and identities. Role boundaries create order and enable defining environmental information into domains, focusing attention, and defining role values, beliefs, goals and norms. Role identities are socially constructed definitions of who the individual is within the role, consisting of central and peripheral features; central features being more definitive, important, and typical. Roles can be contrasted and differentiated by the number of central and peripheral features which differ (Ashforth et al., 2000). For example, typical or central features of a managerial role may include self-motivation, decisiveness, confidence, and effective communication, while peripheral features may include specialist technical skills and creativity. Accordingly, possession of a diverse leader role repertoire provides leaders with the capacity to address

diverse and competing organisational and environmental objectives and demands (Zaccaro, 2001). Denison et al. (1995) referred to this as behavioural complexity or "the ability to perform the multiple roles and behaviours that circumscribe the requisite variety implied by an organisational or environmental context" (p. 526).

Quinn's Competing Values Framework was an early conceptual model of the relationship between leader ambidexterity and leader role repertoires (Denison et al. 1995; Quinn & Rohrbaugh, 1981). The model proposed eight leader roles and associated behaviours, organised along quadrants representing the orientation of the organisation toward the internal or external environment, and the orientation of the organisational structure toward stability or flexibility. Subsequently, Vilkinas and Cartan (2001, 2006) refined the Competing Values Framework to create the Integrated Competing Values Framework, where three of the original eight leader roles were combined to produce five operational roles (Innovator, Broker, Monitor, Deliverer, and Developer) and a new 'control' role labelled Integrator (Appendix A). The integrator role behaviours are examined here as individual factors that contribute to ambidexterity. Integrators characterise leaders who are self- and other-aware, through critical analysis of themselves and the environment, and who reflect on past experiences to learn from and adapt (Vilkinas & Cartan, 2001, 2006).

Individuals break from habitual patterns and expand their roles by learning and integrating new roles into existing repertoires (Denison et al., 1995; Zaccaro, 2001). The behaviours associated with the integrator role, facilitating critical analysis of self and others and capacity to learn from the past, can lead to greater efficiency and effectiveness when matching roles with contextual demands and expectations. For instance, the ability to analyse contexts, identify strategic objectives and potential problems, consider past and current experiences, and differentiate and select roles to match contextual demands (Da'as

et al., 2021; Hooijberg, 1996) is associated with more detailed mental models and development of adaptive behaviour to accommodate and manage potentially diverse demands and expectations (Cheng & Chang 2010). Cognitive capability requires political skill or "the savvy to effectively understand others in the workplace and adjust their behaviours accordingly" (Kapoutsis et al., 2019, p. 620). It is a composite of contextual and personal factor interactions, indicative of the ability to attend to organisational internal/external interfaces, structures and systems, and environmental uncertainty (Cheng & Chang, 2010; Sumner-Armstrong et al., 2008; Yukl & Mahsud, 2010). In essence, the ability to match role behaviours to situational requirements is dependent on an individual's development and refining of integrator role behaviours (Vilkinas & Cartan, 2001).

Integrator Role Behaviours and Manager Ambidexterity

A leader who enacts integrator role behaviours critically observes and assesses themselves and the environment. These behaviours scan for change in the environment, assess one's own strengths and weaknesses with respect to potential impact on the environment and others, and enable learning and adapting through reflection. As such, possessing and utilising the integrator role behaviours has the potential to enhance manager ambidexterity capability (Vilkinas & Cartan, 2001; Vilkinas & Ladyshewsky, 2012).

The integrator role behaviours can support a leader to address potential tensions created by organisational and environmental demands and objectives. Previous research suggests these tensions reflect underlying paradoxes which can be categorised as organising, performing, belonging, and learning paradoxes (Jarzabkowski et al., 2013). Organising paradoxes reflect the complexity of organisations, conflicts arising from deeply embedded communication patterns and behaviours in organisational structures and systems (Lüscher & Lewis, 2008). Reforms to healthcare systems exemplify organising

paradoxes as new replaces old. Performing paradoxes reflect tensions associated with performance expectations and conflicting demands (Lüscher & Lewis, 2008). For example, in periods of staff shortages ensuring nursing staff-patient ratios are maintained and staff have non-patient contact time for professional development may create performing paradoxes for managers in healthcare. Belonging paradoxes reflect tensions of simultaneously belonging to different groups and accommodating and managing the differing values, beliefs, and norms of these groups (Lüscher & Lewis, 2008). For example, mid-level managers are simultaneously superiors and subordinates, these roles having differing values, beliefs, and norms. Finally, learning paradoxes reflect the tension between building up new knowledge acquisition and relegating older knowledge, radical learning versus incremental learning, and learning episodically or continuously learning (Smith & Lewis, 2011).

Integrator role behaviours enable taking an ambidextrous perspective, perceiving how existing and effective processes and procedures could be carried forward, incorporated, or modified for change. These behaviours may support and foster managerial ambidexterity and assist leaders to navigate organisational paradoxes.

Hypothesis 2. The Integrator role has a positive and significant association with manager ambidexterity (high levels of both exploitative and explorative activity).

Contextual Factors

Managerial ambidexterity requires both cognitive and behavioural abilities to switch between and balance exploiting and exploring activity. Variation in manager ambidexterity may, in addition to individual factors, also be contingent on contextual factors which may enable or constrain exhibiting ambidexterity, including role characteristics and organisational constraints (Junni et al., 2015; Laurence et al., 2016; Mom et al., 2009; Mom

et al., 2015). In this study, the influence of manager span of control, managerial roles, and workload on managerial ambidexterity will be explored.

Span of Control

Seniority within an organisation has been linked to tendencies to exhibit exploiting/exploring behaviour beyond individual differences. Seniority is commonly associated with tenure, however seniority can also represent span of control. Higher hierarchical positions are associated with higher levels of contextual uncertainty, senior management interdependence, and strategic decision-making requirements to accommodate and manage inherent organisational conflicts and contradictions (Mom et al., 2009). These factors can increase context demands and complexity, but also greater discretion to switch behavioural orientations. Research suggests managers with role seniority exhibit high levels of both exploiting and exploring behaviour activities (Mom et al., 2015; Zimmerman et al., 2018). However, middle and lower management often assume much of the burden of accommodating and managing tension and conflict at the operational level, thus may be equally likely to demonstrate exploiting and exploring behaviours (Burgess et al., 2015; Prieto-Pastor & Martin-Perez, 2015). This study will explore whether seniority, as a manager's span of control, is linked to the likelihood of managerial ambidexterity.

Managerial Roles

Managerial roles are often characterised with unique conflicting demands, such as conflicts created by meeting the demands of clients while supporting employees. Within healthcare, manager roles may be clinical or non-clinical in nature. Clinical managers assume other roles alongside their professional clinical roles and responsibilities, such as management, while non-clinical managers do not have professional clinical roles and

assume managerial roles and responsibilities solely (Burgess et al., 2015). Both experience

tensions arising from balancing exploitative and explorative behaviours, but from differing

perspectives. Professionals in clinical roles must reconcile conflicts and tensions which may

result from potential differences in objectives and cultures attached to the professional

(medical) and management aspects of their position. If healthcare professionals prioritise

clinical outcomes ahead of non-clinical outcomes, this may hinder the adoption of

healthcare delivery innovations with non-clinical objectives, such as potential cost savings

offered by remote consultations (telehealth) (Burgess et al., 2015). This resistance can have

negative consequences, impacting exploitation and exploration activity at both the

individual and organisational level. Professionals in non-clinical positions experience

tensions due to fitting exploration around exploitation activities. Within public healthcare,

central agendas are often set externally from government and enforced internally through

senior management. The agendas are intended to provide new knowledge,

recommendations, and guidelines but also often set targets, and compliance and assurance

requirements. Resource allocations are often linked to successful achievement of targets,

compliance, and assurance. Thusly, successful achievement of these factors may reinforce

exploitative over explorative behaviour regardless of the fact explorative behaviours

contribute to developing and innovating best practice for exploitation (Burgess et al., 2015).

Non-clinical manager positions exemplify this, as pursuing exploiting behaviours enables

attending to systems and processes which will achieve targets, maximise the potential to

maintain or increase resource allocation, and align with the non-clinical characteristics of

their positions (Burgess et al., 2015).

Workload

Workload is the amount of work to be done by a person within a time period, thus is instrumental in creating demands and expectations. Research suggests that organisationally imposed workload produces negative outcomes such as stress and potential work overload (Laurence et al., 2016). Inherently, stress is associated with cognitive and emotional tension which can negatively impact decision-making and behaviour choices. These abilities are key components for ambidexterity. Literature suggests cognitive strain has been shown to increase as the balancing of exploiting and exploring increases, thus workload could undermine ambidexterity capabilities (Keller & Weibler, 2015).

Contingency theory offers explanations for how role and contextual factors may influence manager ambidexterity. For instance, formal structural and personal coordinating mechanisms help with the development and execution of exploitative and explorative behaviour activity (Mom et al., 2009). Formal structural coordinating mechanisms help individuals coordinate information and knowledge flow/requirements for decision-making, positively influencing an individual's efficiency and flexibility, while personal coordinating mechanisms create formal and informal personal relationships spanning functional and seniority boundaries (Mom et al., 2009). Drawing on contingency theory, exploitation and exploration activity is contingent on the fit, co-existence, and consistency of both coordinating mechanisms. If fit, co-existence, and consistency are present, exploitative and explorative behaviours co-occur, signalling ambidexterity (Mom et al., 2009; Raisch et al., 2009). It is expected increasing workload negatively influences managerial ambidexterity.

Method

Sample and Data Collection

Participants in the study consisted of employees with a leadership/manager role in a large public healthcare organisation. Managers were recruited using a non-probability

sampling technique of convenience and voluntary participation. This sampling technique was applicable as it provided a relevant sample which could report about the variables of interest (Speklé & Widener, 2018). A total of 730 managers received an invitation to participate in the survey. Full participation in the study required the completion of an on-line survey at two points. The only selection criterion required was participants were current managers in the organisation. Participation incentives were not offered, as requested by the organisation.

Self-report data was collected via an on-line survey, eligible participants received an email invitation. To accept the invitation participants clicked on the link directing them to a survey on the Qualtrics website (https://canterbury.qualtrics.com/). The survey opened with an introduction page consisting of consent to participate in the research and information regarding the project. Included were the research objectives, survey time commitment (15-20 minutes), members of the research team, explanation of the consent process, and data use and confidentiality (Appendix B)[1]. Respondents were made aware of the study's approval by the University of Canterbury Human Ethics Committee. Consent to participate was indicated by clicking 'next'.

At the start of the survey, participants were informed the survey would ask about their experience and confidence around and performing new and well-established activities (exploiting and exploring behaviours), work style (paradoxical thinking), and engaging in work-related roles (leader roles). Questions toward the end of the survey would gather their views on functional aspects of the organisation such as workload. Following completion of

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[1] The original study design was intended to measure two time points as detailed in the consent page. Due to potential increases in uncertainty and pressures created by sector structural changes and the COVID-19 pandemic the response rate for the second time point was low necessitating a change utilising data collected at one time point only. With respondents who had completed the survey at both timepoints, only responses at Time 1 were utilised.

the survey demographic information was collected, and a comment box provided for participants to add information to contextualise their responses. Participants were thanked and informed their responses had been recorded.

Respondents clicking on the online survey link resulted in 177 responses, a response rate of 24%. Listwise deletion of cases due to non-response (greater than two responses missing per scale) resulted in a sample of 152 participants. Seniority data was available for 138 respondents: 36 (25.35%) were service providers (narrow span of control), 90 (63.38%) patient care/department managers (medium span of control), and 16 (11.27%) senior management (wide span of control). Likewise, manager role characteristics (clinical or non-clinical) were provided for 143 respondents: 72 (50.36%) clinical and 71 (49.65%) non-clinical.

Measures

All variables were measured used 5-point Likert scales (Appendix C).

Paradoxical Thinking

The ability to accommodate contradictory but interdependent ideas was measured with a three-item measure developed by Ingram et al. (2016). Participants responded on a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). The scale's reported reliability was α = .73. A sample item from the scale is '*It is possible to maintain and develop our core competencies, while simultaneously creating new innovations*'.

Managerial Ambidexterity

Exploiting and exploring behaviour was measured with a 10-item measure, adapting a 14-item measure developed by Mom et al. (2009), with five items measuring exploiting behaviour and five items exploring behaviour. Reliability of the original 7-item scales has

been shown, α = .87 for exploiting and α = .90 for exploring. Scale responses were measured

on a 5-point Likert scale (1= does not describe me, 2 = describes me slightly well, 3 =

describes me moderately well, 4 = describes me very well, and 5 = describes me extremely

well). A sample item of exploiting behaviour is '*I engage in activities I can properly conduct*

by using my present knowledge', and exploring behaviour is '*I engage in work activities that*

require significant adaptability'.

Integrator Role Behaviour

Integrator role behaviour was measured with six items developed by Vilkinas and

Cartan (2001, 2006). Participants responded on a 5-point Likert scale (1 = strongly disagree,

2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). The scale's

reported reliability was α = .91 (Vilkinas & Cartan, 2001, 2006). The integrator role consists

of learning from and reflecting on past situations and experiences, or reflective learning,

and critical analysis of oneself, others, and the environment, or critical observation (Vilkinas

& Cartan, 2001). Sample items include: '*Changing behaviour after reflection*', and

'*Accurately reading the signals of the team and the team environment*'.

Contextual Variables

Categories for a manager's span of control were based on the occupational

descriptions provided by the organisation which aligned with three categories representing

senior management, patient care/department management (mid-level management), and

service providers/team leaders (low-level management). Two categories represented

managerial roles, clinical encompassing clinical and management roles, and non-clinical

encompassing management roles only. These categories were based on occupational

descriptions provided by the organisation.

Workload was measured with an adaption of a five-item scale measuring organisation-imposed and self-imposed workload developed by Laurence et al. (2016). The scale included four items representing organisation-imposed workload and one self-imposed workload item. Participants responded on a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). A sample item of organisational-imposed workload is '*I am required by my organisation to take on too many responsibilities at work*'. The single self-imposed workload item is '*I have to work too fast to complete all the work that is required of me'*.

Data Analysis

All statistical analyses for the present study were conducted utilising Jamovi 2.2.2 statistical software. Exploratory factor analysis was used to determine the underlying factor structure and item loadings of the study measures. Reliability analyses were conducted to assess the internal consistency of each scale, and item exclusion when computing composite scores. To identify patterns in the dataset (Žalik, 2008) which aligned with ambidexterity groups, specifically high ambidexterity, moderate ambidexterity, favouring exploitation, and favouring exploration (Gibson & Birkinshaw, 2004), a *k*-means cluster analysis of the manager ambidexterity scale data was conducted. Correlation analyses were conducted to measure the strength of relationships between the predictor and outcome variables. To determine whether there were significant relationships between the individual and contextual variables and manager ambidexterity a Chi-square test of association was conducted. Additionally, to test for significant differences in mean levels of the predictor variables and ambidexterity clusters, One-way ANOVA analyses were conducted. Finally, a multinomial logistic regression analysis was conducted to assess relationships between the predictor variables and the likelihood of belonging to the four ambidexterity clusters.

Specifically, the multinomial regression analysis would allow assessing how the level of the predictor variables related to the likelihood individuals were members of one of the four ambidexterity groups.

Post-Hoc Power Analysis

A post-hoc power analysis was conducted utilising G*Power 3.1.9.6 software to determine if the model (sample size, 152, and three predictors) had sufficient power, greater than .80 (Field, 2018), to detect statistically significant effects, alpha level $p < .05$. The analysis indicated 27.14% power to detect a small effect ($f^2 = .02$), 98.58% power for a medium effect ($f^2 = .15$), and 99.99% power for a large effect ($f^2 = .35$). The effects of the model were medium ($f^2 = .12$), attaining 95.66 % power which was above the accepted 80% threshold.

Results

Preliminary Statistical Analyses

Reliability and exploratory factor analyses were conducted for each measure of the study's constructs, paradoxical thinking, manager ambidexterity (exploitation and exploration), and the Integrator role (extraction method: principal component analysis; rotation method: Varimax). Factor inclusion criteria included eigenvalues greater than one, factor item loadings greater than 0.4 (Field, 2018), and an item total correlation greater than .30 (Streiner et al., 2015). Cronbach's alpha was utilised to assess scale reliability, with a guide of $\alpha \geq .70$ (DeVellis, 2017; Field, 2018). Factors and loadings for all scales are presented in Appendix D.

Paradoxical Thinking Scale

Initial checks included the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. Both measures, KMO = .71 and Bartlett's Test, $\chi^2(45) =$

552.51, $p < .001$, indicated factor analysis was suitable. Analysis indicated a one factor solution for paradoxical thinking: eigenvalues greater than one, all items loading at greater than .83, and no cross loadings. The scale's reliability was $\alpha = .81$.

Manager Ambidexterity Scale

The KMO and Bartlett's test values indicated factor analysis suitability, KMO = .79 and Bartlett's Test, $\chi^2(45) = 552.51$, $p < .001$. Analysis yielded a two-factor solution, with factors representing exploiting and exploring behaviour. Factor loading for both factors achieved eigenvalues of greater than one. Item loadings ranged between .45 to .89 for the exploiting behaviour scale, and between .69 to .83 for the exploring behaviour scale, with no cross loadings. Scale reliability statistics suggested removing exploiting scale item 4, '*I engage in activities primarily focused on short-term service delivery goals*' (item total correlation = .13) would improve the scale's internal consistency. Removal of item 4 improved the loading of all exploiting items to greater than .69, and the scale reliability from $\alpha = .79$ to $\alpha = .83$. Reliability of the exploring sub-scale was $\alpha = .81$.

Integrator Role Behaviour Scale

Analysis conducted with integrator role behaviour items resulted in a two-factor solution with eigenvalues greater than one, overall KMO = .76 and Bartlett's Test, $\chi^2(15) = 336.32$, $p < .001$. On inspection of the item content, four items loaded onto one factor indicating role behaviours consistent with context responsiveness, or the critical observation of oneself, others, and the environment, including one's own performance ('*Adapting a range of styles/responses to different situations*'), and two items onto one factor indicating role behaviours consistent with reflective learning ('*Learning after reflecting on past behaviours')* (Vilkinas & Cartan, 2001, 2006). The reliability of the context responsiveness sub-scale was $\alpha = .80$, and reflective learning sub-scale $\alpha = .81$.

Workload Scale

The KMO and Bartlett's test values indicated factor analysis suitability, KMO = .87 and Bartlett's Test, $\chi^2(10)$ = 518.24, p < .001. Analysis yielded a one-factor solution, with an eigenvalue of greater than one. Item loadings ranged between .78 to .91. The scale's reliability was α = .91.

K-means Cluster Analysis

K-means cluster analysis, using the Hartigan-Wong algorithm, was conducted with the Manager Ambidexterity scales (exploiting and exploring behaviour) to detect meaningful patterns indicating ambidexterity groups or clusters. Previous research comprising a combination of exploiting and exploring scale items identified four clusters representing high ambidexterity (high levels of exploiting and exploring), moderate ambidexterity (average levels of exploiting and exploring), favouring exploiting (high exploiting and low exploring), and favouring exploring (high exploring and low exploiting) (Gibson & Birkinshaw, 2004). Inspection of the elbow curve of the Gap Statistic *k* and scatter plot suggested four manager ambidexterity clusters which aligned with those found by Gibson and Birkinshaw (2004), high ambidexterity, moderate ambidexterity, favouring exploring and favouring exploiting, although the cluster characteristics for high ambidexterity and favouring exploiting differing. The high ambidexterity cluster exhibited both behaviours to an above average level, although exhibiting exploiting behaviour was higher than exploring behaviour. The moderate ambidexterity cluster exhibited both behaviours at an average level which were balanced. The favouring exploring cluster exhibited greater exploring than exploiting behaviour. Likewise the favouring exploiting cluster exhibited greater exploiting behaviour than exploring, although the mean level differences between the two behaviours

was not as distinctive as the difference between the behaviours in the favouring exploring

cluster. Figure 1 is a plot of item means across cluster.

Figure 1.

Plot of Means across Clusters
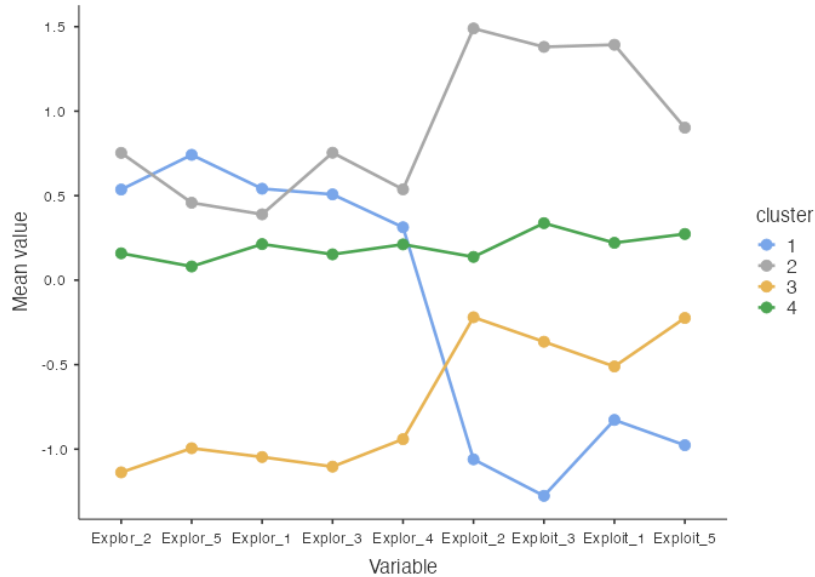
Note: Cluster 1 = favouring exploring, cluster 2 = high ambidexterity, cluster 3 = favouring exploring, cluster 4 = moderate ambidexterity.

Frequencies and Correlational Analyses

Table 3 provides the frequencies and within-cluster percentages for managerial roles

and manager span of control for manager ambidexterity clusters. The within-group

percentages provide an indication of the distribution of managers in the role and

occupational categories along the ambidexterity clusters. With respect to span of control,

exhibiting moderate ambidexterity was most prevalent with patient care/department

managers (medium) and service providers (narrow), while favouring exploiting with senior

managers (wide). Only 18 managers out of a sample of 150 exhibited high ambidexterity

(12%), of which 14 (78%) were clinical managers. Most managers (61) belonged to the

moderate ambidexterity category, followed by favouring exploring (37), and favouring

exploiting (32).

Table 3

Summary of Frequencies and Within-Cluster Percentages for Manager Ambidexterity Clusters

Variables	Ambidexterity Cluster							
	1		2		3		4	
Manager Role		%		%		%		%
Clinical Position	11	15.28	14	19.44	18	25.00	29	42.28
Non-Clinical Position	16	22.53	4	5.63	14	19.72	33	46.48
Span of Control								
Service Providers/Team Leaders	6	16.67	3	8.33	6	16.67	21	58.33
Patient Care/Department Managers	17	19.77	14	16.28	19	22.09	36	41.86
Senior Managers	4	25.00	1	6.25	7	43.75	4	25.00

Note: Clinical managers N =72, non-clinical managers N = 67, service providers N = 36, patient care/department managers N = 86, senior managers N = 16. Cluster 1 = favouring exploring, cluster 2 = high ambidexterity, cluster 3 = favouring exploiting, and cluster 4 = moderate ambidexterity. % = % within cluster.

Descriptive statistics and bivariate correlations are provided in Table 4. With regards to organisational tenure (years), those belonging to each cluster were: cluster 1 (favouring exploring) *M* = 8.77, cluster 2 (high ambidexterity) *M* = 14.33, cluster 3 (favouring exploiting) *M* = 13.56, and cluster 4 (moderate ambidexterity) *M* = 12.90.

Table 4

Summary of Descriptive Statistics and Bivariate Correlations for Predictor Variables and Outcome Variables

	1	2	3	4	5	6	7	8	9
1. Exploring Behaviour	(.83)								
2. Exploiting Behaviour	.10	(.81)							
3. Paradoxical Thinking	**.26**†**	.01	(.81)						
4. Reflective Learning	**.30***†**	**.17*†**	**.31****†**	(.81)					
5. Context Responsiveness	**.39***†**	**.20*†**	**.20*†**	**.50***	(.80)				
6. Workload	.03	-.09	-.14	-.11	.13	(.91)			
7. Organisational Tenure	-.09	.12	-.07	.01	.02	.06	-		
8. Span of Control	-.12	-.12	-.02	-.04	-.12	.02	.18*	-	
9. Clinical/Non-clinical	.12	**-.19***	.15	-.04	-.06	.01	-.19	-.22**	-

*Note: * $p < .05$, ** $p < .01$, *** $p < .001$. † N = 149. Scale internal consistency expressed as Cronbach's alpha shown in brackets.*

Chi-Square Test of Association

A chi-square test of association was conducted to identify significant associations between the categorical variables of managerial role and span of control, and manager ambidexterity clustering respectively. There were no significant differences between clinical and non-clinical managers with respect to membership in ambidexterity clusters, χ^2 (N =

139,3) = 7.07, p = .07, or span of control with respect to membership in ambidexterity clusters, χ^2 (N = 138,6) = 8.96, p = .18. Therefore managerial role and span of control do not significantly influence the likelihood of managers exhibiting ambidextrous behaviours.

One-Way ANOVA

A One-way ANOVA was conducted to test for significant differences in mean levels of paradoxical thinking, reflective learning, context responsiveness, and workload along favouring exploring (cluster 1), high ambidexterity (cluster 2), favouring exploiting (cluster 3), and moderate ambidexterity (cluster 4) clustering. The results indicated significant differences in the mean levels of reflective learning, F (3,54.29) = 5.01, p < .01 and context responsiveness, F (3,57.32) = 11.41, p < .001, across the manager ambidexterity clusters. There were no significant differences in the mean levels of paradoxical thinking, F (3,53.85) = 1.09, p = .36, and workload, F (3,53.38) = 1.17, p = .33, across the manager ambidexterity clusters.

The Games-Howell Post Hoc Test was conducted to specifically identify where and what the mean differences were across manager ambidexterity clusters. The test indicated a significant higher mean level of reflective learning in managers exhibiting high ambidexterity (cluster 2) (M = 4.47) compared to managers who favoured exploiting (cluster 3) (M = 3.88), t (28.99) = 3.43, p < .01. A significant difference in the mean level of reflective learning was also indicated between managers exhibiting moderate ambidexterity (cluster 4) (M = 4.21) and those favouring exploiting (cluster 3) (M = 3.88), t (75.89) = -3.04, p < .05. Overall, reflective learning was higher for those exhibiting high ambidexterity and moderate ambidexterity when compared to those favouring exploiting.

Significant differences in mean levels of context responsiveness in managers were also indicated. The test indicated significant higher mean level of context responsiveness in

cluster 2 (M = 4.51) compared to cluster 1 (M = 4.11), t (44.75) = -3.10, $p < .05$, cluster 3 (M = 3.84), t (42.06) = 5.84, $p < .001$, and cluster 4 (M = 4.19), t (33.95) = 3.12, $p < .05$. There was also a significant higher mean level of context responsiveness in cluster 3 (M = 3.84) compared to cluster 4 (M = 4.19), t (68.32) = -3.47, $p < .01$. Overall, managers in the high ambidexterity cluster showed higher levels of context responsiveness compared to managers within favouring exploring, favouring exploiting, and moderate ambidexterity clusters. These preliminary associations will be further explored in the next section.

Hypothesis Testing

Multinomial logistic regression was conducted to test hypotheses 1 and 2, whether paradoxical thinking and the integrator role behaviours were associated with manager ambidexterity (Akareem & Hossain, 2016; Meyer et al., 2013). Specifically, to assess how these variables relate to the odds of managers belonging to the four manager ambidexterity clusters of favouring exploring (cluster 1), favouring exploiting (cluster 3), or moderate ambidexterity (cluster 4) relative to the odds of belonging to the high ambidexterity (cluster 2). Cluster 2 was chosen as the reference level as this cluster aligned with the definition of ambidexterity previously stated, that is the ability to exhibit exploiting and exploring behaviour *equally well* at a level above average.

To reduce potential multicollinearity, the predictor variables paradoxical thinking, reflective learning, and context responsiveness were mean centred, thus estimates represented the effect of one predictor when mean values of other predictors were held equal (Shieh, 2011). In multinomial logistic regression the odds ratio represents the change in the odds of belonging to the comparison cluster compared to the reference cluster with each unit increase in the predictor, the odds ratio representing an effect size (Meyer et al., 2013). Odds ratios > 1 (positive logistic regression coefficients) indicate the relative

likelihood of belonging to the comparison cluster rather than the reference cluster increases as the predictor score increases, with larger values equalling a greater positive effect. Odds ratios < 1 (negative logistic regression coefficients) indicate the relative likelihood of belonging to the comparison cluster relative to the reference cluster decreases as the predictor score increases, with values closer to zero equalling a greater negative effect or increasing the likelihood of belonging to the reference cluster (Meyer et al., 2013). For example, with reflective learning or context responsiveness a negative odds ratio which is closer to zero is indicative of a greater likelihood of membership of the high ambidexterity cluster.

Each predictor variable was entered individually (Table 5). The reference level for the cluster category was high ambidexterity (cluster 2). Comparing the three predictor variables individually, paradoxical thinking did not contribute significantly to predicting the odds of belonging to cluster 1, 3, or 4 (favouring exploring, favouring exploiting, or moderate ambidexterity) relative to the odds of belonging to cluster 2 (high ambidexterity); hypothesis 1 was not supported. Reflective learning individually contributed significantly to predicting the odds of belonging to cluster 1 and 3 relative to the odds of belonging to cluster 2, although it did not contribute significantly to predicting the odds of belonging to cluster 4 relative to cluster 2. An individual's level of reflective learning has the potential to be a factor in distinguishing between high ambidexterity and favouring exploration, odds ratio (OR) = 0.31, and favouring exploitation, OR = 0.14, however it lacks the potential to be a distinguishing factor between high ambidexterity and moderate ambidexterity; hypothesis 2 was partially supported with respect to reflective learning behaviour. Context responsiveness individually contributed significantly to predicting the odds of belonging to cluster 1, cluster 3, or cluster 4 relative to cluster 2. An individual's level of context

responsiveness has the potential to be a factor in distinguishing between high ambidexterity

and the other three manager ambidexterity clusters (moderate ambidexterity, OR = 0.21,

favouring exploring, OR = 0.14, and favouring exploiting, OR = 0.04); hypothesis 2 was

supported with respect to context responsiveness behaviour.

Table 5
Summary of Multinomial Logistic Regressions (One Predictor per Analysis)

Ambidexterity Cluster	Predictor	b(*SE*)	Odds Ratio	p
1 - 2	Paradoxical Thinking	-0.18(0.60)	0.83	.76
3 - 2	Paradoxical Thinking	-0.95(0.59)	0.38	.11
4 - 2	Paradoxical Thinking	-0.41(0.53)	0.66	.44
1 - 2	Reflective Learning	**-1.18(0.58)***	**0.31**	**.04**
3 - 2	Reflective Learning	**-1.95(0.58)***	**0.14**	**<.001**
4 - 2	Reflective Learning	-0.96(0.51)	0.38	.06
1 - 2	Context Responsiveness	**-1.96(0.69)****	**0.14**	**.005**
3 - 2	Context Responsiveness	**-3.35(0.75)***	**0.04**	**<.001**
4 - 2	Context Responsiveness	**-1.54(0.60)***	**0.21**	**.01**

Note: Cluster 1 = favouring exploring, cluster 2 = high ambidexterity, cluster 3 = favouring exploiting, and cluster 4 = moderate ambidexterity. Reference group is high ambidexterity. b = estimate, *SE* = standard error, p = probability. *$p < .05$, **$p < .01$, *** $p < .001$.

A hierarchical stepwise multinomial logistic regression was conducted with

paradoxical thinking, reflective learning, and context responsiveness to predict manager

ambidexterity (high levels of both exploitative and explorative activity) (Table 6). The order

for inclusion of the predictor variables for the stepwise regression aligned with the

hypotheses regarding the relationship between the level of the predictor variables

(paradoxical thinking, reflective learning, and context responsiveness) and the likelihood of

exhibiting high ambidexterity. Inclusion of reflective learning to a model that included

paradoxical thinking significantly contributed to predicting the odds of belonging to cluster 2

(high ambidexterity) relative to belonging to cluster 1 (favouring exploring) and cluster 3

(favouring exploiting); χ^2 (N = 151,6) = 14.39, *p* = .03. Reflective learning did not significantly

contribute to predicting the odds of belonging to cluster 2 relative to cluster 4 (moderate

ambidexterity). When all three predictors were included in the model, context

responsiveness uniquely and significantly contributed to predicting the odds of belonging to

cluster 1 (favouring exploring), cluster 3 (favouring exploiting), and cluster 4 (moderate

ambidexterity) relative to cluster 2 (high ambidexterity); χ^2 (N = 151,9) = 29.48. *p* < .01.

Context responsiveness suppressed the effect of reflective learning, becoming the sole

significant predictor; an individual's level of context responsiveness has the potential to be a

factor in distinguishing between high ambidexterity and moderate ambidexterity, and

between high ambidexterity and favouring exploration. Further, context responsiveness has

the potential to strongly distinguish between high ambidexterity and favouring exploitation.

Overall, the integrator role behaviours which link to the ability to scan the environment and

adapt are predictive of high ambidexterity.

Table 6
Multinomial Logistic Regressions Predicting Ambidexterity

Ambidexterity Cluster	Predictor	b (*SE*)	Odds Ratio	p
Model 1				
1 - 2	Paradoxical Thinking	-.19(0.61)	0.83	.76
3 - 2	Paradoxical Thinking	-1.11(0.60)	0.33	.07
4 - 2	Paradoxical Thinking	-.39(0.54)	0.67	.46
Model 2				
1 - 2	Paradoxical Thinking	0.41(0.66)	1.50	.54
	Reflective Learning	**-1.32(0.64)***	**0.27**	**.04**
3 - 2	Paradoxical Thinking	-0.40(0.65)	0.67	.54
	Reflective Learning	**-1.79(0.63)****	**0.17**	**.005**
4 - 2	Paradoxical Thinking	0.05(0.57)	1.05	.92
	Reflective Learning	-0.99(0.57)	0.37	.08
Model 3				
1 - 2	Paradoxical Thinking	0.42(0.67)	1.52	.53
	Reflective Learning	-0.50(0.71)	0.60	.48
	Context Responsiveness	**-1.77(0.81)***	**0.17**	**.03**
3 - 2	Paradoxical Thinking	-0.32(0.68)	0.72	.63
	Reflective Learning	-0.64(0.71)	0.52	.37
	Context Responsiveness	**-2.98(0.84)*****	**0.51**	**<.001**

4 - 2	Paradoxical Thinking	0.05(0.57)	1.06	.92
	Reflective Learning	-0.30(0.64)	0.74	.64
	Context Responsiveness	**-1.44(0.71)***	**0.24**	**.04**

Note: Cluster 1 = favouring exploring, cluster 2 = high ambidexterity, cluster 3 = favouring exploiting, and cluster 4 = moderate ambidexterity. Reference group is high ambidexterity. b = estimate, *SE* = standard error, p = probability. * *p* < .05, ***p* < .01, *** *p* < .001.

Discussion

The capacity for organisations to exhibit ambidexterity has been shown to be beneficial for ensuring stability and sustainability and pursuing innovation, flexibility and competitive advantage (Birkinshaw & Gupta, 2013; March, 1991). The individual freedom and ability to self-select and execute exploiting and exploring activities in response to contextual demands and expectations is an important factor which can contribute to organisational ambidexterity (Gibson & Birkinshaw, 2004; van Assen, 2020). Engaging in exploiting and exploring behaviour creates paradoxical tensions, which need to be navigated, thus gaining an insight into individual and contextual factors which may influence the capacity for ambidexterity and the ability to manage potential tension will benefit individuals and organisations alike. In an attempt to understand contributing factors, this study set out to explore manager ambidexterity as a function of paradox and leader role behaviours. Specifically, the relationship of paradoxical thinking, and the integrator role behaviours of reflective learning and context responsiveness, with manager ambidexterity.

The present study found empirical support for previous research suggesting a duality of exploiting and exploring behaviours underlying manager ambidexterity, and manager ambidexterity variation based on individual factors, and to a lesser extent on occupational factors. Exploratory factor analysis indicated two correlated factors representative of exploitation and exploration behaviour (Mom et al., 2009), suggesting the behaviours being mutually inclusive rather than opposing ends of a continuum (Gupta et al., 2006). Exploiting

and exploring behaviours compliment, clarify, and support each other, contributing to accommodating and managing differing objectives and goals associated with contextual demands and expectations (Cunha et al., 2019; Rosing & Zacher, 2017; Wilms et al., 2019). Ambidextrous managers appear to have the capability to utilise both behaviours, whether simultaneously or in rapid succession (Gupta et al., 2006; Mom et al., 2009). The results of the *k*-mean cluster analysis revealed differences in the levels of exploiting and exploring behaviours between manager ambidexterity clusters, some individuals exhibiting both behaviours to moderate or high levels, while others favouring exploiting or exploring. These findings were consistent with previous research exploring business unit ambidexterity suggesting four categories or clusters of manager ambidexterity: favouring exploitation, favouring exploration, moderate ambidexterity (average levels of both behaviours), and high ambidexterity (high levels of both behaviours) (Gibson & Birkinshaw, 2004).

In contrast to previous research findings, the present study found although those who were highly ambidextrous exhibited above average levels of both exploiting and exploring behaviours, exploiting behaviour out competed exploring behaviour. Gibson and Birkinshaw (2004) suggest environmental and organisational contexts influence the encouragement and support of individuals making choices and prioritising exploiting and exploring behaviour, consequently the present study's results may reflect contextual influences. Gibson and Birkinshaw's (2004) study included responses from senior and mid-level managers from ten multinational organisations spanning a range of industries, excluding lower-level line managers and non-management employees. The present study included responses from senior-, mid-, and low-level management employees. This potentially influenced the balance of exploiting and exploring behaviour exhibited within

the high ambidexterity cluster, and the only slightly higher levels of exploring behaviour in the high ambidexterity cluster compared to the moderate ambidexterity cluster.

Contextual factors which increase uncertainty may potentially influence the dimensions of manager ambidexterity[2]. Uncertainty in an organisation's environment has been shown to have the potential to elicit both exploiting and exploring behaviour (Turner et al., 2016). At both the organisational and individual level, exploiting behaviours may be favoured over exploring behaviours to ensure stability and continuity in the face of uncertainty. Another possible explanation, is those who exhibit ambidexterity have a greater ability to tolerate uncertainty therefore they can activate exploiting behaviours which are 'tried and true' providing stability and activate exploring behaviours for innovation to enhance flexibility and agility (Bell & Hofmeyr, 2021; Priyono et al., 2020). Overtime however, increasing contextual uncertainty may reduce taking a positive approach toward contextual demands and expectations, resulting in an increase in stress, a decrease in perceptions of control, and tipping the balance in favour of exploiting over exploring behaviour even for ambidextrous managers (Boulamatsi et al., 2021; König et al., 2020; Turner et al., 2016).

The present study explored manager ambidexterity in the public healthcare sector, where healthcare innovation is often tasked to research institutes and universities (Ministry of Health, 2020). Innovations are introduced into the wider public health system once developed, thus reducing risks and costs. This policy may bias toward exhibiting exploiting behaviours which can aid in the smooth and seamless embedding of innovation as new

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[2] During the study there were two significant events which may have influenced managers within this healthcare organisation. Firstly, the ongoing COVID-19 pandemic, and secondly the abolition of the District Health Board structure which was established in January 2001 (Ministry of Health, 2016). Both events have the potential to influence an organisations support and encouragement of ambidexterity but also individual choices and prioritising of exploiting and exploring behaviours.

algorithms and protocols. Further, publicly funded healthcare agendas are developed externally by central government, with senior management within the healthcare system tasked with implementation. These agendas are associated with targets, compliance, and assurance requirements (Burgess et al., 2015). As such, the leveraging characteristics of exploiting behaviours which refine and maximise for efficiency may increase the likelihood of achieving set requirements and securing ongoing resourcing (Burgess et al., 2015). That may partly explain exploiting behaviour out competing exploring behaviour.

Cluster analysis revealed only a small percentage of the sample exhibited high ambidexterity, of which three-quarters were patient care/department managers, or mid-level management. These findings may reflect mid-level management benefiting from being highly ambidextrous, as they often experience tensions created by the necessity to translate strategy and directives from senior management into operational terms for lower-level positions. By necessity an operational rather than strategic orientation may dominate to facilitate translation and manage frontline tensions (Burgess et al., 2015; Prieto-Pastor & Martin-Perez, 2015; Tempelaar & Rosenkranz, 2019). Interestingly, three quarters of those in the high ambidexterity cluster were also clinical managers. Previous literature suggests ambidextrous managers exhibit characteristics such as multitasking, seeking opportunities outside job boundaries, and building linkages with others to combine talents. These characteristics align with generalisation rather than specialisation, increasing their flexibility and ability to divide their time between exploiting and exploring behaviour (Birkinshaw & Gibson, 2004; Burgess et al., 2015; Mom et al., 2009). Compared to colleagues who are healthcare professionals without management responsibilities, and to non-clinical professional managers, clinical managers likely have a greater diversity of interfaces

spanning professional, status, and power differences which increases generalisation and exhibiting high ambidexterity (Burgess et al., 2015).

It was predicted manager ambidexterity was positively associated with paradoxical thinking. Overall findings of the study indicated paradoxical thinking did not significantly predict manager ambidexterity. This was surprising, as manager ambidexterity is the capability to demonstrate equally well exploiting and exploring behaviour by accepting and integrating conflict and contradiction, thus paradox (Gibson & Birkinshaw, 2004; Jarzabkowski et al., 2013; Mom et al., 2009). The lack of support for paradoxical thinking as a predictor of manager ambidexterity found in the present study, may be due to the scale's limitations. Although the scale items incorporated the essence of accepting paradox and integrating seemingly conflicting and contradictory activities by using the wording '*while simultaneously*', the items did not fully capture actual integration. Further, the scale was developed to explore the relationship of paradoxical thinking with innovative behaviour in family firms but has not been validated in other organisations and sectors (Ingram et al., 2016).

The underlying complexity of elements which contribute to paradox may also have contributed to paradoxical thinking not significantly predicting manager ambidexterity. Ingram et al. (2016) found paradoxical thinking positively impacts innovation, whereas paradoxical tensions negatively impact innovative behaviour. Current literature suggests there is a natural tendency to favour 'either/or' rather than 'both/and' solutions to avoid paradoxical tensions, thus impacting paradoxical thinking and managerial ambidexterity (Cunha et al., 2019).

The current study also found a duality of behaviours within the integrator role. Exploratory analysis of the integrator role found items loaded onto two factors, one factor

reflecting behaviours consistent with reflective learning, the other consistent with context responsiveness. This contrasted with previous research which found a single factor with behaviours described as encompassing reflective learning and critical assessment (Vilkinas & Cartan, 2001). Findings revealed reflective learning was higher in the high and moderate ambidexterity groups compared to those favouring exploiting, while context responsiveness was higher for individuals exhibiting high ambidexterity compared to other manager ambidexterity clusters. Lower levels of reflective learning in those favouring exploiting may reflect the underlying focus of exploiting behaviour on refinement, maximising efficiency, and reducing risk. The necessity to learn from experience is perhaps less important with exploiting behaviour as the behaviour is based on utilising the known (Vilkinas & Cartan, 2001).

Both integrator role behaviours significantly contributed to predicting manager ambidexterity. Reflective learning is the basis for the design of actions to achieve certain outcomes, with the continual monitoring of actions for effectiveness and consequences (reflecting) producing learning (Greenwood, 1998). Reflecting on the match between role behaviour selection and context demands enables refining and maximising experience for the present (exploiting) but also making discoveries (exploring) (Greenwood, 1998; Papachroni & Heracleous, 2020). Reflective learning allows critiquing perspectives taken and going beyond assumptions considered to be the norm (Gray, 2007; Papachroni & Heracleous, 2020).

Context responsiveness has been defined as the capability of an individual to interact with the environment utilising observation of self and others, and feedback, to adapt in response to evolving contextual conditions (Sabiescu, 2020). The ability to accurately assess, process, and respond to contextual information, including that emanating

from oneself or others, contributes to selecting behaviours to achieve outcomes and guides

managers in matching roles with contexts (Mayer et al., 2008; Vilkinas & Cartan, 2001;

Vilkinas & Ladyshewsky, 2012). This aligns with the underlying characteristics of being

ambidextrous; flexible yet consistent, adaptable yet reliable. Previous research suggests

managers at the frontline achieve ambidexterity through their ability to continually assess

and respond to organizational contexts (Zimmerman et al., 2018). The ability to

demonstrate high levels of context responsiveness likely increases matching leader roles

with contextual demands leading to leader effectiveness, thus contributing to managerial

ambidexterity (Vilkinas et al., 2020). The integrator role behaviours contribute uniquely to

managerial ambidexterity, with reflective learning being a mechanism for integrating

exploiting and exploring behaviours, and context responsiveness an indicator of this

integrating capacity (Zaccaro et al., 2018).

Although reflective learning and context responsiveness both contributed to

predicting manager ambidexterity, context responsiveness contributed above and beyond

reflective learning. A possible explanation for this is that context responsiveness utilises an

individual's organisational capital (position in the organisational structure/system), social

capital (relationship networks and knowledge within), and human capital (individual

capabilities such as emotional and social intelligence) (Turner et al., 2013). Context

responsiveness thus enables managing emotions, potentially negative, generated by the

tensions associated with exhibiting both exploiting and exploring behaviour. Further, it can

counter resistance to switching behaviours created when individuals lack autonomy to self-

select exploiting or exploring behaviour (Bidmon & Boe-Lillegraven, 2020; Cunha et al.,

2019, Tempelaar & Rosenkranz, 2019). Reducing negative emotions, tension, and resistance

may influence the calculation of the subjective utility value of outcomes associated with

exploiting and exploring activity, thus enhancing ambidexterity (Bidmon & Boe-Lillegraven, 2020; Leith & Baumeister, 1996; Miron-Spektor et al., 2018). Reflective learning is an important capability for manager ambidexterity, enabling utilising the past for the present which influences the future. However, context responsiveness is a capability that enables an individual to interact with their environment, and utilise and leverage their organisational, social, and human capital. Together they enable the development and enactment of a repertoire of leader roles in response to contextual demands, thus facilitating managerial ambidexterity.

Limitations

Several limitations are associated with the present study. The study relied on a cross-sectional design thus preventing establishing the causality between the variables of interest and the outcome variable manager ambidexterity. The study is one of the first studies to explore manager ambidexterity as a function of reflective learning and context responsiveness, therefore a longitudinal design could better capture mutually influencing dynamics among integrator behaviours, ambidexterity, and changing contextual demands. Future studies could explore the relationships with a longitudinal study design.

Data was gathered using a self-report survey. A potential issue with self-report survey is social desirability bias, or the tendency to answer in ways which overrate favourable behaviour and underrate less desirable behaviour (Kwak et al., 2021). This can occur despite anonymity assurances, which were provided within the general information given to respondents. Obtaining ratings from superiors and subordinates for comparison would be beneficial toward reducing social desirability bias (Podsakoff et al., 2012). Future studies could obtain ratings from superiors, colleagues, and subordinates directly in contact

with the manager, such as superiors no more than two levels above the manager and team members, to enable comparing self and other ratings of ambidexterity.

Common method bias, or biasing effects on estimates of relationships of constructs due to the same method being used to measure the constructs, may have occurred. Proximal and psychological separation were employed in an attempt to reduce the likelihood of bias (Kock et al., 2021; Podsakoff et al., 2012). Proximal separation uses spatial separation to increase the distance between measures. For example, the Paradoxical Thinking Scale was combined in a panel with another scale titled 'managerial style and views of work'. Psychological separation provides a cover for the purpose of the survey to reduce respondents deducing what the study is exploring (Koch et al., 2021; Podsakoff et al., 2012). Respondents were informed the purpose of the study was to examine reactions to the Leadership Training Programme, along with changes in leaders' levels of confidence and competence around the areas covered in the modules. A longitudinal design in future studies would also introduce temporal separation, or the collection of data at two separate time points, to enable comparing predictor – criterion variable ratings (Podsakoff et al., 2012).

The scales used in the study were also not without limitations. The original Manager Ambidexterity scale was developed using a sample derived from five large firms ranked in the top 25 of the Fortune Global 500 (2007) (Mom et al., 2009), impacting the scales ecological validity. Mom et al. (2009) suggested these firms likely experienced short-term competitive pressures requiring focusing on activities with short-term goals to contend with this competition. The public healthcare sector lacks competitive pressure, hence underlying drivers for short- and long-term goals likely differ. Within the business sector drivers for defining short- and long-term goals include the market, technology, and competition (Mom

et al., 2009), whereas within healthcare, and especially public healthcare, drivers include the level of public funding available and clinical outcomes. A short-term goal with a clinical outcome may be very different to a business perspective of a short-term goal, and indeed differ between clinical and non-clinical managers.

Finally, the sample size of the present study also was a limitation. The sample size in the present study was small, 152 respondents, consequently impacting the statistical power for detecting an effect of a given magnitude (DeVellis, 2017). Based on Comrey, a sample size of 200 would be required for a factor analysis involving 24 items, as in this study (DeVellis, 2017, p.203). A larger sample size of 200 may have provided empirical evidence of reflective learning being a significant distinguishing factor between high ambidexterity and moderate ambidexterity in Model 2, as in Model 3.

Implications and Directions for Future Research

There are several avenues future research could pursue to further understanding of manager ambidexterity. Firstly, future studies could explore manager ambidexterity between public and private sectors, and across industries, including knowledge intensive organisations. The private healthcare sector is generally thought to be more efficient and effective in delivering healthcare due to the demands and expectations of patients. Private hospitals have incentives to maximise profits as financial surplus is retained in comparison to public hospitals where surpluses may be reinvested in the organisation or returned to government (Jabnoun & Chaker, 2003; Moscelli et al., 2018). These contextual factors may have an important and substantial influence on manager ambidexterity by changing the balance and level of both exploiting and exploring behaviours, even when comparing public and private healthcare delivery (Birkinshaw & Gibson, 2004).

Further investigation is required with respect to the influence of clinical and non-clinical manager role characteristics on manager ambidexterity. Previous research suggests high educational levels may be associated with increasing managerial ambidexterity (Kang & Snell, 2009; Mom et al., 2009; Mom et al., 2015; Papadakis et al., 1998). As educational levels increase cognitive ability increases, influencing factors such as development and utilisation of leader roles, as well as potential for organisational seniority and wider spans of control (Burgess et al., 2015; Mom et al., 2009; Mom et al., 2015). As educational levels increase expertise also increases, which in turn increases specialisation. However, increasing expertise may constrain exposure to different knowledge and information, negatively influencing the development of ambidexterity (Mom et al., 2009; Mom et al., 2015). Findings suggest as individuals become more specialised so too their mental models to which contextual stimuli are matched. This potentially limits flexibility in matching behaviours with context, reducing ambidexterity. The converse occurs with generalists whose mental models are less defined thus allowing greater behavioural flexibility and increased ambidexterity (Tempelaar & Rosenkranz, 2019). With respect to clinical managers, all clinical managers will have tertiary level professional qualifications by virtue of being a healthcare professional, which at a minimum is likely a bachelor level qualification. Their continuing professional development increases specialisation and moving from being generalists to specialists. With respect to non-clinical managers, conversely higher tertiary level professional qualifications, such as a Master of Business Administration, may further increase generalisation and managerial ambidexterity. Future studies could explore manager ambidexterity of clinical managers and non-clinical managers with respect to the potential influence of increasing specialisation or generalisation associated with post-

graduate qualifications. Thusly, education level and expertise are separate but interlinked

factors which may potentially influence managerial ambidexterity.

Finally, more research is required to fully explore manager ambidexterity as a

function of accommodating and managing paradox. The present study did not support

paradoxical thinking influencing manager ambidexterity, however the ability to

accommodate and manage paradox is likely complex and multidimensional. Future research

could provide greater insight into the relationship between paradox and manager

ambidexterity capability by exploring the influence of the perception of paradoxical tensions

alongside paradoxical thinking.

Practical Implications

The findings of this study offer insights for organisations and individuals alike.

Organisations should be mindful they have the potential to influence individual and

organisational ambidexterity at both the macro- and micro-level. For example, at the macro-

level organisations may enhance and support manager ambidexterity through a structural

approach. By tasking business units and/or teams with specific exploiting and exploring

activities, individuals within these units and/or teams then have opportunity to hone and

strengthen their capabilities to balance and switch between exploiting and exploring

behaviours (Caniëls & Veld, 2019; Mom et al., 2019; Prieto-Pastor & Marin-Perez, 2015;

Swart et al., 2019). At the micro-level, organisations can embed a culture which fosters,

supports, and normalises exploiting and exploring activity as part of leadership

(Antonacopoulou, 2006; Gibson & Birkinshaw, 2004; Khan & Mir, 2019; Rosing et al., 2011;

Swart et al., 2019; Wang & Rafiq, 2014). For instance, organisational cultures which

empower individuals to autonomously select and execute aligning or adapting activities,

may in turn positively contribute to developing intrinsic motivation toward developing

ambidexterity both as individuals and for the organisation overall (Caniëls & Veld, 2019;

Swart et al., 2019).

Previous research suggests human resource practices, including on-the-job

development, coaching, mentoring, and specific training programmes, contribute to

developing managerial ambidexterity by clarifying contextual information and demands for

improving strategy utilisation: this occurs over time (Anthony, 2017; Bowles et al., 2007; Day

& Dragoni, 2015; Mom et al., 2019; Santos et al., 2015). Other factors also contribute to

manager ambidexterity, including organisational factors such as organisational structure,

culture, climate, and social relationships (Junni et al., 2015), and individual occupational

factors such as educational background and level, leadership styles and characteristics,

career ambitions and stage, and drivers such as self-efficacy and learning orientation (Junni

et al., 2015). Organisations should be mindful of human resource practices which could

influence these factors, thus positively contribute to managerial ambidexterity

development.

The findings from the current study suggest individual development of skills and

competencies for reflective learning and context responsiveness could also benefit

individual ambidexterity. Consequently, organisations have an opportunity to incorporate

reflective learning and context responsiveness skill and competency training into leader

training programmes. Such skill and competency training would support team reflexivity,

whereby team members can improve and refine knowledge and work processes by

reflecting on team and individual goals and strategies (Matsuo, 2018). Together, an

organisational structural approach which can support honing and developing skills and

competencies for developing individual ambidexterity, plus a culture which embeds

manager ambidexterity across all hierarchical levels, should enhance talent management, succession planning, and contribute to organisational ambidexterity.

Conclusion

For organisations and individuals alike, ambidexterity is a valuable capability. It enables contending with the dynamic and changeable environment of today. At a micro-level manager ambidexterity enables maximising potential benefits to be gained from contextual demands and expectations, while at a macro-level it contributes to achieving organisational stability and sustainability but also flexibility and agility. The current study explored whether paradoxical thinking, reflective learning, and context responsiveness would be positively associated with manager ambidexterity. The findings suggest reflective learning and context responsiveness contribute to manager ambidexterity, reflective learning being a mechanism for developing ambidexterity and context responsiveness the capability for demonstrating ambidexterity. This study has extended the existing body of literature on the antecedents of manager ambidexterity, with new insights into the positive influence of reflective learning and context responsiveness on manager ambidexterity. The study suggests manager ambidexterity can be supported, fostered, and empowered by organisations at the macro- and micro-level to provide individuals and the organisation overall with positive outcomes and benefits.

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Appendices

Appendix A

Table 1

Competing Values Framework Roles, Integrated Competing Values Framework Roles, and Behaviour Repertoires Associated with Leader Roles

Competing Values Framework Roles	Integrated Competing Values Framework Roles	Behaviour Repertoire
Innovator	Innovator	Explores potential for innovation and improvement Envisions a future not yet a reality Encourages and supports change
Broker	Broker	Secures resources for team/unit Upwardly influences using political astuteness Networks to maintain team/unit legitimacy
Monitor	Monitor	Collects, analyses, and compares data Disperses information Creates stability and continuity
Producer Director Coordinator	Deliverer	Task and achievement oriented Motivates to achieve objectives Sets goals and expectations Clarifies roles and priorities Directs workflow Schedules, coordinates, problem solves Rule and standard oriented
Facilitator Mentor	Developer	Participatory decision making Seeks consensus, negotiates compromise Displays empathy and concern toward individuals Attempts to facilitate individual development Fair and supports legitimate requests
	Integrator	Process and integration oriented Critically observes and interprets environment Self-diagnoses personal strengths/limitations Facilitates learning and adapting to environment based on previous experiences

Note: Adapted from Vilkinas and Cartan (2001, 2006).

Appendix B – Information and Consent to Participate in Research

Objective: To Evaluate the Canterbury and West Coast DHBs' Leadership Programme, Te Huarahi Hautū. _Two surveys (baseline and post-training) will be used to examine reactions to the training, along with changes in leaders' levels of confidence and competence around the areas covered in the modules._

Time commitment: If you choose to take part in the training evaluation project, your involvement consists of the completion of two online surveys: one before the programme starts (baseline), and one right after the Leading Self and Others modules are completed (post-training). Each survey will take about 20 minutes to complete.

Research team: The evaluation of the Leadership Development Programme is coordinated by Associate Professor Joana Kuntz with University of Canterbury. The evaluation will be divided into smaller research projects focusing on specific areas of the training (e.g., leader communications, coaching, strategic management, and leading diverse teams), carried out by Lucas Hill, Susan Budge, Sheridan Jackson, and Courtney Townsend as part to their requirements to complete their MSc in Applied Psychology.

Participant rights and risks: Participation is voluntary, and you have the right to withdraw at any stage without penalty by closing the browser. Incomplete surveys will not be used for analysis. Some of the questions may concern sensitive issues, such as difficult conversations with the team or your confidence as a leader. While it is unlikely that you will experience significant distress from answering these questions, you can withdraw from the study if you feel uncomfortable. If you require further assistance, you may contact Lifeline (0800 543 354), your local GP, or call 0800 327 669 for your nearest EAP service provider.

Confidentiality: You are assured of complete confidentiality for all data gathered in this investigation. No one aside from the UC research team will know whether you have elected to participate, and what you responded to the survey. Now raw data will be shared with the DHBs. Data will be gathered via Qualtrics, stored on a password-protected computer located at UC, and accessible only to the principal researcher and her team. The identifier used to link the two surveys (your email address) will be deleted prior to analyses. At the end of the project, the DHBs will receive a report that will only include a generalised summary of findings and not include respondent identities. A thesis is a public document and will be available through the UC Library.
This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

I understand what is required of me if I agree to take part in the research.

I understand that participation is voluntary, and I may withdraw at any time without penalty Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.

I understand that any information or opinions I provide will be kept confidential and that any published or reported results in journal articles or conference papers will not identify the participants or their place of employment.

I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after ten years.

I understand the risks associated with taking part and how they will be managed.

I understand that I can contact the principal researcher Joana Kuntz at joana.kuntz@canterbury.ac.nz for further information. If I have any concerns, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@ canterbury.ac.nz).

By clicking "next" I am consenting to participate in the study.

Appendix C – Study Measures

Paradoxical Thinking Scale
Source: Ingram, A. E., Lewis, M. W., Barton, S., & Gartner, W. B. (2016). Paradoxes and innovation in family firms: The role of paradoxical thinking. *Entrepreneurship Theory and Practice, 40*(1), 161-176. https://doi.org/10.1111/etap.12113

Scale items:
1. It is possible to maintain and develop our core competencies, while simultaneously creating new innovations.
2. It is possible to embrace successful standard operating procedures, while simultaneously changing to meet the demands of the current environment.
3. It is possible to emphasise efficiency and standardisation of work processes, while simultaneously looking for new ways to do things and identifying opportunities.

Note: Response choices: (1) Strongly disagree, (2) Disagree, (3) Neither disagree nor agree, (4) Agree, and (5) Strongly agree.

Manager Ambidexterity Scale
Source: Mom, T. J. M., van den Bosch, F. A. J., & Volberda, H. W. (2009). Understanding variation in managers' ambidexterity: Investigating direct and interaction effects of formal structural and personal coordination mechanisms. *Organization Science (Providence, R.I.), 20*(4), 812-828. https://doi.org/10.1287/orsc.1090.0427

As a team leader …
Explorative behaviour scale items:
1. I evaluate diverse options with respect to services and processes.
2. I focus on ways to renew services and processes.
3. I engage in work activities that require significant adaptability.
4. I engage in activities requiring me to learn new skills or knowledge.
5. I explore options that are not yet clearly part of the organisational policy.
Exploitative behaviour scale items:
1. I engage in activities I can properly conduct by using my present knowledge.
2. I engage in activities of which it is clear how to conduct them.
3. I engage in activities relative to which I have a lot of experience.
4. I engage in activities primarily focused on short-term service delivery goals.
5. I engage in activities which clearly fit into existing organisational policy.

Note: Response choices: (1) Does not describe me, (2) Describes me slightly well, (3) Describes me moderately well, (4) Describes me very well, and (5) Describes me extremely well.

Items excluded from the 14-item exploitative behavioural scale:

I carry out activities as if they were routine.

I engage in activities which serve existing (internal) customers with existing services/products.

Items excluded from the 14-item explorative behavioural scale:

I search for new possibilities with respect to products/services, processes, or markets.

I engage in activities of which the associated yields or costs are currently unclear.

Integrated Competing Values Framework Instrument (Integrator Role)

Source: Vilkinas, T., Murray, D. W., & Chua, S. M. Y. (2020). Effective leadership: Considering the confluence of the leader's motivations, behaviours and their reflective ability. *Leadership & Organization Development Journal, 41*(1), 147-163. https://doi.org/10.1108/LODJ-12-2018-0435

As a team leader, I feel confident engaging in the following work-related roles…

Integrator Role scale items:

1. Learning after reflecting on past behaviours.

2. Changing behaviour after reflection.

3. Responding to others in an appropriate manner.

4. Accurately reading the signals of the team and team environment.

5. Adapting a range of styles/responses to different situations.

6. Focusing on the most important signals from the team and team environment.

Note: Adapted from Vilkinas et al. (2020). Response choices: (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree.

Workload Scale

Source: Laurence, G. A., Fried, Y., & Raub, S. (2016). Evidence for the need to distinguish between self-initiated and organizationally imposed overload in studies of work stress. *Work and Stress, 30*(4), 337-355. https://doi.org/10.1080/02678373.2016.1253045

1. I am required by my organisation to take on too much at work.

2. I am required by my organisation to take on too many responsibilities at work.

3. I am required by my organisation to be involved in too many initiatives at work.

4. I am being pushed to work too hard by my organisation.

5. I have to work too fast to complete all the work that is required of me.

Note: Response choices: (1) Strongly disagree, (2) Disagree, (3) Neither disagree nor agree, (4) Agree, and (5) Strongly agree.

Appendix D - Factor Loadings and % of Variance for Paradoxical Thinking, Manager Ambidexterity, and Leader Role Repertoire Constructs

Table D1

Item Loading and Communalities for Paradoxical Thinking

Item	Factor 1
It is possible to maintain and develop our core competencies, while simultaneously creating new innovations (1).	.86
It is possible to embrace successful standard operating procedures, while simultaneously changing to meet the demands of the current environment (2).	.86
It is possible to emphasise efficiency and standardisation of work processes, while simultaneously looking for new ways to do things and identifying opportunities (3).	.83
Eigenvalue	2.17
Percentage of variance (after extraction)	72.45

Note: Principal component analysis, varimax rotation.

Table D2

Initial Item Loadings, Final Item Loadings, and Communalities for Manager Ambidexterity

Item	Factor 1 Initial (Explore)	Factor 2 Initial (Exploit)	Factor 1 Final (Explore)	Factor 2 Final (Exploit)
I focus on ways to renew services and processes (2).	.83		**.83**	
I explore options that are not yet clearly part of the organisational policy (5).	.78		**.78**	
I evaluate diverse options with respect to services and processes. (1).	.75		**.75**	
I engage in work activities that require significant adaptability (3)	.75		**.75**	
I engage in activities requiring me to learn new skills or knowledge (4)	.69		**.69**	
I engage in activities of which it is clear how to conduct them (2)		.87		**.91**
I engage in activities relative to which I have a lot of experience (3)		.86		**.88**
I engage in activities I can properly conduct by using my present knowledge (1)		.78		**.80**
I engage in activities which clearly fit into existing organisational policy (5)		.72		**.69**
I engage in activities primarily focused on short-term service delivery goals (4)		.45		
Eigenvalues	2.95	2.88	**2.92**	**2.76**
Percentage of variance (after extraction)	29.54	28.81	**32.49**	**30.65**

Note: Principal component analysis, varimax rotation.

Table D3

Item Loadings and Communalities for Integrator Role

Item	Factor 1 CR	Factor 2 RL
Learning after reflecting on past behaviours (1).		**.89**
Changing behaviour after reflection (2).		**.88**
Using a range of styles/responses to different situations (5).	**.83**	
Focusing on the most important signals from the team and the team environment (6).	**.81**	
Accurately reading the signals of the team and the team environment (4).	**.80**	
Responding to others in an appropriate manner (3).	**.52**	.43
Eigenvalues.	2.33	1.87
Percentage of variance (after extraction).	39.00	31.18

Note: Principal component analysis, varimax rotation. CR = Context Responsiveness, RL = Reflective Learning.

Table D4

Item Loading and Communality for Workload

Item	Factor 1
I am being pushed to work too hard by my organisation (Item 4).	.91
I am required by my organisation to take on too many responsibilities at work (Item 2).	.90
I am required by my organisation to be involved in too many initiatives at work (Item 3).	.85
I am required by my organisation to take on too much at work (Item 1).	.85
I have to work too fast to complete all the work that is required of me (Item 5).	.78
Eigenvalues.	3.71
Percentage of variance (after extraction)	74.20

Note: Principal component analysis, varimax rotation.